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Completion of UK's biggest ever  
coastal realignment scheme -  
Page 20



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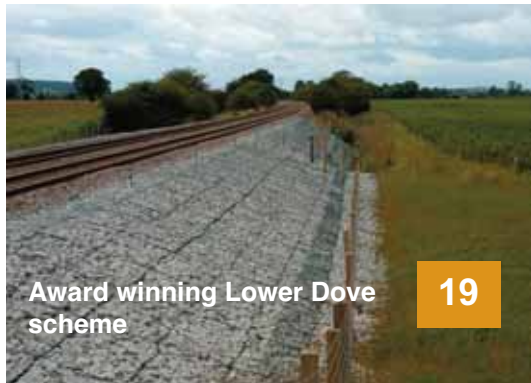
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# Flood Risk



## Managing Water Magazine and the FADS Directory are pleased to introduce Mike Humphrey



Mike joins FADS as Business Development Manager and will help associates and subscribers to get the most from the FADS Directory and Managing Water magazine. Mike has over 40 years of marketing and PR experience in the Flood Defence, Water Level Management and Agricultural industries and brings experience and ability to oversee the future development of FADS and Managing Water.

*"The FADS Directory offers a great opportunity for product and service providers to get themselves in front of industry decision makers and specifiers at a very reasonable cost. I very much look forward to working with existing supporters and contributors to the site, and magazine, as well as generating and supporting new clients. Please feel free to contact me"*

Mike

Contact Mike by email at [mike@fadsdirectory.com](mailto:mike@fadsdirectory.com) or Telephone: 0845 2 575 575

## Liz Truss appointed Environment Secretary



Liz Truss has replaced Owen Paterson as Environment Secretary, in the second phase of David Cameron's reshuffle gets.

Liz entered Parliament in 2010 and is the Conservative MP for South West Norfolk. She was appointed Parliamentary Under Secretary of State for Education and Childcare in September 2012.

Elizabeth was previously Deputy Director at Reform. She also worked in the energy and telecommunications industry for 10 years as a commercial manager and economics director, and is a qualified management accountant.

## Sir Philip Dilley appointed as the new Chairman of the Environment Agency



Sir Philip Dilley has been confirmed as the new Chairman of the Environment Agency and will take up the post on 8th September 2014.

Mr Dilley was until recently the Executive Chairman of Arup, a trust-owned global planning, engineering, and project management consulting group with fee revenues in excess of £1 billion and more than 11,000 staff members. His role carried responsibility for the group performance and brand. Mr Dilley has spent most of his career with the Arup Group.

He is also Chairman of London First, a business membership organisation with the mission to make London the best city in the world in which to do business. It influences national and local government policies and investment decisions to support London's global competitiveness. He is also a member of the governing council of Imperial College, which carries out undergraduate and post-graduate teaching and research in science, engineering, medicine, and business.

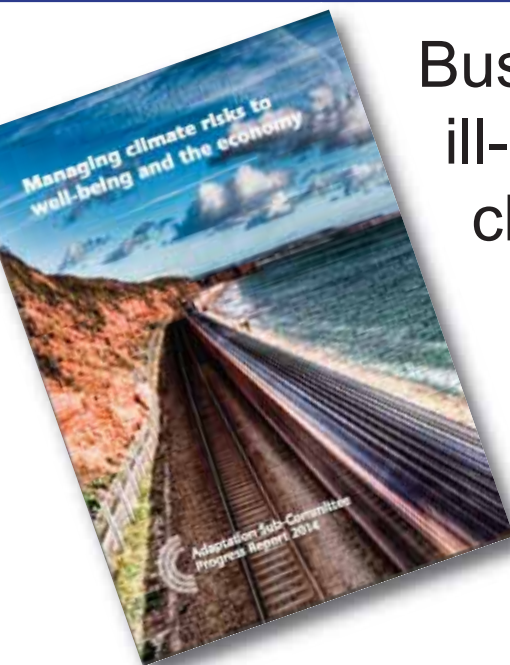
From 2011 to 2013, Mr Dilley was a member of the Prime Minister's Advisory Group, which is comprised of business leaders from sectors of strategic importance to the UK who are invited to provide regular, high-level advice to the Prime Minister on business and economic issues.

## Brendan McCafferty has been named chief executive of Flood Re



Brendan is currently commercial director at PaymentsShield, a subsidiary of Towergate, and a former UK president of Willis and director of its commercial and network business in the UK and Ireland has nearly 30 years' industry experience.

Flood Re director and Association of British Insurers director general Otto Thoresen said that McCafferty had "a proven track record in making things happen and getting the job done, which will stand him in very good stead as we build momentum in the establishment of Flood Re".



# Business and infrastructure ill-prepared for climate change

The Adaptation Sub-Committee (ASC) of the Committee on Climate Change has published its third, in a series of annual reports exploring what should be done in England to prepare for climate change.

The full report can be found [here](#) new report (pdf)

Lord John Krebs, Chair of the Adaptation Sub-Committee of the Committee on Climate Change



*"The impacts of climate change on the UK in the decades ahead are likely to include rising sea levels, more flooding, summer heatwaves, and perhaps more frequent storms and droughts."*

*"We have found good evidence of positive action being taken in a number of areas to safeguard public health and the economy from the impacts of climate change. Despite the disruption experienced by many in the storms this winter, the impacts would have been much worse if it hadn't been for past investment in flood defences, and in flood forecasting and emergency planning. This is a clear demonstration of the benefits that result from investing in greater resilience, but there is no room for complacency."*

*"As our report highlights, there is more to be done to counter the increasing risks of severe weather that are likely to be associated with climate change. As well as making vital infrastructure services more resilient to flooding and storms, the country needs to adapt homes and other buildings so they are suitable for higher summer temperatures."*

## Adapting to flood risk



Past investment in flood defences, and recent improvements in forecasting, early warning and flood emergency planning, helped to limit the impacts of the December 2013 tidal surge. However, current under-investment in flood prevention, together with a reliance on defences to protect new development, will increase the potential for avoidable flood

damage. Major new development in flood risk areas appears to be proceeding, or is being refused, in line with Environment Agency advice.

However, specific advice is not provided on thousands of minor planning applications in the floodplain each year. The cumulative impact of new development on future flood risk is unknown.

- Limited national and local funding means hundreds of flood defence schemes are on hold, and three-quarters of existing flood defences are not being maintained as they should each year. The new long-term investment scenarios being published in autumn 2014 by the Government should make clear the implications for future flood losses arising from current spending plans, and continuing development in flood risk areas, in the context of climate change. Evidence should be published on the cumulative impact of Environment Agency staff reductions on important flood risk management functions.
- The Government should evaluate whether local flood risk management arrangements are now in place across the country in line with the recommendations made by the Pitt Review. Some of the funding provided by Defra to Lead Local Flood Authorities for their new roles and duties under the 2010 Flood and Water Management Act is being

diverted to other council services. Statutory local flood risk management strategies have yet to be published in many areas. Local scrutiny of plans and actions appears to be lacking.

- The Government and the insurance industry should take action to ensure the 'Flood Re' subsidised flood insurance scheme incentivises and supports additional flood mitigation by high risk households. This will help improve the scheme's poor value for money. Tackling flood risk will be the most cost-effective and sustainable approach to keeping flood insurance affordable in the long-term.
- There is increasing potential for surface water flooding in urban areas. We have found low uptake of sustainable drainage systems in new development. Rules to limit the loss of front gardens to impermeable surfacing introduced after the Pitt Review are not being enforced by local councils. The Government should introduce without further delay the Flood and Water Management Act provisions to require sustainable drainage in new development, also recommended by the Pitt Review.

### Resilience of national infrastructure



The energy transmission and distribution sector, and to some extent Network Rail, are monitoring weather-related disruption, assessing future climate risks, investing in resilience, and reporting on progress. Similar approaches should be taken for the strategic road network, in the water sector, for ports and airports, and amongst ICT providers, where evidence of progress is less apparent.

- Infrastructure networks are a priority for adaptation action as assets are long-lived, sensitive to extreme weather, and failures in one network can cascade onto others. Loss of vital services can be detrimental to the economy, as well as to peoples' health and well-being. Acting now to improve the resilience of infrastructure makes economic sense, especially in the context of climate change.
- Natural hazards such as storms, flooding and drought already account for 10-35% of all delays or interruptions of service to electricity, road and rail customers.
- Climate change will lead to an increase in the number of infrastructure assets exposed to high temperatures, flooding, coastal erosion and subsidence in the coming decades. Infrastructure assets could also become more exposed to high winds and storms, but there remain large uncertainties in projecting these changes.
- Major new infrastructure projects, such as HS2 and nuclear power stations, are accounting for relevant



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climate hazards including increases in flood risk. However, planning policy statements are sector-based and there is limited strategic assessment at the national and sub-national levels to guide where new infrastructure should be located. The resulting potential for a systemic build-up of risk should be considered by the Government, for example in areas exposed to coastal flooding, and water scarcity.

## Emergency planning



The need for an effective emergency response capability will increase with climate change. The demands placed upon the emergency services will be exacerbated by continuing building in flood risk areas, a growing and ageing population, and a building stock not designed for extreme heat. There is a lack of information on the level of national capability in some areas. The 2004 Civil

Contingencies Act provides a robust framework for emergency planning in the UK, and risks from severe weather feature in the National Risk Register. However, the Government should consider four areas where further action may be needed to ensure that the system is set up to cope with increasingly severe weather events.

- In order to fully assess preparedness, more comprehensive information is needed on the action being taken by emergency responders to plan for and in response to extreme weather. A single body, with cross-departmental representation, could be given responsibility for collecting and analysing data and advising the Government.
- In some cases, neither the current level of emergency capability nor the capacity required under potential future scenarios is known. For example, the current national capability for flood rescue is not clear, nor what may be required in future. Only some rescue assets are declared by emergency responders and the total need in the event of a large scale flood is unknown. The Government should review current capabilities, and future requirements, where this knowledge is lacking.
- There are fewer staff in the Fire and Rescue Service, the Environment Agency and the Police than in previous years. Further reductions in local authority budgets are planned. The cumulative impact of these staff and budget reductions needs to be assessed in light of the resources that may be required in a range of emergency scenarios.
- Community risk registers may not be giving sufficient weight to all climate risks outlined in the National Risk Assessment, such as drought. Community risk registers should be subject to independent scrutiny to assess whether they have appropriate coverage and are fit for purpose.



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# Environment Agency flood risk schemes win 3 construction awards

Medmerry managed realignment scheme wins two awards and Godmanchester flood risk management scheme wins the Outstanding Contribution Award

The only UK project to win two awards, Medmerry protects 348 properties

Medmerry managed realignment in West Sussex, the UK's largest manmade coastal habitat scheme, has won 'The Prime Minister's Better Public Building Award' and 'Civil Engineering Project of the Year' in the 2014 British Construction Industry Awards.

The only UK project to win two awards, Medmerry protects 348 properties, two holiday parks, a water treatment works and a main road serving over 5,000 households in Selby. In addition it has created 183 hectares of intertidal habitat which encourages visitors to the area.

The 'Outstanding Contribution Award' went to the Godmanchester flood risk management scheme in Cambridgeshire. This scheme, which cost £9.1 million and protects 556 properties, consists of 1.5km of engineered defences made from earth embankments, sheet piles and masonry clad reinforced concrete walls. It also includes two new pumping stations.

Godmanchester is a Roman town that has a long history of flooding. The team that delivered this project worked hard to make sure that the defences were in keeping with the surroundings.

Dr Paul Leinster, Chief Executive of the Environment Agency, said:

*These awards recognise the excellent work of our dedicated staff and contractors in protecting people and property through delivering innovative and effective flood risk management schemes.*



The Medmerry Flood Defence scheme has created fantastic new habitats for wildlife whilst reducing the risk of coastal flooding

*The Medmerry managed realignment scheme in West Sussex protects 348 homes, important infrastructure that serves over 5,000 households and creates an intertidal habitat at the same time that will boost tourism in the area.*

*The Godmanchester flood risk management scheme in Cambridgeshire, which has been*

*built so that it's in keeping with this historic town, protects 556 properties from flooding.*

These schemes have been completed as part of the ongoing programme of investment in flood assets, which aims to reduce the risk of flooding to 165,000 properties between 2011/12 and 2014/15.



