

Managing Water

and its
environment



Godmanchester Flood Alleviation
Scheme - Page 10



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Flood Risk



Flooding

Counting the Cost

Following on from the wettest winter on record, the ABI have said that flood damage claims are likely to be in the region of £450 million.

Taking into account the projected cost of storm damage claims over the same period, insurers will be paying an estimated **£1.1 billion** to help their customers recover from the effects of the bad weather. This figure comes in at one third of the total cost of the severe 2007 floods.

The figures cover the period 23 December 2013 to 28 February this year, during which time, insurers received 17,500 flood claims. 9,000 from homeowners, 5,400 for flooded vehicles, and 3,100 from businesses.

Of the £450 million, an estimate of around £280 million is expected to be paid to flooded homeowners; £150 million to business owners, and upwards of £20 million to vehicle owners.

Flooded customers received early emergency payments of £27 million and temporary accommodation was arranged for over 2,100 flooded households at a projected cost of £24 million.

***“Extra £1.5bn
required due to
the Winter deluge”***

The cost of repairing potholed roads has risen, this year, by £1.5 billion, due to the Winter deluge. Councils in England said the cost of restoring roads to a reasonable condition had risen 30 per cent since last year to an average of £90million per authority. This was recognised in the recent budget when Chancellor George Osborne announced an extra £200million to repair potholes in 2014-15. Transport Secretary Patrick McLoughlin then announced



£183.5million emergency funding to help with road repairs following ‘the wettest winter on record’.

The National Rail Network suffered much disruption. The Dawlish line, was partly destroyed by tidal waves and was out of action for over 2 months.



Network Rail are totting up how much money they will need to protect the railways against future events, following the damage wrought by flooding over the winter.

Flood risk assets damaged

In the Budget, the Environment Agency were given an additional

£140 million to fix and maintain damaged flood risk assets. This was in addition to the £130 million announced in February.

The EA say that 1300 damaged flood risk assets needed repair, following winter flood and storm damage, to restore protection to around 300,000 properties.

Over 150,000 flood risk management assets were inspected by over 100 Environment Agency flood risk management specialist inspectors, aided by around 200 members of the armed forces, which took six weeks to complete.

Add to this the flood recovery fund, given in the form of various grants for businesses, households, and farmers. The claims submitted by Local Authorities under the Belwin Scheme. The lost output to business and the possible long term impact on land values in Somerset, it all combines to make a staggering and as yet undefined total.

The money saved with flood defence spending and maintenance cuts becomes insignificant when looking at the cost of making good. With climate change experts warning that these are not ‘one off’ incidents then it stands to reason that a tactical solution needs to be put in place to protect against future events.





EFRA report on the Winter Floods

“protection must take priority over cost-cutting”

The Environment, Food and Rural Affairs Committee has published its report into the winter floods of 2013-14, with the key message being that the Government must not neglect maintenance of flood defences and watercourses if homes, businesses and farmland are to gain better protection against future flooding risk.

During winter, the Environment Agency issued 155 severe flood warnings and over 7,000 properties were flooded. On a positive note, over the same period, more than 1.3 million homes and businesses were successfully protected by existing flood defences. Although the varying nature of severe weather and flood events does not allow for direct comparison, these figures suggest improvement upon previous flood events, such as those of summer 2007 when over 55,000 homes and businesses were flooded and an estimated 100,000 properties protected.

Nevertheless, the winter floods showed that there are lessons still to learn about: the capability of the country's flood defences; the suitability of the Government's flood risk management priorities; and whether sufficient funding is available in the face of increasingly frequent weather events of this nature.

The sudden and sustained nature of the winter floods underlined the serious need for coherent policies and sufficient funding. The Government must not neglect long-term issues such as improving resilience through regular and sustained maintenance of flood defence assets and watercourses.

With funding for maintenance at a bare minimum, watercourse conveyance and dredging is the first thing to be cut. In the face of limited budgets, low-priority areas such as farmland are sacrificed in favour of urban, highly populated areas.