Part of the Godmanchester flood scheme

# £3.5m Fazeley flood risk management scheme officially opened

The Environment Agency, with the support of Christopher Pincher MP, has officially opened the Fazeley section of the Lower Tame flood scheme.

In September 2014 the Environment Agency, with the support of Christopher Pincher MP, officially opened the Fazeley section of the Lower Tame flood scheme. This work has reduced the risk of flooding to 250 properties in the area.

Construction of the £3.5million Fazeley section of the scheme began in June 2013 and was completed in August 2014. The works include new flood banks at Mayfair Drive as well as new flood walls along New Mill Lane, Coton Green Football Club, Brook End and parts of Coleshill Road. The work has also involved raising the existing flood bank on Brook End and the Environment Agency has worked with Staffordshire County Council to reduce surface water flooding on Brook End and Coleshill Road.



Raising existing Flood walls

The Fazeley section is one of the 4 sections that make up the Lower Tame flood risk management scheme. The others are in Coton, Kingsbury and Whitacre Heath, with a total scheme cost of £11million. There were over 2,000 residential properties at risk from flooding in these areas from the River Tame before works began.



Beverley Brown, Project Manager said:

*We're pleased to officially open the second section of the flood risk management scheme today. There has been a huge amount of work done to get us to this point and I'd like to thank everyone who's been involved with the project.*



Raising existing embankments

Christopher Pincher, MP for Tamworth, opened the flood scheme and said:

*I'm delighted to have been invited along today to open the Fazeley section of the flood scheme. In 2007, many houses in Fazeley were flooded from the River Tame and the new flood defences will go a long way to ensure that doesn't happen again.*

Also present at the ceremony were members of the project team and local residents.

## Lower Tame Scheme

The Lower Tame flood risk management scheme consists of 4 flood schemes. These are in Coton, Fazeley, Kingsbury and Whitacre Heath. There are over 1,000 residential properties at risk from flooding from this section of the River Tame.

The Lower Tame schemes take forward recommendations from the River Tame flood risk management strategy. The strategy set out our plan to reduce flood risk on the River Tame over the next 100 years (2009 to 2109).

### Coton, Tamworth

The £2.5 million scheme in Coton aims to further reduce the risk of flooding to 463 properties in the area.

### Fazeley, Tamworth

The £3.5 million scheme aims to further reduce the risk of flooding to 216 properties in the area.

### Whitacre Heath

The £2.5 million scheme aims to further reduce flood risk to 304 properties in the area.

### Kingsbury

The £2.5 million scheme aims to reduce the risk of flooding to 216 properties in the area.



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### SPEAKERS INCLUDE



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**Douglas Barnett**  
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**Cllr John Osman**  
*Somerset County Council*



**Alberto Scotti**  
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**Richard Coutts**  
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**Martin Baxter**  
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# 10 Year anniversary of the Boscastle and North Cornwall Floods

Some of the worst floods ever seen in Britain devastated Boscastle and surrounding areas of North Cornwall ten years ago on the 16th August, 2004.

## Facts & Figures

84 wrecked cars were recovered from Boscastle's harbour and streets, 32 could still be out at sea.

440 million gallons of debris-laden water rushed through Boscastle in a single day after eight inches of rain fell on the village in 24 hours.

Helicopters airlifted 100 desperate people to safety as the flash floods struck.

58 homes and businesses were hit, with four being completely demolished.

No major injuries or loss of life were reported.

Two million tonnes of water flowed through Boscastle caused by 5 hours of torrential rain. The flash floods affected hundreds of homes and businesses, destroyed 4 properties in Boscastle and 2 at Crackington Haven, swept away about 115 vehicles and badly damaged roads, bridges, sewers and other infrastructure.

The Environment Agency and professional partners removed around 4,000 tonnes of flood debris from Boscastle, including shingle which had been deposited in the village.

The Agency worked with Cornwall Council's predecessors, the National Trust, Forrabury and Minster parish council, the Chamber of Trade and Commerce and South West Water to

develop flood defence schemes for both the River Valency and River Jordan as part of the village's post flood regeneration.

More than £10 million of improvements were carried out, which, as well as the regeneration and defences in Boscastle, included upgrading flood schemes in the nearby communities of Canworthy Water and Helebridge.

The defences and regeneration works in Boscastle were sympathetically designed to respect the historic character of the village and reduce the risk of property flooding. The work was partly funded by the European Objective One as well as flood defence grant in aid. Local levy funding was used to fund the upgrade to defences in Canworthy Water.

The Valency scheme included widening and deepening of the river and replacing the lower bridge to increase flow capacity. The main car park was raised and set back from the river to make space for water and sediment and a new tree management regime was introduced to reduce the risk of tree blockage.

The Jordan flood defence scheme involved installing a flood relief culvert behind Marine Terrace, down Old Road, via a new dissipation chamber. The Environment Agency





also worked with Cornwall Highways to carry out flood risk improvements at a number of culverted highway crossings on the upper reaches of the River Jordan. A stone catcher was installed above Paradise Road to reduce the chance of the new highway culverts blocking.

Since the completion of the new defences they have successfully

protected communities across Boscastle and North Cornwall on several occasions, notably in 2010 and 2012.

The EA have also worked closely with people in Boscastle and other such rapid response catchments to raise awareness of the flood risk in these areas and develop community flood plans. Local residents and

businesses in these catchments have been helped to achieve greater flood resilience and this work is ongoing.

The Environment Agency recently introduced a bespoke flood warning service for Boscastle which uses information from rain and river gauges in the area.

## Flood Champion Appointed To New Protection Role



National trade body the Property Care Association (PCA) has appointed Mary Dhonau OBE, as the head of the new Flood Protection Group responsible for helping to steer and shape this developing section of the Association.

The Flood Protection Group has been developed by the PCA to help consumers locate experienced, skilled, dependable specialists who are able to provide reliable flood resistance and resistant solutions

that can protect homes and businesses across the UK.

Mary became a powerful advocate for flood resistance and resilience after her home was flooded in 2000 and received an OBE in 2009 for her tireless campaigning on the issue.

At the PCA, one of the areas Mary is looking to develop centres around the concept of 'property level flood protection', where homeowners play an important role in building flood protection measures into their homes to counteract and limit the impact of flooding events.

Mary said: "A number of the property level flood defence and resilience measures installed after the floods of 2007 have been tested recently and they have worked.

"The result is dry homes that would have otherwise flooded or buildings that will be reoccupied in weeks rather than months or years.

"We want to see this type of work adapted across the country and help to dramatically reduce the impact of flooding throughout the UK.

"The creation of the Flood Protection Group provides a

*national platform to promote best practice, high standards and most importantly, peace of mind to those who have or could be affected by flooding, delivering solutions for communities nationwide, with the reassurance of UK-wide standardisation and assurance.*

*"It will give consumers certainty in getting the right products for the right property – with future resilience features built-in - and provide insurance companies, property professionals and householders with access to consultants, manufacturers and contractors offering a recognised and reliable approach to prevent the flooding of buildings."*

The PCA is noted for its training and technical expertise, with an industry-recognised training programme and a renowned technical panel able to share best practice and guidance with members.

It is also a scheme operator of Trustmark, the Government-backed scheme which aims to help consumers find reliable and trustworthy tradesmen when making improvements or repairs to their homes.

[www.property-care.org](http://www.property-care.org)

# National centre for resilience to be established for Scotland

Scotland's resilience capabilities will be boosted by a new national centre in Dumfries that will help improve responses to issues such as flooding.

The new centre, situated at Crichton Campus, will also act as a national hub; coordinating work to understand how best communities and local emergency responders can prepare for an anticipated increase in natural hazard events as a result of climate change.

## The centre will look to support and help coordinate:

- Further improvement in Scotland's resilience to natural hazards such as severe weather and flooding, augmenting existing systems and complement work of partners such as Adaptation Scotland
- Building community resilience across Scotland, learning from existing good practice across the South of Scotland
- Improvement in the protection and resilience of Scotland's communities to flooding
- Development of Scotland's resilience research capability
- Provision of resilience training and development opportunities and ensuring the identification and sharing of good practice
- Improvement in local multi-agency

resilience arrangements and evaluation of the benefits to responders of investment in flood warning technology in the region

Partners in this ambitious and wide-ranging project include Dumfries and Galloway Council, Met Office, SEPA and emergency response organisations such as Police Scotland and the Scottish Fire and Rescue Service as well as the Scottish Funding Council and the Crichton Trust.

The Scottish Funding Council (SFC) is leading work to harness the research capacity on resilience across Scotland. They will support development of a new Research Centre of Excellence for Scotland by leading a workshop involving academia, the Met Office, industry and other stakeholders. A panel will assess a proposal from a consortium prior to any Funding Council award. SFC has also agreed in principle to fund two additional posts based at Crichton to help support the Research Centre of Excellence.

The announcement was made on a visit to Crichton Campus by Environment and Climate Change Minister, Paul Wheelhouse, who said:

*"Scotland's resilience arrangements*

*are already widely recognised as robust but we must not rest on our laurels and this new centre will ensure we remain forward thinking in how we deal with natural hazards. As the recent severe weather, in the North of Scotland, has shown we cannot be complacent and residents of Dumfries and Galloway themselves understand only too well the impact of such events, having experienced horrendous conditions over the festive period. This centre will provide a focus of intelligence and skills and networking of good practice that will fulfil a national role to support emergency planning and response activities across all of Scotland.*

*"The Scottish Government resilience operations, and emergency response agencies and organisations like SEPA, Met Office, Police Scotland, Scottish Fire and Rescue Service, and local authorities have already worked together successfully in a number of challenging situations. This new centre will help build on these experiences and share existing knowledge with partners and communities throughout Scotland.*

*"We know that human activity is changing the global climate and extreme weather events are more common than they were previously.*

Scotland will not be immune and we are already seeing evidence of Scotland's climate changing. With extreme weather events predicted to become more frequent, it is of the utmost importance that we are as prepared as possible to respond when these hit which is why we have put well developed resilience arrangements in place to help minimise their impacts.

"The facilities at Crichton Campus are first class and the proximity of the Campus to other institutions, including the Crichton Carbon Centre, the water rescue expertise of the local fire and rescue service and a very experienced team at Dumfries and Galloway Council provides an excellent opportunity for resilience partners, academia and the Scottish Government to work collaboratively on climate and flooding related resilience issues and to optimise multi-agency working.

"This approach sits well within the context of Dumfries and Galloway having already strong local resilience arrangements in place, with an emphasis on an integrated and multi-

agency approach, which offers the prospect of the region presenting a good opportunity to provide practical training opportunities and to identify lessons with relevance for all Scotland. The Centre will be well placed to also evaluate the benefits to responders of the roll-out of further flood warning technology, with roll-out of the coastal flood warning system for the Solway scheduled for 2015."

Dumfries and Galloway Council Leader, Ronnie Nicholson, said:

"I welcome this announcement from the Minister about the new Scottish Resilience Centre. Within this new resilience centre will be experts on community resilience, research into emergency planning and severe weather. It will also house quality research facilities.

"Dumfries and Galloway has been recognised nationally as having some of the best emergency planning arrangements in Britain, and have also been routinely recognised as having an innovative approach in the field. Our team have been asked to provide advice to other regions

and agencies who have experienced emergency situations disruptive events including the recent flooding in Somerset. Basing the new Scottish Resilience Centre here is recognition that we have the skills and expertise here in our region."

David Pirie, Executive Director at SEPA, said:

"The founding of this national centre of excellence recognises the increasingly important role that community resilience will play in understanding, preparing for, and reacting to severe weather events in Scotland. This is a positive step towards co-ordinating a wide range of quality information, knowledge and understanding across many agencies and partnerships who work to keep Scotland running during adverse events.

"SEPA regards this new centre as complementary to the work it undertakes and furthers the Team Scotland approach which sees Scotland's public bodies working together to deliver efficient and effective services."