"We have repeatedly called on the Government to increase revenue funding so that necessary dredging and watercourse maintenance can be carried out to minimise flood risk, yet funding for maintenance remains at a bare minimum. Ministers must take

action now to avoid a repeat of the devastation caused by the winter floods."

Chair of the Efra Committee, Miss Anne McIntosh



The Relief Effort

The Committee commended the widespread help provided to communities during the winter floods relief effort.

Numerous organisations and services were involved in the response to the winter floods including the Environment Agency, emergency services, local councils, highways agencies, the military, public health, the national flood forum and individual volunteers. Around 4,500 Environment Agency staff worked to help flooded communities by running pumping stations, erecting temporary barriers, clearing blockages from rivers and issuing flood warnings.

Following a visit to some of the worst-affected areas in the South-West and the Thames Valley in February, the Prime Minister made a statement thanking all the Environment Agency staff, emergency services, local authorities and local volunteers for their contribution to the relief effort.

Below the EA work through wind, rain and darkness to deploy an AquaDam in Chertsey before the Thames rises further.



Maintenance and dredging

Dredging can be beneficial in certain circumstances, and as part of a portfolio of measures, but it should not be seen as an all-purpose solution. Where dredging is appropriate, the benefits need to be sustained through routine maintenance. Too often maintenance is neglected until a need is created for costly one-off capital investment.

Current maintenance responsibilities and powers are split

between a variety of entities, including the Environment Agency, local councils, internal drainage boards and landowners. The Committee supports the introduction of public sector co-operation agreements between the Environment Agency and internal drainage boards to facilitate internal drainage boards undertaking maintenance of watercourses in their districts with the requisite funding to support their activities. However, there is an underlying confusion relating to the division of responsibilities, with a commonly held, but incorrect, assumption that maintenance is solely the responsibility of the Environment Agency.

Defra and the Environment Agency must work together to improve public awareness and understanding of maintenance powers and responsibilities, particularly in relation to landowners' maintenance responsibility for watercourses on or next to their land. Alongside this education campaign, Defra and the Environment Agency must improve the regulatory regime so that it does not create a barrier to landowners carrying out maintenance work.

The Committee calls for fully funded plans to address the current backlog of dredging and watercourse maintenance as well as to maintain the growing numbers of man-made flood defences. It urges Defra to revisit its policy for funding allocation to recognise the economic and social value of agricultural land.

With different flood risk and management requirements for different catchment areas, the Committee says that, in order to be effective, priorities must reflect local knowledge and local circumstances.

Environment Agency funding cuts

The Committee warns that it is essential that Environment Agency funding cuts do not lead to unintended consequences where funding is redirected to one operational area to the detriment of another. The Report also calls for a reassurance from Defra that frontline flood jobs at the Environment Agency will not be cut.

The Committee identifies the current split between capital and revenue budgets as a major barrier to targeting funding according to local priorities. If the Government moved to a total expenditure approach for flood funding, this would allow more flexibility to spend in the most effective way.

Overall, Defra needs to recognise the importance of regular and sustained maintenance work in the prevention and management of flood risk and take steps to reflect the equal importance of maintenance alongside capital. The avoidance of flood events that devastate communities should, as far as is possible, take priority over cost-cutting.

[Click here for the full report:](#)



Winter Floods Report a lot more needed

Paul Cobbing,
Chief Executive
of the National
Flood Forum

Winter Floods Report – a lot more needed

The EFRA Select Committee report Winter Floods 2013-14 highlight the lack of maintenance of flood defences and the lack of funds needed to do it. This is spot on, but this only tackles part of the issue. All Government departments should proactively reduce flood risk.