## Flood Protection Systems Flow Control Equipment Spill Barriers Material Handling



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Demountable Flood Barrier



Penstocks



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Flow Control Systems



## CIWEM Events

### Climate Change - Building the Age of Resilience

23 October 2014  
SOAS, University of London

Don't miss out on this unique opportunity to discuss your views on climate resilience with **Defra Shadow Minister, Barry Gardiner MP!**

[Keynote Address, 10 am]

#### Join us in October to...

- Explore how resilience can be implemented in a business and corporate context
- Understand the implications of managing your asset base in changing conditions
- Learn how to de-risk your organisation
- Learn and share ideas about the importance of social/community resilience
- Learn from and network with industry thought leaders and peers, policy makers, politicians and those directly affected by recent extreme events
- Share your own experiences and debate with fellow delegates and speakers

#### Speakers include:

Barry Gardiner MP | Committee on Climate Change | Global Sustainability Institute | Environment Agency | Yorkshire Water | Network Rail | DfID | Defra

#### Who should attend?

Regulators | Decision makers | Infrastructure operators | Consultants involved with delivery of schemes | Community groups | User groups and NGOs | Local government | Academics and researchers

Please visit [www.ciwem.org/events](http://www.ciwem.org/events) for more information and to book online.



## Working With Nature Natural Flood Management

During last winter's floods the subject of flood defence gained media profile and gave industry professionals the opportunity to discuss the diversity of solutions on offer. This enabled them to go beyond the dredging debate to communicate the different sources of flooding and the varied ways both urban and rural environments can be adapted to slow flows and therefore mitigate flooding. Katherine Pygott of CIWEM's (The Chartered Institution of Water and Environmental Management) Rivers and Coastal Group and director of water management at Peter Brett Associates, was just one of a number of experts to engage with the media, highlighting in particular the benefits of natural flood management. On the 10 September she took part in CIWEM's conference, Natural Flood Management: The Evidence Requirements for Wider Delivery, held at SOAS, University of London.

The conference provided the opportunity for industry professionals to showcase successful examples of natural flood defence, which is gaining interest amongst at-risk communities, due to the range of techniques available, the economic efficiency of many of these methods and the ability to obtain funding for such projects.

The event was timely in that a number of research projects on natural flood defence were coming to conclusion, expanding the evidence-base for natural flood defence. The event saw the launch of the Environment Agency's research framework on natural flood defence and provided a platform for key messages from the Channel Management Handbook (soon to be published) to be presented to an audience of industry experts and practitioners. Tom Nisbet, programme manager for Forest Research presented the findings of his organisation's opportunity mapping for natural flood defence in the Midlands and the North East of England, and Laura Thomas, senior ecologist for JBA Consulting, presented the findings of a recent study of the role of aquatic plants in watercourse management.

With the conference structured around the innovative concept of a



tour of a fictitious catchment, presentations guided delegates through the catchment from headwater through the middle catchment to estuaries and the sea. The programme enabled delegates to gain greater understanding of the interactions between land use management and flood risk, assess the potential for natural flood management in large catchments, and examine the funding routes available for landowners who make their land available for natural flood defence projects.

Keynote speaker, Alastair Driver, national biodiversity manager for the Environment Agency, says: *'The conference provided a great opportunity to present a range of examples of natural flood defence and demonstrate how they can deliver multiple benefits, be that carbon storage or improvements to health and wellbeing, these additional benefits can be delivered in addition to flood risk management.'*

He continues: *'We at the Environment Agency have limited resources, so we need to make them go further, by finding new ways of working that deliver multiple benefits and make good use of public money.'*

Alastair Driver's presentation highlighted a range of catchment management techniques that the Environment Agency and its partners have implemented in recent years and revealed early findings on the quantifiable benefits of sustainable catchment management, which could be transferred readily to other parts of the UK and abroad. Examples included the restoration of upland bog systems to reduce flow and store carbon; tree planting and catchment sensitive farming in upper catchments to reduce surface run-off and diffuse pollution; the reconnection of floodplains to provide improved flood risk management; and the use of coastal realignment to help

manage sea level rise.

*He says: 'I like to highlight the benefits of natural flood management by providing "killer facts" from published journals and articles to bring the point home – "leaky ponds" from Belford Burn, for example. A "leaky pond" holding 800 cubic metres of water takes roughly 8-12 hours to drain completely and delays the peak flow one kilometre downstream by approximately 15 minutes.'*

A further killer fact presented by Driver gave the example of a National Ecosystem Assessment, which estimated the value of wetland to society to be £1,200 per hectare per year.

Driver concludes: *'In the past there has been a focus on hard engineering. But natural flood defence also has a lot to offer; particularly when you consider the additional benefits it can deliver, such as improvements to biodiversity and water quality. It's not a case of either hard engineering or natural flood management, what we need to encourage is a blend of these practices, to enable us to deliver the best outcomes, both economically and environmentally.'*

CIWEM's conference was timely in that it seems to have caught a moment of convergence as new thoughts on sustainable water management are emerging. Alastair Moseley, honorary vice president of CIWEM, who helped shape the conference programme says: *'The conference has done a lot to raise awareness of the benefits of natural flood management, which I think will come to really capture the imagination. In the past the discussion around SuDS, which is a form of natural flood management, has been mired by problems associated with long-term management and people don't always understand what SuDS are and how they can work. Natural flood management offers a concept that is much more tangible to those outside of the profession.'*

He continues: *'Ian Moodie from the NFU gave a presentation that suggested that natural flood defence is something that farmers really want to be involved in and that they can engage in it without it impeding their business.'*

*'The role that volunteers can play in this is also really beneficial. There are many groups that work to benefit local wildlife that could become involved in these projects, engaging in husbandry that the Environment Agency might not otherwise be able to afford. This could pull communities together to provide a range of benefits. This could be achieved easily provided volunteers are given coordinated, technical expertise and guidance.'*

He concludes: *'We need technical rigour to help develop the tools for natural flood defence; landowners prepared to be involved; and motivated volunteers. With these three things we can develop a range of measures to manage water in the environment and respond to flood risk in a positive way.'*

Erika Yarrow, editor, The Environment

# Award winning flood alleviation scheme offers hope to other blighted communities

The Lower Dove Flood Alleviation Scheme, which has raised and extended flood defences along the River Dove in Derbyshire, demonstrates how through collaboration and tenacity stakeholders can work to ensure that their community is protected from the disruption, economic cost and emotional trauma of flooding.

Awarded the Jack Lewin Prize by the Chartered Institution of Water and Environmental Management's (CIWEM) Rivers and Coastal Group, a prize that is awarded annually in recognition of a project that has made a significant contribution to the development and promotion of rivers and coastal environments, the scheme brought together a range of local stakeholders, including Egginton and Scropton Parish Councils and South Derbyshire District Council, and received financial support from Nestle. The scheme was selected as an excellent example of successful partnership funding and stakeholder engagement.



South Derbyshire District councillor and chair of Egginton Parish Council, Lisa Brown says: *'This prize is the result of a wonderful culmination of 12 years of totally dedicated and determined meetings, planning, commitment, negotiation and lobbying; encouraging individuals, communities, organisations, commerce and industry to come together in partnership to deliver flood defences to the beleaguered communities in South Derbyshire. It is an award for these communities, the Environment Agency, the local authorities and industry, all of which have worked together in partnership, sharing the vision, the energy and the financial commitment.'*

She adds: *'I hope that the scheme will be a beacon and model for others to follow and the community is so very grateful for the unique honour of this award.'*

Hannah O'Callaghan, past chairman of CIWEM's Rivers and Coastal Group explains her reasons for selecting this innovative project for recognition. She says: *'I am*

*impressed by the dedication of the multi-organisational project team that worked together on the Lower Dove Flood Alleviation Scheme. This project is a great example of where a partnership funding approach has been taken that has reduced flood risk to local communities and business in the Lower Dove valley.'*

The £8.7million scheme began construction in September 2012 and consists of five kilometres of new and improved flood defences on the border of Staffordshire and Derbyshire, reducing the risk of flooding to 2,000 residential and major commercial properties. The work has involved improvement of existing defences along the Foston Brook in Scropton and the raising and extension of localised embankments on the River Dove in Hatton, Scropton and Egginton. Improvement works to protect the railway embankment at Scropton have also been carried out.

According to Environment Agency figures, Hatton and Scropton were at significant risk of flooding from a flood event with a one in 20 (five per cent) chance of occurring in any given year. Egginton village was at risk of flooding from a one in 50 (two per cent) flood event. The scheme has increased the standard of protection for all three villages against a flood event with a one in 100 (one per cent) chance of occurring in any given year. Households, a sewage treatment works, vulnerable local roads and the Nestle site at Hatton all benefit directly from the improved flood protection. The scheme has also helped to achieve Water Framework Directive objectives by providing improved recreational access and assisted fish passage to support salmon stocks.

However, this scheme may have never come to fruition in its current form without an extraordinary level of multi-stakeholder commitment, including local businesses, the Environment Agency, parish and district councils, community groups and local residents.

As Mark Swain of the local Environment Agency Partnership Strategic Overview Team explains: *'Although*



All photographs courtesy of Ray Soden



Track protection

*the local area experienced serious flooding in the year 2000, we couldn't start construction until we could prove the economic case for the scheme.'* Improved modelling and viability, feasibility and strategic studies across a period of ten years, together with the raising of additional private funding enabled the project to be secured. The computer models also played an important part in helping to communicate the flooding issues to stakeholders such as Nestle.

Tony Beresford of Foston and Scropton Parish Council says: *'Mark's been a driving force. If it was up to us we'd give him a knighthood. To see this project to conclusion through straitened financial times has demonstrated an incredible commitment.'*

Nestle, whose site at Hatton was affected by past floods, contributed £1.65million to the scheme, which has not only helped to protect their existing business, but allowed them to expand the site, creating around 400 new jobs for local people. The work undertaken at Salt Brook, which included the building of a 1.2 kilometre v-shaped channel to hold water, has also created valuable habitat for wildlife and amenity for Nestle employees and the wider community.

The strengthening of the railway embankment, to protect the railway from damage if it was overtopped, was a particular consideration of this project, which required close collaboration with Network Rail. In addition, road traffic signs have been installed to alert drivers when the flood storage area at Scropton fills, which is the largest

holding area in the locality, managing overflow from the River Dove and Foston Brook. Culverts are also monitored by cameras to enable blockages to be addressed quickly, should they occur.

The case for Egginton to be included in the scheme was difficult to achieve on a purely financial basis because it is a small community, but a community in very much need nonetheless. In previous floods the village had been cut off completely, becoming an island surrounded by floodwater from the River Dove and Egginton Brook. The emergency services were unable to reach villagers and access could only be achieved by helicopter.

Lisa Brown says: *'Egginton used to become isolated by floodwater. The village is at the end of the line in terms of receiving floodwater, but the raised road now provides a means of escape should the flood bank be breached.'*

She continues: *'Nestle were determined that we would be included in the scheme and Toyota and Cemex also made donations. The community pulled together and there were even door-to-door collections. It shows what communities can do if they have the determination to keep going. Flooding ruins lives, property and destroys businesses. Hopefully this project will raise awareness of what is possible and encourage other communities to do the same.'*

Erika Yarrow, editor, The Environment



## Completion of UK's biggest ever coastal realignment scheme

Stear Marshes coastal scheme was a joint project between WWT and Environment Agency and the completion means the Environment Agency can continue its maintenance of flood risk schemes elsewhere in the Severn Estuary that protect 100,000 homes and businesses.

Rising sea levels are predicted to result in loss of inter-tidal habitat in the Severn Estuary. Steart Marshes will replace about half of this loss and reduce the flood risk for local communities. Just before 7am on Monday 8 September, high tides entered 250 hectares of low-lying land for the first time in centuries, through a newly excavated 200 metre gap in the Parrett Estuary coastal embankments.