Paul Cobbing, Chief Executive of the National Flood Forum said, Last winter showed that flood risk management should be a national priority, not just something for Defra and its agencies to deal with. Government should deliver an integrated, people centred flood risk management policy:

- 1 Set much more meaningful targets to reduce flood risk to homes and businesses, with milestones and a statutory requirement to report to Parliament on progress
- 2 Review how planning policy is actually implemented to address the concerns of hundreds of communities across the country
- 3 Improve building regulations and British Standards to protect properties.
- 4 Implement Sustainable Urban Drainage on new developments to reduce run-off, and consider how to do the same for existing properties
- 5 Ensure that local authorities have flood risk management teams with the right skills, as required by the Flood Risk and Water Management Act 2010
- 6 Require public and business organisations in significant flood risk areas to have flood incident plans in place and to practice these at least annually.
- 7 Commission Fire and Rescue services to promote flood risk management in their work, as some already do
- 8 Review design standards for highways, drainage and sewerage systems
- 9 Deliver funding to reduce flood risk, as highlighted by the Environment Agency in 2012, the Climate Change Commission in 2014 and the EFRA Select Committee in this report. An additional £20million is required each year over and above what was being spent in 2010/11. We are still nowhere near that commitment
- 10 Actively promote the full range of flood risk management approaches through all departments, including managing catchments, supporting and empowering community initiatives and maintaining rivers and ditches.

Extreme Weather & Heavy Downpours

Extreme weather number one challenge facing the nation



Britain's wettest winter for 250 years also underlines the need to continue improving flood defences to cope with future extreme climate, Chris Smith said in a keynote speech.

In addition, there needs to be a continued commitment from Government and partners to

investing in flood defence maintenance, more widespread use of individual property flood protection measures and a higher priority given to flood risk in national infrastructure planning, he added.

Speaking to a packed audience at the Royal Geographical Society, Lord Smith said:

"More frequent extreme weather is the number one challenge facing the nation. The climate will throw more at us in the future and we need to be even better prepared".

Lord Smith said he was extremely proud of Environment Agency staff who had worked night and day from December to February to run pumping stations, deploy defences, co-ordinate information for the emergency services, issue warnings and clear blockages from rivers "often in challenging conditions".

Looking ahead, Lord Smith added

"The Environment Agency, working with communities and partners was key to increasing long-term resilience to flood risk."

This approach is already having real benefits in the Calder Valley, where flash flooding in summer 2012 affected 900 households and 250 businesses and the Environment Agency, local authority and flood wardens are working to understand how collective data, information and intelligence can be combined with technology to provide the community with more time to prepare for flooding.

CONVEX research indicates more intense downpours and increased risk of flash

The new study was a joint Met Office and NERC funded CONVEX project and uses a state-of-the-art climate model providing the first evidence that hourly summer rainfall rates could increase.

While summers are expected to become drier overall by 2100, intense rainfall indicative of serious flash flooding could become several times more frequent.

The results from the study, published in Nature Climate Change, are the first step towards building a more complete picture of how UK rainfall may change as our climate warms.

Dr Lizzie Kendon, lead author of the research at the Met Office, said: *"Until now, climate models haven't been able to simulate how extreme hourly rainfall might change in future. The very high resolution model used in this study allows us to examine these changes for the first time."*

"It shows heavier summer downpours in the future, with almost five times more events exceeding 28mm in one hour in the future than in the current climate - changes we might expect theoretically as the world warms. However, we need to be careful as the result is only based on one model - so we need to wait for other centres to run similarly detailed

simulations to see whether their results support these findings."

As the atmosphere warms it can hold more moisture and this is expected to intensify rainfall. However, research is needed to understand what this might mean for extremes and how this might affect the UK.

In winter it is the daily or multi-day rainfall totals that are important, because we tend to get steady, long-lasting periods of rain from large scale weather systems - similar to those seen during the winter floods of 2013/14.

Climate models, which generally work at coarse resolutions, have been able to accurately simulate winter rainfall and have suggested generally wetter winters with the potential for higher daily rainfall rates in the future. In summer, however, it is the hourly rates that are more important as rain tends to fall in short but intense bursts - as seen during the Boscastle flooding of 2004 and 'Toon Flood' in Newcastle in 2012. Climate models have so far lacked the resolution to accurately simulate the smaller-scale convective storms which cause this type of rain.