People and property remain protected by newly constructed flood risk management scheme. Over the coming months and years salt-tolerant plants will colonise the area and form a new saltmarsh. The Wildfowl & Wetlands Trust (WWT) and Environment Agency's Steart Marshes scheme uses the shallow gradient and coarse vegetation of the saltmarsh to absorb wave energy naturally. This will help to protect local villages from storm surges, and protect the newly constructed flood banks from erosion so that they last longer.

WWT Chief Executive Martin Spray said:

*We need to be brave and bold if we*

*are going to deal with the impacts of climate change. WWT Steart Marshes proves you can protect homes and businesses by using wetland technology that works with nature, not against it.*

*Climate change is here now. Last winter was the wettest on record and we suffered the worst storms for 20 years. I want to give full credit to the villagers of the Steart Peninsula for getting behind this idea, helping to shape it and helping to save the peninsula from being lost to rising sea levels.*

Richard Cox, for the Environment Agency, said:

*Over 200km of coastal banks around the Severn Estuary reduce flood risk to more than 100,000 homes and businesses, a benefit valued at £5 billion. There is an ongoing need to maintain these structures.*

The Steart project will directly protect homes, businesses and the surrounding infrastructure. The National Grid power lines into Hinkley Point power station are a key element of the national infrastructure protected by the scheme.

Saltmarsh is a natural flood risk management scheme. Like coral reefs or mangroves in the tropics, saltmarsh takes energy out of the tide and reduces wave height. At Steart Marshes the new flood embankments are set behind 100s of metres of saltmarsh which will reduce the impact of high tides on them,

bringing down maintenance costs and prolonging their life.

Half a million cubic metres of soil were dug and moved to create new and improved flood banks.

The area is being managed as farmland and a nature reserve and in time the creek system should become a nursery for commercial fish stocks such as sea bass. Steart Marshes has been carefully landscaped over the last two years and paths and bridleways have been created and improved to help more people enjoy the landscape. Local residents have played a key part in creating the scheme; several even took part in a sweep of the land before the seawater flowed in, to move any mammals or reptiles.

WWT plan to develop opportunities at Steart Marshes for young people to learn conservation and heritage skills that will lead to jobs in the South West.

Saltmarshes are part of Britain's rich coastal heritage. It's the landscape that inspired Charles Dickens' "Great Expectations" and many paintings by JMW Turner.

As well as protecting the country from coastal flooding, and filtering pollution that would otherwise flow into the sea, saltmarshes are home to some of Britain's most iconic wildlife – the Severn Estuary saltmarshes alone support more than 70,000 water birds.

# The Land Drainage Contractors Association

## About the Land Drainage Contractors Association

The LDCA is a national standard setting organisation - a trade association of contractors, manufacturers and suppliers who undertake to comply with recognised standards of workmanship and materials.

Today's performance and environmental sustainability requirements make it essential to have drainage work carried out by specialist, experienced, properly equipped contractors working to recognised standards.

The LDCA publishes Technical Specifications for Field Drainage Schemes, Pipeline Reinstatement Drainage and Guidelines for Sportsturf Drainage Installation which set out the quality of workmanship and materials to be used in drainage and water management schemes. These standards are recognised by industry bodies and the LDCA Sportsturf Guidelines have been adopted by Sport England and the Football Foundation as the standard to which funded sportsturf drainage schemes must be carried out.

An LDCA contractor undertakes to work to these Specifications and Guidelines and to the requirements of the LDCA Quality Assurance Scheme, which also covers the use of British Standard materials, liability insurance, health & safety legislation and provision of a warranty with regard to workmanship and materials.

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## More Land Drainage To Prevent Flooding – Not As Crazy As It Sounds!

Bruce N Brockway  
Secretary Land Drainage Contractors Association

During the recent floods weather presenters and news reporters were repeatedly heard to say "more heavy rain is forecast and where this rain falls on saturated and waterlogged land there is the risk of flooding" – very true. Subsequent reports have then concentrated on flood defences and how to get rid of the water more quickly, even today attention is focused on dredging.

But for a different perspective just cast back to the opening statement "where this rain falls on saturated and waterlogged land there is the risk of flooding" – true.

But what happens when rain falls on land that is not saturated and waterlogged?

Answer - nothing!

Unsaturated land acts as a sponge and soaks water up. If all the land in Britain could act as a giant sponge it would soak up enormous quantities of rainfall. This would significantly reduce the uncontrolled surface run off of water which is what causes waterways and rivers to flood.

So, how do you make land into a sponge? You drain it!

What! Surely that makes the problem worse! Wrong!

A little bit of soil science tells you that if you lower the water table of land then you dramatically increase its capacity to store water. Also this stored water bleeds off slowly through the land drainage which greatly extends the run-off period and reduces flooding significantly. Land drainage provides large scale attenuation of water. What's more this could be far more cost effective than building flood defences, barrages and all the other downstream measures that are being talked about.

To concentrate attention upstream will produce a much more effective long term sustainable solution.

Drainage of land is very straightforward and can readily be done by a long established land drainage industry.

Land is routinely drained with perforated pipes to provide optimum growing conditions for plants including agricultural crops, fruit and vegetables, grassland for livestock,



*Land drainage pipes being installed and even the turfgrass for your local sports club, golf course, or the park where you take the kids to play and walk the dog on a Sunday morning.*

The benefits of land drainage, apart from being able to play football on your local pitch or play golf on your course 365 days a year even after heavy rain, are the economic benefits of food production on UK farms which can show up to 30% increase in yield from drained land. As importantly drained land can allow more timely cultivations and sowing and harvesting of crops. Everybody will have sometimes seen on TV undrained crop fields where potatoes or corn has to be left in the ground to rot because the fields are so waterlogged machinery cannot get onto the ground to harvest the crop. This is why farmers drain land, and why land drainage has an economic benefit to consumers in reducing costs of food production.



*Stored water bleeds off slowly through the land drainage which greatly extends the run-off period and reduces flooding significantly*

Soil is drained to get rid of excess water and let air in because plants need air as well as water around their roots to survive. Also to provide a more stable soil structure.

If you pick up a handful of soil half of it is solid particles such as sand or clay and half of it is the spaces between these particles. If all these spaces were full of water the soil would be saturated and you would be holding a handful of mud! If all the spaces were full of air the soil would be very dry and would run through your fingers.

Neither condition is good for plants which require soil to be neither wet nor dry but moist.

Clearly when soil is saturated like mud it can't soak up any more water which is why when there is heavy rainfall on saturated soil you get flooding. Equally when there is no water in the spaces and they are full of air the soil is capable of soaking up enormous quantities of water. For plants the ideal is for the spaces to be half water and half air. So even a well drained soil that provides good growing conditions for plants still has lots of capacity to soak up water in periods of heavy rainfall. 25% or more of its volume! This excess water is then drained away more slowly to restore the right balance for the plants. It can be released to water courses at a controlled rate over a longer period of time which considerably reduces flood risk.

This is why more land drainage can help prevent flooding – possibly counter intuitive but it works!

Naturally the water drained from land has to be held but this can be done in a controlled way in watercourses, ponds, lakes, reservoirs and wetlands before it even reaches rivers. These can be used to slow water down to prevent it rushing overland into towns and flooding built up areas.

Ditches which take the water from drained land can have mini weirs to hold the water in the ditch during periods of high rainfall. Further downstream these can discharge into ponds which on a larger scale can be lakes. To be really sustainable these



*A lake under construction which catches and holds water reducing flooding downstream*

can be reservoirs to hold water for use as irrigation during the drier summer months – the water can even use the drainage system for subsurface irrigation - the ultimate recycling of water!



By controlling the rate of discharge of water from these upstream measures you don't need to deliberately let land be flooded downstream as sacrifice areas to protect built up communities.

There is nothing new in this. Many of the measures taken by our forefathers were designed to hold water back before discharging at a slower rate. Dew ponds were a common feature, along with village ponds which filled up in winter and dried out in summer, and a network of ditches and watercourses which have since been filled in. Even the century's old 'ridge and furrow' land was a form of flood prevention.

However, modern techniques can be thrown at this to get the best of both worlds. Controlled drainage is fairly easy to achieve by creating a series of buffers to slow the passage of water. The starting point is control of the water table in the soil which can be done mechanically and is already practiced in Holland. It is being well researched in the USA, not for reducing flood risk, but as a means of reducing pollution of water courses

by nitrates which it has been shown to do by up to 50% so is a win win situation.

Other simple measures like grass buffer strips and grassed gulleys in fields can slow the run off of water into water courses. As importantly, these buffer strips can also filter out much of the soil particles and sediment that would otherwise be washed into the watercourse and be washed downstream – less soil erosion and hence less need for dredging.

A larger scale extension of using vegetation to slow and filter water are grassed waterways which can be used to control water run-off and soil erosion. These are already being used very effectively in the UK and their use should be extended.

The ultimate use of vegetation to slow water with added environmental benefits in reducing pollution is using areas of land as a watershed to filter and purify drainage and run off water naturally by allowing it to percolate through surrounding grassland into wetland areas, ditches and streams before being stored in a lake or reservoir.

These natural attenuation areas slow the passage of water which not only reduces the flood risk but also allows time for the natural biological action of vegetation to remove pollutants from the water. These areas used as watersheds to slow and purify water in this way can even result in water being cleaner when it leaves the area than when it arrived – how about that for a good news story!

The key to all this is to drain the land in the first place to allow the soil to act as a big sponge to soak the water up so that you can control where the water goes thereafter.

‘Drain before the Rain’

Otherwise, as the weather forecasters predict, you will just get surface run-off which you can't control – result – floods!

It's very simple really!



*Grassed waterways help to control water run-off and soil erosion*





# SuDS & Surface Water Management





Alex Stephenson,

Alex has 40 years experience in stormwater drainage design and related issues. As well as being the UK Stormwater Director with Hydro International he is also Chairman of the British Water SuDS focus group. He is ideally situated to keep you up to date with the industry changes and legislation.

## Climate Change Won't Wait for Widespread SuDS

The Government's advisory committee on climate change has issued a strong warning that we must do more to improve our flood resilience as changing weather patterns result in rising sea levels, increased flooding and greater swings between storms and droughts.

Of all the consequences of changing weather, increased flood risk poses the greatest threat, according to the Committee on Climate Change, the body that exists to provide independent, evidence-based advice on climate change resilience to the UK Government and Parliament.

Last winter, parts of England saw rainfall unprecedented in 250 years of records. In January some areas saw rainfall three times the average and 7000 properties were flooded. The damage done could have been much worse without investment already made in flood protection and emergency planning.

Yet, our memories are short when it comes to paying for flood defences. True, the Government pledged £270million after the winter floods, but only to repair the damage already done. Funding shortages mean three-quarters of our existing flood defences are inadequately maintained, according to Managing Climate Risks to Well Being and the Economy 2014, (July, 2014).

Yet every £1 invested in flood defences in the UK has been calculated to save £8 in flood damage. There have been improvements in flood resilience in recent years, but not enough says the CCC.

Just seven years ago another flooding 'wake-up call' prompted a major review of the country's flood resilience. The Pitt Review recommended a raft of measures that led to the 2010 Flood and Water Management Act in England and Wales. But some important parts of the Act are still to be implemented. The CCC wants the Government to evaluate whether the local flood risk arrangements have been made in line with the Pitt recommendations, warning that some of the funding provided by Defra to Lead Local Flood Authorities is being diverted to other council services.

New National Standards for implementing Sustainable Drainage Systems (SuDS) on new developments in England and Wales have been delayed repeatedly and are still to be implemented. Now the Government has consulted on new proposals to integrate SuDS approval within the planning system.

But here is a sobering fact: flood-resilience contribution made by SuDS through new developments will still be a tiny fraction of what is needed.

The real challenge comes in upgrading and improving the existing surface water drainage infrastructure. Because they are often smaller, and less grandiose compared with new developments, retrofit SuDS schemes can seem like a poor relation. But in reality, they are the lifeblood of improving surface water flooding resilience and water quality.

The recent focus has been mostly on new residential developments,

but SuDS also need to be implemented to ensure flood and water quality resilience from industrial and commercial premises, especially where a high degree of pollution control is also required.

Critically, to work, the principle of attenuation at source must be applied at a micro and a macro level. Whilst small scale retrofit schemes and new development SuDS deal with water quality and quantity at the local level, larger scale flood alleviation schemes are also needed to hold back water in the upper reaches of rivers.

The committee placed great emphasis on the need for a more comprehensive approach to flood resilience that recognises the water is part of a wider energy and transport infrastructure. It's also critical that we start to view water management in a more 'joined-up' way and here approaches such as Water Sensitive Urban Design can provide clues to managing water in a more integrated way.

Using the same SuDS principles of attenuation a catchment level is also a critical part of the water management jigsaw. Schemes that hold back water in the upper reaches of a river provide sustainable means of protecting urban centres. To achieve good catchment management requires and overall planning and management approach which involves a number of agencies including water companies, local authorities and the Environment Agency is the key to success. As Climate Change continues to gather momentum, there is still a huge amount to be done.

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# Largest SuDS scheme in the East of England

Anglian Water is investing over £200,000 in a SuDS scheme for Taverham in Norfolk. The scheme, starting this week, will be the largest scheme of its type in the East of England.

The project will prevent flooding by capturing rainwater and cleverly diverting it into a drainage system using special plants and grasses that also slow water and provide more opportunity for it to soak away into the soil or evaporate.

Up to 21 million litres of water - more than eight Olympic sized swimming pools – will be taken out of the sewers every year and put it back into the environment naturally, considerably reducing the risk of flooding to nearby homes on Suters Drive which have been affected in the past.

Jonathan Glerum, Anglian Water's Flood Risk Manager, said:

*"SuDS are becoming more common on new housing developments as a more sustainable way of preventing flooding to homes, but what's special about this scheme is that as well as being the biggest in the east of the country, we're retrofitting it to protect existing homes. We hope this scheme will demonstrate the potential of SuDS and encourage more schemes right across the country."*

Five 'basins' will be created on land in the north east of Taverham, near Ashgrove, Badgers Brook and Judge's Garden. These will capture rainwater and allow it to soak into the ground. When it rains heavily the basins will fill up and slow the flow of water to the existing drainage system. Any excess surface water will be channelled onto a new permeable footpath from Suters Drive down to the wetland area and pond near Marriot's Way south of Suters Drive.

Thirsty wildflower grasses and plants will be planted in the basins and in strategic places to create a larger system that slows and soaks up the water, and allows it to drain away more effectively. These basins will also help to attract pollinators such as bees and butterflies.

The only traditional work that's required is digging some stretches of tarmac to lay pipelines to alter the highway drainage in Suters Drive and making alterations to the footpath to make the surfaces more permeable, which will help rainwater soak away more quickly.

Jonathan continued:

*"As towns and cities grow, so do the hard surfaces around them and that means there's less opportunity for rainwater to soak away naturally. We need to reinstate these natural areas to reduce the risk of flooding and SuDS are a proven method of doing this."*

*"Traditionally we would build bigger pipes or tanks to*

*store the water during storms but those schemes take a long time to plan and install, they're disruptive to residents and they are expensive.*

*"This SuDS scheme is not just effective; it's also roughly half the cost of the traditional solution, which enables us to keep customer bills low. Plus, they allow you to work with nature rather than fighting against it. It's a win-win which is why we are pioneering the technology."*

Such schemes are only possible and successful by working in close partnership with local councils.

Cllr John Fisher, Broadland District Council's portfolio holder for environmental excellence is pleased that Taverham is one of the pioneering areas as flooding causes devastating and costly damage: "It is wonderful that Taverham will benefit from the biggest SuDS scheme in the East of England," he said.

*"This project tackles one of our district's greatest environmental issues – flooding – but is also sustainable, helps wildlife and is one of the cheaper flood prevention measures available."*

*"With this project, Anglian Water is helping Broadland District Council work towards two of its four main ambitions: environmental excellence and carefully planned and well housed communities. We commend the SuDS scheme as a forward-thinking approach to water management."*

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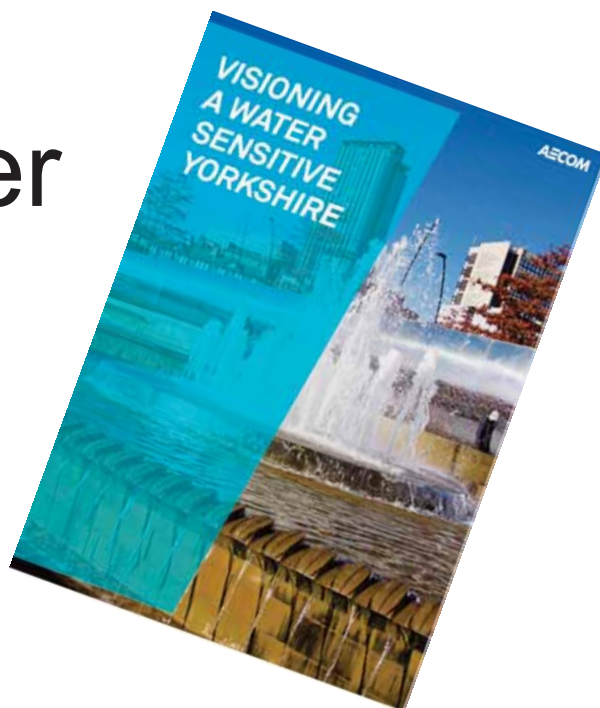
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# Visioning a Water Sensitive Yorkshire



AECOM has published a document entitled 'Visioning a Water Sensitive Yorkshire' that identifies a more sustainable response to urban and rural water management in Yorkshire.

On the 29th May 2014 key organisations within Yorkshire came together to discuss Water Sensitive Urban Design (WSUD) and develop a vision for a water resilient future for Yorkshire. WSUD is an approach that can meet today's water challenges by integrating water cycle management with the built and natural environment through planning and urban design. This document sets out the combined view of the workshop participants on how integrated, smart and sustainable approaches to water management can be developed to mitigate the fluctuating challenges of flooding and water shortages and reinvigorate the community's connection with water.

The document sets out a Vision for giving a greater priority to water management considerations at the earliest stages of development and regeneration to provide resource security and future resilience to the impacts of climate change.

The publication highlights approaches to WSUD from a variety of stakeholder perspectives and addresses the drivers and blockers to achieving a water sensitive

Yorkshire. 'Visioning a Water Sensitive Yorkshire' has been produced following a one-day workshop hosted by AECOM in May. Participants included Yorkshire Water, City of York Council and the Environment Agency.

The document has been produced to share the vision with a wider audience and to outline water sensitive design elements that Yorkshire could adopt to enhance water conservation, management of runoff and water quality. It also reaffirms the commitment by key stakeholders to continue to collaborate and place WSUD at the centre of water management strategies.

Within the publication, Steve Wragg, Flood Risk Manager, City of York Council explains: "Lead Local Flood Authorities, in collaboration with their planning teams, must ensure their region is "future-proof" and have a long term sustainable future. WSUD should be central to good place making, providing shade and shelter through effective planning; WSUD can also regain and provide new character to an area. Crucially, however WSUD will assist with urban cooling and discharging of increasing water – the two key impacts of climate change."

Charles Forman shares some insight from the Environment Agency: "The

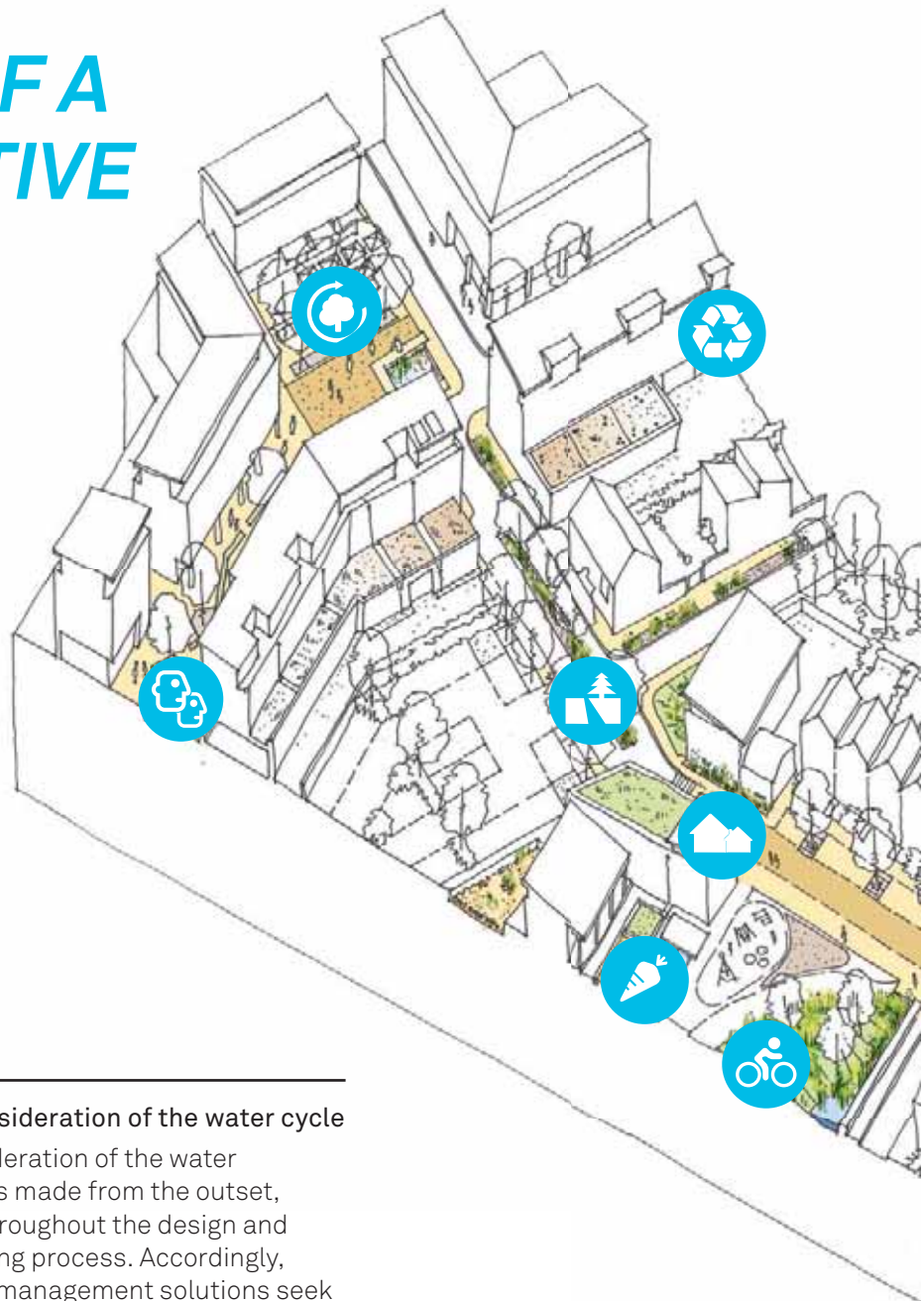
*Environment Agency sees WSUD as a tool for achieving multiple benefits on both a local and strategic scale, and understands our role in the process as a regulator, advisor and project partner."*

Brian Smith, Drainage Strategy Manager confirms Yorkshire Water's approach: "Development of a WSUD approach cannot be considered or delivered in isolation. Partnership working, cooperation and collaboration are essential and Yorkshire Water will work with others to create a strategy that is all encompassing."

Summarising the objectives of a collaborative approach, Matthew Jones, director for AECOM's water practice in the North of England believes that "Sharing the great examples of integrated water management and benefits it brings to the cities and towns of Yorkshire will encourage greater collaboration and facilitate faster adoption of this smarter approach to water management across our region. Working towards this vision will ensure the region continues to support thriving, prosperous communities whilst protecting the unique environments that give Yorkshire its iconic quality."

'Visioning a Water Sensitive Yorkshire' can be downloaded here.

# ATTRIBUTES OF A WATER SENSITIVE YORKSHIRE



Water Sensitive Urban Design is the process of integrating water cycle management with the built environment through planning and urban design.

Two principles are essential to its application:

## 1. Managing all elements of the water cycle

All elements of the water cycle and their interconnections are considered concurrently to achieve an outcome that sustains a healthy natural environment while meeting human needs. This includes managing:

- Water demand and supply
- Wastewater and pollution
- Rainfall and runoff
- Watercourses and water resources
- Flooding and water pathways

## 2. Consideration of the water cycle

Consideration of the water cycle is made from the outset, and throughout the design and planning process. Accordingly, water management solutions seek to meet the expectations and aspirations for design of successful places, such as:

- Celebrating local character, environment and community
- Optimising the cost-benefit of infrastructure and built form
- Improving quality of life for communities
- Providing resource security and resilience in the future.

## The water sensitive town



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# Climate Change Makes Hard Choices for Flood Protection

By Alex Stephenson, Operations Director of Hydro International's UK Stormwater Division and Chair of the British Water Sustainable Water Management (SuWM) Focus Group

COMPLAINING about the weather is a favourite British pastime and there's little doubt that weather extremes are going to give us more to grumble about in future. More severe weather patterns are afflicting countries across the globe with the same ruthlessness whether rich or poor, developed or developing. Climate change is moving the goalposts for water management and that we need to respond quickly – and creatively.

In England, according to a recent report by the Committee on Climate Change (CCC), our changing weather is likely to result in rising sea levels, increased flooding and summer heat waves. We are going to experience greater swings between flooding and drought. Of all the consequences of climate change, increased flood risk poses

the greatest threat, according to the CCC, the body that exists to provide independent, evidence-based advice on climate change resilience to the UK Government and Parliament.

In winter 2014, parts of England saw rainfall unprecedented in 250 years of records. In January some areas experienced three times the average and 7000 properties were flooded. Prolonged inundation of the Somerset Levels prompted a national debate on the causes of flooding and it seemed like everyone had a potential solution.

## Flood Defence Investment

The Government pledged £270million after the winter floods, but only to repair the damage already done. Memories are short when it

comes to paying for flood protection. Funding shortages mean three-quarters of England's existing flood defences are inadequately maintained, according to the CCC report *Managing Climate Risks to Well Being and the Economy 2014*, (July, 2014).

## Wake-up Calls

Population growth and continued development are placing ever-greater pressure on the sewer network. Sooner or later our infrastructure will not be able to cope.

There is good reason for investment in flood resilience: Every £1 invested in flood defences in the UK has been calculated to save £8 in flood damage. There have been improvements in flood resilience in recent years, but not enough to

prepare for the weather to come, says the CCC.

Just seven years ago another flooding 'wake-up call' prompted a major review of flood resilience in England and Wales. Those devastating floods claimed 14 lives, caused £3.2 billion worth of damage and affected 48,000 homes and 6,000 businesses. Two thirds of the flooding was attributed to surface water.

The need for change was recognised in the Pitt Review. It recommended a raft of measures most of which became a requirement of the 2010 Flood and Water Management Act. Now the CCC has called on the Government to review whether the local flood risk arrangements have been made in line with the Pitt recommendations.

## Sustainable Drainage Systems

New National Standards for implementing Sustainable Drainage Systems (SuDS) on new developments in England and Wales have been delayed repeatedly. Now the Government has consulted on new proposals to integrate SuDS approval within the planning system.

The principle of Sustainable Drainage Systems (SuDS) is that they are designed and engineered to manage surface water as close as possible to where it falls by mimicking natural paths and



processes. SuDS fulfil the joint objectives of quality, quantity and amenity using a wide toolbox of techniques to deliver attenuation, infiltration, flow control and water treatment. SuDS can be natural features or manufactured devices, or a combination of both.

Effective sustainable drainage systems don't just control water quantity; just as importantly they improve the quality of water being discharged back into the environment. Surface water flows lift sediments and pollutants from hard surfaces such as fields, roads and industrial sites and carry them into rivers and watercourses. The European Water Framework Directive has set important targets to

improve protection of the water environment, but there's still a long way to go.

## Ecosystems Services

Latest thinking has also linked sustainable solutions to rainwater capture and re-use in schemes such as rainwater harvesting. In particular, there is a growing recognition that better use and re-use of water presents an opportunity to achieve multiple benefits for communities; that water is a resource to be exploited, rather than waste to be 'managed' and flushed away.

The concept of 'Ecosystems Services' places greater emphasis on the multiple value of surface water drainage features to contribute to the economic wellbeing of a community. In this way, the value is justified not just in terms of cost of the drainage, but in terms of amenity benefits provided, for example through landscaping, biodiversity, leisure facilities and so on.

Here, there are rich pickings to be had from sharing experience and best practice across the globe. Water Sensitive Urban Design (WSUD) is an approach to planning and designing towns and cities which began in Australia. It emphasises integrated and sustainable approaches to the water cycle as a whole.



## Towards a vision for widespread SuDS

The latest delays to SuDS implementation in England and Wales have rightly prompted frustration. But the sobering fact is they are only applicable to new development. Even when the legislation is in force and the phased implementation completed over the next few years, the flood-resilience contribution made will be just the tip of the iceberg.

The real challenge comes in upgrading and improving the existing surface water drainage infrastructure. In the industry we give this the jargon tag of 'retrofit SuDS'. Because they are often smaller and less grandiose compared with new developments, retrofit SuDS schemes can seem like a poor relation. But in reality, they are the lifeblood of improving surface water flooding resilience and water quality.

## The Responsibility of Business

The challenge of retrofitting sustainable drainage to tackle surface water flooding 'hotspots' and improve water quality is particularly relevant for commercial and industrial premises. Businesses might have, for example, high quantities of runoff from roofs, car parks, vehicle loading bays or waste collection areas. Each commercial activity comes with its own challenges – and risks – for effective surface water management and pollution containment. At present many businesses do not fully understand the risks and responsibilities. However, as controls for water quality tighten the need for practical and commercially-viable solutions will grow.

The contribution of business needs to cover both better flood protection control and improved surface water quality. The solutions include rainwater re-use – for example

collecting water from the vast roofs of out of town shopping centres and using it for toilet flushing or vehicle cleaning. Businesses must also be prevented from discharging polluted surface water into local rivers – with pollution ranging from litter and silt, oil, petrol and metals from vehicles to more specific chemicals involved with individual business activities.

## Attenuation

A key principle of SuDS is that they deal with surface water as close as possible to the point where the rain falls by holding back flows at peak times and discharging them at a carefully controlled rate; the principle of attenuation.

To work, this principle of holding back excess water at peak times must be applied at both a micro and a macro level. Whilst small-scale retrofit schemes and new development SuDS deal with water quality and quantity in urban centres, larger-scale flood alleviation schemes are also needed. They can hold back water in the upper reaches of rivers – before it reaches sensitive downstream areas.

Sustainable engineering solutions that work in harmony with the natural environment to create temporary flood storage areas protect urban areas downstream. For example, in Glasgow the White Cart Flood Alleviation Scheme has avoided £millions of damage to property by creating flood storage areas which hold back the White Cart Water and its tributaries Earn Water and Kitch Water during peak storms in the highlands above the city. A total of 90,000 sq metres of rich and diverse wetland habitats have been created and water is discharged downstream at a controlled rate to avoid flooding in a sensitive part of the city.

## Towards Integrated Urban Water Management

Much is already being done to improve flood control and water quality in urban environments in the UK and there is a developing body of knowledge from around the world to inform best practice. But for those of us in the industry, progress still

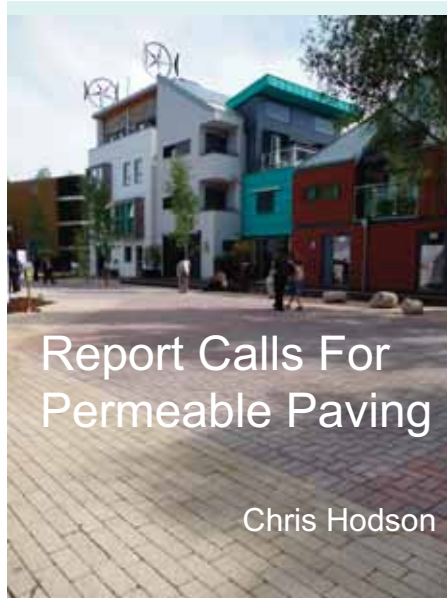


## Stormwater & SuDS

seems painfully slow and hampered by political inertia and low public spending priorities.

Yet, the consequences of Climate Change are not going away any time soon and that means we have to regard the need for better urban water management as a matter of urgency. The techniques and technologies are already well-developed across the world for every country to learn from. What's more the opportunity exists to enhance the value of our urban environments with a toolbox of natural and manufactured devices.

For more information about Sustainable Drainage Systems visit the knowledge-sharing website



A new report from the Committee on Climate Change highlights the need for wider use of permeable paving and sustainable drainage to help fight flooding and pollution.

The Committee on Climate Change (the CCC) is an independent, statutory body established under the Climate Change Act 2008. Published in July, the CCC's Adaptation Progress Report to government stresses that increased flood risk is the greatest threat to the UK from climate change. It calls on government to implement the 2010 Flood and Water Management Act – which will effectively make sustainable drainage systems

(SuDS) mandatory - without further delay.

But it also points out that: “The National Planning Policy Framework already requires local planning authorities to actively consider SuDS when scrutinising development applications”, although most are still failing to do so. And it demonstrates that planning regulations from 2008 for paving in gardens and around non-domestic premises are not being enforced by planners either. Here, permitted development rights were removed for new or replacement hard surfaces, such as drives and car parks, unless permeable paving solutions are used. Clearly, local planning authorities should now prioritise SuDS and permeable paving in development control.

The Report also advocates that: “the uptake of permeable paving should be encouraged”. Concrete block permeable paving is a key SuDS technique and uniquely placed to meet a wide range of sustainable drainage and urban design requirements. Sharing the same impressive performance as conventional block paving - including slip and skid resistance, durability and strength – it can support the heaviest loads and trafficking, and is ideal for all hard landscape, shared surfaces and residential streets. At

the same time, it can provide completely level, well-drained, firm and slip-resistance ‘accessible’ surfaces without the need for cross-falls, channels, gulleys or other interruptions. Rainwater ‘ponding’ is eliminated, reducing the risk of ice forming on the surface and preventing splashing from standing water.

But its real strength is an ability to remove water-borne pollution offering the important – and often missed - opportunity of a gradual supply of treated water that can be exploited for innovative landscape design, harvesting and ecology by imaginative designers. This is a clarion call for architects, master-planners and other designers to take the lead in using concrete block permeable paving and other multi-functional SuDS as an integral part of urban design and place shaping.

This aspect is explored in Interpave's latest discussion document – ‘SuDS + Permeable Paving Today, Edition 2’ - which is freely available via: [www.paving.org.uk/commercial](http://www.paving.org.uk/commercial). Here, a wealth of information is available including the ‘Permitted Paving’ guidance on planning rules for areas around existing buildings and the comprehensive ‘Understanding Permeable Paving’.



# River & Wetland Management





Community and grassroots groups again have the chance to put the state of their local wetlands – good or bad – on the international agenda.

Their testimony will be used to nominate the Blue and Grey Wetland Globes, which are awarded by the World Wetland Network (WWN) for the best managed wetlands and those under threat on each continent.

Community groups have successfully used past Wetland Globes to recognise examples of best practice to influence the management of their local wetlands for the better.

Voting is open to groups and individuals at

[www.worldwetnet.org](http://www.worldwetnet.org) until 2 February 2015, World Wetlands Day. The awards will be announced at the Ramsar Convention's conference in Uruguay in June 2015.

Chris Rostron, Chair of the World Wetland Network, said:

*"Civil society groups and concerned individuals are often at the forefront of caring for wetlands. World Wetland Network gives them a voice on the world stage and the Wetland Globes have become a really useful way to recognise the good and highlight where things need to improve."*

Blue Globes highlight best practice, where wetlands are well managed in partnership with local people. Grey Globes are awarded to wetlands that are neglected or actively degraded by human activities, highlighting solutions through local cooperation.

Lake Natron received a Blue Globe award in 2010, in part recognizing the Tanzanian government for turning down plans to develop a soda ash factory that could severely impact the wetland and its status as home to 75% of the world's breeding lesser flamingos. The Blue Globe award has played a central role in successful lobbying against subsequent proposals.

Ken Mwathe of BirdLife International Africa Regional Office said:

*"The Wetland Globes have really helped to conserve Lake Natron. Highlighting the ecological importance of the wetland makes politicians sit up and recognise its true value for the flamingos, and the benefits to local people such as eco-tourism in the area."*

Lake Tota in Colombia received a Grey Globe award in 2012, after an incredible campaign by a small local NGO and its supporters that drew attention to the pollution and over-use that had caused the extinction of a local fish species. The government has since opened discussions with local stakeholders and academia on how to protect the wetland. Improvements to the way Lake Tota is used and managed are being developed so that it continues to support local people's livelihoods and recreation activities.

Felipe Velasco, of local NGO Fundación Montecito, said:

*"The Wetland Globes created a constructive opportunity to improve the status of our beautiful but threatened Lake Tota. Although many people initially saw it as a negative award, and it was at first difficult for the authorities in particular to accept, they are all now realising that this is a chance to work together to take positive action for Tota."*

Voting is open to all NGOs, civil society groups and local individuals at [www.worldwetnet.org/awards](http://www.worldwetnet.org/awards). The awards will be announced by the WWN committee at the Ramsar Convention's Conference in Uruguay, June 2015.

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*The Aire Rivers Trust, a registered charity, was formed in 2011 with the specific intention of increasing the amenity value of the River Aire, particularly as regards recreation, fish populations and associated wildlife.*

## Salmon and Sea Trout make a welcome return to the River Aire

For nearly 200 years, fish passage up the River Aire has been hampered by the construction of over 20 weirs. The river also suffered from poor water quality, with the Industrial revolution being a major factor in the rivers decline. The Aire became a dumping ground for pollutants and was in a very poor ecological state.

Over the past 40 years, improvements in water quality have seen an increase in fish populations and this has led to the introduction of fish passes to allow fish movement upstream. The fish passes not only improve the fish stocks in the Aire but also improve the overall ecology. Freshwater trout now breed throughout the Aire catchment area and as the fish return so too has other wildlife, such as otters and heron. Otters have in fact been spotted in Granary Wharf in Leeds city centre.



### Rodley (2012)

Last year a new fish pass was completed at Rodley, between Leeds and Shipley, by Yorkshire Water's partner MMB, supported by a grant from the Environment Agency. Between 2015 to 2020, Yorkshire Water are looking to invest a further £10m on 20 further fish barriers to fish.

The river bypass work was supported by a grant from the Environment Agency.



### Kirkstall (2014)

Two new fish passes recently been opened at Burley Mills Weir and St Ann's Mills Weir on the River Aire alongside Commercial Road in Kirkstall, Leeds. The passes were built by the Aire Rivers Trust in partnership with Leeds City Council and the Environment Agency. The £400,000 Kirkstall project was funded by Defra's Catchment Restoration Fund which is administered by the Environment Agency and Leeds City Council will be taking ownership of the two fish passes.

The fish passes will enable the current fish populations of brown trout and coarse fish to move freely past the weirs to find the best places to feed, shelter, spawn and grow. In the longer term the two fish passes will be a part of a chain which will allow salmon and sea trout to reach their historic spawning grounds upstream in Leeds, Bradford and the Craven District of North Yorkshire.



Burley Mills Fish Pass



St Ann's Mills Fish Pass

## Work in Progress

Kevin Sunderland, chairman of the Aire Rivers Trust, is equally passionate about the river's fisheries. He says the possibilities for salmon and sea trout will change after the biggest remaining challenge, the weir near Knostrop sewage treatment works in South Leeds, has been developed.



*Knostrop Weir, to be replaced as part of the £50m Leeds flood alleviation scheme*



Hirst Weir, Shipley

matter of introducing obstacles, such as boulders, to slow the current and provide resting areas for the fish.

Further upstream, at Hirst Weir in Shipley, Bradford Amateur Rowing Club are working with the Environment Agency to raise money for repairs to the weir which will include a fish pass as part of the project.

At both Knostrop and Crown Point, a smaller weir between Knostrop and Leeds Railway Station, new moving weirs will be built as part of the £50m Leeds Flood Alleviation Scheme. Construction is due to begin this year and is scheduled to be completed next year. It means that if the rains are favourable, salmon and trout will be able to reach West Yorkshire's great cities.

The river flows underneath Leeds Railway Station through massive underground channels and Network Rail are also working with the Environment Agency to ensure that fish can get through. It is understood that minimal intervention will be required and may well simply be a



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The invasive species, the quagga mussel (*Dreissena rostriformis bugensis*) which is generally the size of a thumbnail but can grow to 4cm, has been discovered in the south east.

The discovery was made by Environment Agency teams carrying out routine water quality testing on River Wraysbury. It has subsequently been found in the nearby Wraysbury reservoir too.

The identification was confirmed by Dr David Aldridge of Cambridge University on 1 October 2014.

Since the mussel was identified the Environment Agency has been working with partners including Thames Water, Angling Trust and local angling clubs, to put biosecurity measures in place. Work is now taking place to monitor the River Thames and reservoirs in the local area to investigate the extent of the problem and the distance that the quagga mussel has spread. Anglers and boaters can play an important part and everyone is urged to help stop the spread of this species by following the 'check, clean, dry' approach and thoroughly cleaning any equipment.

The quagga mussel is a prolific breeder – a fully mature female mussel is capable of producing up to one million eggs per year. Due to its ability to filter out large quantities of nutrients and to breed quickly, the quagga mussel can significantly reduce native populations and affect freshwater ecosystems. It can outcompete native mussels. This alters the ecology of the habitats it invades. It can also block water pipes and smother boats' hulls.

Sarah Chare, deputy director of fisheries and biodiversity at the Environment Agency, said:

*Invasive species, such as the quagga mussel, cost the UK economy in excess of £1.8 billion every year. And while Britain's rivers are the healthiest for over 20 years, rivers that harbour non-native species could fall short of tough EU targets.*



## Quagga mussel discovered for first time in UK

*The quagga mussel is a highly invasive non-native species, affecting water quality and clogging up pipes. We are monitoring the extent of its spread and working closely with partners to ensure they are aware of it.*

*If you spot one then please report it to us through the online recording form. Like the zebra mussel and killer shrimp this species comes from the Ponto-Caspian region – an area around the Black and Caspian seas in south-east Europe.*

Simon Earl, head of water production at Thames Water, said:

*Another invasive species is the last thing we need clogging up our network. But we have a lot of experience in dealing with zebra mussels, which are similar to quagga mussels, and there is no threat to the quality of the water we supply to our customers. We'll continue to work closely with the Environment Agency to monitor the mussels discovered at Wraysbury reservoir.*

Mark Owen, head of freshwater at the Angling Trust, said:

*It's vitally important that all water users, including anglers, take every possible precaution to stop this*

*species spreading throughout the UK. Quagga mussels could do untold damage to freshwater and estuarine environments if they are allowed to spread which could have a significant impact on marine and freshwater fish stocks.*

The mussels tend to be about the size of a human thumbnail but can grow to about 4cm. The larvae of quagga mussel are not visible to the naked eye, which makes drying a critical step in applying good biosecurity. There's good evidence that rinsing or soaking equipment in hot water increases the chance of killing larvae and adults, and is a suggested addition to the Check, Clean, Dry approach. Check, Clean, Dry is important not only to help slow the spread of this species, but also other invasive species that might be present in our waterways. It is especially important to prevent the spread of invasive non-native species to isolated, vulnerable or protected sites.

More information and advice on the quagga mussel and advice on how to slow its spread can be found on the Non-native Species Secretariat web pages: (<http://www.nonnativespecies.org/alerts/quaggamussel>)

# Water voles return to every county in England

Introduction of water voles to Cornwall sees them return to the every county in England for the first time since 1989.

Wildlife experts at the Environment Agency have confirmed that water voles have returned to every county in England, following the final release of 60 captive bred voles within the Bude river catchment in Cornwall. The release, by the Environment Agency and Westland Countryside Stewards, means that there is now an established breeding vole colony in Cornwall, the first time since 1989. There are now breeding colonies in every county in England.

The introduction programme began in 2013 as water voles were highly unlikely to naturally colonise in Cornwall due to the distance to the next nearest population in East Devon.

Water vole populations have been in decline since the 1970s due to long-term habitat loss, predation by American mink and extreme weather. Statistics released by the Environment Agency and wildlife trusts last year showed that the populations could have fallen by as much as a fifth since 2011. Populations in the south west, Lake District and parts of the Midlands are especially vulnerable.

However, reintroduction schemes combined with mink control programmes and habitat management are providing a lifeline for this iconic species. Creating and maintaining large-scale good quality habitat is also key to ensuring the species' survival.

Alastair Driver, the Environment Agency's National Conservation Manager and Chair of the UK Water Vole Steering Group, said:

*Habitat creation and restoration projects are hugely valuable for most wildlife, there are some species for which introduction programmes are necessary simply because populations have become so fragmented and the species is not very mobile.*

*The Environment Agency has created nearly 5,000 hectares of wetland and river habitats in the last 10 years, and worked hard to tackle unsustainable abstraction from our rivers, to the extent that some 55 billion litres of water each year is now returned to the environment. However we are keen to support carefully located water vole release projects as well, but only as long as there is rigorous control of American mink in the catchment. This is essential if the populations of water*



*voles are to benefit from these healthier rivers and new habitats.*

Water voles were successfully released into the River Axe in Devon in 2009 and are known to have thrived there ever since, thanks to careful management of the habitat and control of American mink.

John Duncan, Chief Executive of the charity Westland Countryside Stewards, said:

*It has been a privilege to play a part in the release of water voles back into a Cornish habitat where they were once a common sight. The success of the project is a great demonstration of the way a small local charity such as ours can work with larger organisations like the Environment Agency to achieve a common goal.*

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# Protecting our native White-clawed

The White-clawed crayfish is the UK's only native crayfish species and is designated as "endangered" on the International Union for the Conservation of Nature (IUCN) Red list of threatened species. Non native invasive species of crayfish, mainly the American signal crayfish, have been the main reason for the rapid decline in our native White-claws. This is mainly due to their ability to out-compete for habitat and food and because they carry a deadly mould called crayfish plague (*Aphanomyces astaci*) which the natives are not immune to.

## Disease infects native White-clawed crayfish in River Allen

Crayfish plague has been found on Dorset's River Allen following an investigation by the Environment Agency and Dorset Wildlife Trust.

Until recently the river Allen's native White-clawed crayfish population, one of the few remaining in Dorset, has managed to remain free from disease but dead and distressed crayfish were recently spotted in the river in July.

Samples were sent to the Centre for Environment Fisheries and Aquaculture Science for disease analysis and they have now confirmed that the crayfish are infected with crayfish plague.

Andy Martin for the Environment Agency said:

*The crayfish plague is carried by non-native American signal crayfish, which are not susceptible to it and are present in many of our Dorset Rivers. It is transferred to new waters either through the movement of the signal crayfish or by water and/or damp equipment that has come from waters that contain signal crayfish. It is not clear yet how the disease reached the River Allen.*

American Signal Crayfish look similar to small lobsters, they are red-brown in appearance with large, smooth claws. They are far larger than the endangered native white-clawed crayfish.

They carry a fungal disease called crayfish plague, which can kill native crayfish. They are active during the summer and hibernate in winter, usually in burrows in riverbanks.

They outcompete our native White-Clawed Crayfish for food. They also cause damage to riverbanks by deep burrowing, impact on river fly populations and can reduce fish stocks by eating large amounts of fish eggs.

The Environment Agency is working closely with the Dorset Wildlife Trust and local landowners to monitor the situation and determine the extent of the outbreak.



Dorset Wildlife Trust Conservation Officer, Amanda Broom, said:

*It is very sad that White Clawed Crayfish have been infected with the crayfish plague on the River Allen, as this was one of just three populations remaining in Dorset. However, by remaining vigilant and observing biosecurity procedures such as cleaning and drying equipment and shoes that have been near the river, hopefully we can limit the amount of crayfish being affected by this disease.*

*Whilst we can't be sure of the fate of the surviving crayfish, the work we are doing on the River Allen with the Environment Agency, such as providing cover for crayfish to hide in, will provide any surviving white clawed crayfish a good habitat to thrive in.*

Andy Martin, for the Agency, added:

*We are urging river users to ensure that any equipment they use in the River Allen is clean and dry before entering the river, when moving between locations and at the end of the day. This will hopefully limit the rate of spread of the disease through the river and reduce the risk of it being spread to other rivers that still have white-clawed crayfish populations.*

## Ark Sites - the response to the decline

In response to the severe decline of native White-clawed crayfish in South West England, The South West Crayfish Project was set up. The project is a partnership between the Environment Agency, Buglife, Avon Wildlife Trust and Bristol Zoo. The project involves re-homing at-risk populations of White-clawed crayfish to new safe havens known as Ark sites, monitoring existing populations and captive breeding populations at Bristol Zoological Gardens. Last year good numbers of White-claws from the River Allen were translocated to a safe isolated stream away from the threat of any non-native crayfish species. This population will be monitored in future years to determine the success of the project.

# crayfish

## Safe ark for threatened Norfolk white-clawed crayfish

An endangered population of white-clawed crayfish have been released into the headwaters of a river in north Norfolk.

In September, the Environment Agency and partner organisation volunteers caught 300 white-clawed crayfish from a population at risk from the invasive non-native American signal crayfish. They released them to safety into the headwaters of the River Glaven.

The signal crayfish and the new population of white-clawed crayfish will be separated by a number of sluices which act as a physical barrier that slows the upstream spread of crayfish. The signal crayfish in the lower river may take decades to reach this site, and in the meantime ongoing research will hopefully find a way of controlling signals in the future.

Over the next five years the new site will be surveyed to check whether the new population of white-clawed crayfish are breeding and doing well. It is thought that the white-clawed crayfish were present in this location until the 1970s when they may have been wiped out by a pollution incident.

This is part of a longer term project to help conserve the white-clawed crayfish, to populate ark sites through an annual co-ordinated day of action.

The partnership works to conserve white-clawed crayfish in Norfolk, Suffolk and Essex. Organisations involved included the Environment Agency, Norfolk Rivers Trust, Norfolk Biodiversity Partnership, Norfolk Non-Native Species Initiative, River Glaven Conservation Group, Norfolk Wildlife Trust and University College London. This is the fourth year of translocating crayfish at risk to safe Ark sites.

## “Save Our Waters”

Countryside lovers are being given an opportunity to speak up for the English rivers, lakes, ponds, beaches and wetlands they love.

A wide group of environmental charities and organisations, under the Blueprint for Water banner, are frustrated with the limited progress made in protecting and improving our waters in recent years and is urging countryside lovers and communities to have their say by responding to a consultation on the future of England's waters, published today by the Environment Agency.

Blueprint for Water is asking people which stream, river, pond or landscape matters to them and urging them to tell the Environment Agency about it via Blueprint for Water's Save Our Waters website. It may be local special places where people enjoy relaxing, or popular places to visit such as the Norfolk Broads, Lake District or the beaches and estuaries of Devon and Cornwall.

All these types of places need our help - many have suffered the effects of extreme flooding, drought or pollution in recent years and only a quarter of our water bodies are in a healthy state. So Blueprint for Water's "Save Our Waters" campaign is inviting everyone to tell the Environment Agency how

important their local stream, river, pond, lake or beach is to them, and to urge the EA to raise their ambition and do much more to ensure all these waters are healthy in the future.

Blueprint for Water Chair Janina Gray said:

*"Water is vital to our health and wellbeing. Wildlife, farming and the economy all rely on good quality water environment, and we love our waters as places to relax and enjoy. Yet currently only 25 per cent of our waters are in good health. This is awful and more needs to be done."*

*"This is a chance for everyone to send a clear message to the Environment Agency and the Government that your local water is important to you and that you want it managed well in future, for everyone's benefit."*

The Save Our Waters website also has an option for anyone who has a little longer to contribute their views, as well as pages setting out the detailed vision of the scientists and experts behind Blueprint for Water as to what good water management in England should look like in the future. You can read more details at:

<http://saveourwaters.org.uk>



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# Canal & River Trust award £150m framework contract



Canal &  
River Trust

The £150m National Engineering & Construction Contract (NECC) has been awarded to Kier and will run, initially, for six years, at £25m per annum. There is an option to extend up to a maximum of 10 years which is aimed at encouraging greater capital investment, innovation and improvement in services.

The new Framework replaces the existing Omnibus contract held by Kier, and equates to approximately 100 major construction projects and over 200 minor repair projects annually including:

- Channel lining, trench sheeting, and piling;
- Culvert cleaning, lining, inspection and repair;
- Towpath surfacing;
- Repairs to historic locks, bridges and aqueduct repairs, including grouting;
- Safety related reservoir works
- Mechanical & Electrical works;
- Repairs to weirs on both canals and rivers;
- Restoration schemes (which may include new build)
- Minor works including bridge parapet repairs and bank protection projects

Kier managing director for utilities, Paul Fletcher, commented:

*"We are extremely proud to have secured the National Engineering & Construction Contract. The Canal & River Trust is one of our most valued clients and we look forward to enhancing the strong relationship we have developed over the five and a half years of the previous framework. "The opportunities for greater integration and collaboration to drive exceptional customer service and sustainable efficiencies are hugely exciting within this progressive and ground breaking framework."*

Vince Moran, operations director for the Canal & River Trust, said:

*"This contract is the result of 18 months of hard work, care and attention reviewing how we manage projects of this type and looking at how we can improve things. We're delighted with the way in which Kier have understood and reflected our values and we look forward to continuing our work with them. "The contract will play a major role in what the Trust is trying to achieve; putting our customers at the heart of what we do and ensuring that our waterways remain special places alive with people, boats and wildlife."*

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## Duprojet Dredging Launch

Duprojet is a new hydrodynamic dredging unit which is solely available through Land and Water Services. Duprojet has been designed by our partners Silt UK, with whom we have worked to develop the system over the last 12 months. This road transportable and versatile unit can carry out water injection dredging projects in those areas that are logistically challenging. The unit can be used on craft that can navigate inland waterway canals and rivers, as well as coastal waters, allowing it to be deployed across diverse projects.

The Land and Water Duprojet technology has been used to successfully carry out projects on the River Tees, River Severn, Sharpness tidal basin and docks and the Gloucester & Sharpness canal. The most recent campaign with the technology has been to dredge Gloucester docks in order to ensure that the tall ships could access the docks to carry out filming for a new movie. In order to facilitate the tall ships a channel had to be dredged in excess of 4m depth to allow the ships safe passage. The Duprojet has successfully carried out this work during amber drought conditions, which involves co-ordination between the water controllers and the crew on the Duprojet.

The Duprojet has moved sand bars along the Gloucester

and Sharpness canal which have not been previously moved with other Hydrodynamic dredgers. It has also moved dense silt build up on the approach jetty at Sharpness basin, which Duprojet moved last year in order to provide greater navigational abilities for the ships accessing Sharpness docks. It was also successfully deployed to remove silt build up on the lock approach to the River Tees barrage, which it also removed to the Client's satisfaction.

The Duprojet unit can be mounted from a hiab, or can be used on Land and Water's bespoke craft in order to gain manoeuvrability in difficult access areas, or in areas where the wash walls are in a fragile condition and can work in shallow waters with a minimum water depth of 1.8m.

Hydrodynamic dredging injects water into the bed to place the sediment into suspension. The suspended solids are then transported either by a naturally occurring hydraulic gradient, such as an ebbing tide or a hydraulic gradient is created on impounded basins by opening ground paddles to create a flow of water. The suspended solids then move naturally and redistribute along the waterway. Duprojet has been used in impounded basins, tidal estuaries and canalised river sections.



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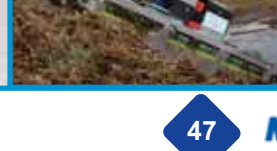
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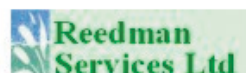
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The screenshot displays the FADS directory website with a grid of service providers. The top navigation bar includes links for Home, About Us, Services, and Contact Us. The main content area is divided into several sections, each featuring a logo and a brief description of the service. The services listed include:

- Energy Efficiency & Green Building:** A section with a red header and a list of services including Energy Audits, Energy Modeling, and Green Building.
- ENERGREEN:** A section with a green header and a list of services including Energy Audits, Energy Modeling, and Green Building.
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The bottom of the page features a large blue banner with the text "FADS directory" and a list of services including Energy Audits, Energy Modeling, and Green Building.



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- Flails
- Flap Valves
- Flap Valves Fish Friendly
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- Flood Analysis
- Flood Barriers
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- Pumps
- Pumps Archimedes
- Pumps Axial
- Pumps Fish Friendly
- Pumps PTO
- Pumps Submersible
- Pumps Volute
- Radio Telemetry
- Reclamation
- Rainwater Drainage
- Rapids
- Rapikant
- Reclaimed Timbers
- Recycled Lumber
- Recycling
- Reed Beds
- Remote Control Mowers
- Remote Monitoring
- Removable Barriers
- Renewable Energy
- Reservoirs
- Reservoirs Act
- River Management
- River Restoration
- Roadways
- Rock Armour
- Safety Equipment
- Sand Bags
- Sediment Analysis
- Sewage Treatment
- Sewer Lining
- Sewer Rehabilitation
- Sewerage Consultants
- Sewers
- Shredders And Chippers
- Silt Fence
- Silt Pushers
- Slit Trips
- Slope Stabilisation
- Sludge Gates
- Solar Power
- Sports Field Drainage
- Sports Turf
- Storm Water Management
- Strategic Catchment Reviews
- Structural Pumps
- Surface Erosion
- Sustainable Drainage Solutions
- Tanking Systems
- Telemetry Heating Services
- Telemetry Software
- Telemetry Systems
- Temporary Door Covers
- Temporary Roadways
- Temporary Water Control
- Terracing
- Tilting Gates
- Tractors
- Trailers
- Trench Filters
- Trenching Machines
- Trenching Utility
- Urban Surface Water Drainage
- Vegetation Control
- Vehicle Tracking
- Vent
- Vent Turbopower Turbines
- Vmax
- Water Conservation
- Water Consultants
- Water Control
- Water Proof Plastic
- Water Purification
- Weed Boat Accessories
- Weed Boats
- Weed Buckets
- Weed Control
- Weed Harvesting
- Weed Harvesting
- Weed Mates
- Weed Rakes
- Weed Screens
- Weedscreen Cleaners
- Weedscreens
- Weirs
- Wetlands Creation
- Wildlife Protection
- Willow
- Wind Power
- Windmill Water Pumps
- Wire Gabions
- Wire Drains
- Aggregates
- Agrotextiles
- Airbrick Covers
- Algae Treatment
- Anti-flood Doors
- Aquatic Plant Data Sheets
- Aquatic Plants
- Arboreal Cultural Works
- Archimedian Screw Pump
- Bank Retention
- Biodegradable Oils
- Biogeengineering
- Blowers
- Boardwalks
- Bridges
- Brushwood Mattresses
- Cable Protection
- Catch Pits
- CCTV Surveys
- Channel Maintenance
- Chippers
- Civil Engineers
- Coir Mesh
- Coir Pallets
- Coir Rolls
- Concrete
- Concrete Cloth
- Concrete Pipes
- Containment Booms
- Contractors
- Contractors Drainage
- Contractors Dredging
- Countryside Management
- Culverts
- Damp Proofing
- Dams
- Dams Coffor
- Data Collection
- Dehumidifiers
- Ditch Cleaners
- Door Barriers
- Drain Covers
- Drain Jetting
- Drain Lining
- Drain Silt Removal
- Dredging
- Dredging Boats
- Dredging Cutter Suction
- Dredging Pumps
- Dryers
- Duct Sealing
- Earth Works
- Eel Pass
- Electrical Contractor
- Embankment Reinforcement