To deal with this issue, this study uses a climate model

Intense summer flooding

with a higher resolution than ever used before to examine future rainfall change - using 1.5km grid boxes instead of the usual 12km or larger - the same as the Met Office weather forecast model. This model gives a realistic representation of hourly rainfall, allowing us to make future projections with some confidence.

It was so computer intensive that only the southern half of the UK could be studied and even then it took the Met Office supercomputer - one of the most powerful in the world - about nine months to run the simulations.

These simulations looked at two 13-year periods, one based on current climate and one based on expected climate around 2100.

Prof Hayley Fowler, from Newcastle University's School of Civil Engineering and Geosciences, and lead on the CONVEX project, added: *"We need to understand about possible changes to summer and winter rainfall so we can make informed decisions about how to manage these very different flooding risks in the future. The changes we have found are consistent with increases we would expect in extreme rainfall with increasing temperatures and will mean more flash floods."*

"The next steps are to see if these changes are consistent with observed trends in summer rainfall extremes and changes projected by climate models in other parts of the world. We will be looking at this over the next five years, jointly with the Met Office and other leading international scientists in the European Research Council funded INTENSE project."

Preferred candidate announced to replace Chris Smith as Chairman of the Environment Agency

Owen Paterson is pleased to announce Philip Dilley has been selected as the Government's preferred candidate to succeed Lord Chris Smith in the post of Chair of the Environment Agency, the independent body which delivers Government policy for the protection and enhancement of the environment.

Philip Dilley was until recently the Executive Chairman of Arup, is currently Chairman of London First, a business membership organisation and also a Member of the Governing Council of Imperial College.

He was identified following a rigorous selection process which was validated by an independent assessor from the Office of the Commissioner for Public Appointments. The recruitment process was conducted in accordance with the Commissioner for Public Appointments Code of Practice for

Ministerial Appointments to Public Bodies.

The Secretary of State has invited the Environment, Food and Rural Affairs Select Committee to hold a pre-appointment hearing and to report on Mr Dilley's suitability for the post. This is in line with the Government's commitment to strengthen the role of Parliament in scrutinising major public appointments.

Pre-appointment hearings enable select committees to take evidence from preferred candidates for major public appointments before they are appointed. Hearings are in public and involve the select committee publishing a report setting out their views on the candidate's suitability for the post. Pre-appointment hearings are non-binding but Ministers will consider the committee's views before deciding whether to proceed with an appointment.

Water Act gets Royal Assent

Introduced on 14th May, the new Water Act, will open up competition in the water market, bringing real benefits to businesses and the economy. Together with the other water market reforms set out in the Act, this will grow the economy by £2 billion over the next 30 years.

The Act will ensure affordable flood insurance for hundreds of thousands of households, in the highest flood risk areas, from 2015.

The new law gives businesses the freedom to switch supplier. This will bring real competition into the market, so businesses can seek out the most competitive deal and save money.

Hundreds of thousands of households in the highest flood risk areas will also be able to

access affordable flood insurance from 2015.

It will see flood insurance premiums limited and linked to council tax bands. A new industry-backed levy will enable insurance companies to offer cover to those most at risk of flooding.

This legislation is a huge step forward towards our goal to ensure affordable flood insurance for those households most at risk.

"This winter's exceptional weather has had devastating effects on communities and we want to make sure those most at risk are protected both now and in the future."

Owen Paterson

You can read more about the Water Act here.

Godmanchester Flood Alleviation Scheme



A flood scheme that compliments its surroundings and preserves the historic character

By Richard Chubb CEng MICE, Atkins

Key participants:

Client:
Environment Agency

Design Consultant:
Atkins

Principal Contractor:
Jackson Civil Engineering

Commercial Consultant:
EC Harris

CDM-Coordinator:
Atkins

Partnership Funding Organisations:

- Regional Flood and Coastal Defence Committee
- Cambridgeshire County Council
- Huntingdonshire District Council

Godmanchester, a town of 6000 population, sits on the River Great Ouse in Cambridgeshire.

The town came very close to flooding in 1998 and since then the Environment Agency has been able to secure the funding to construct flood defences to protect the town over the next 100 years. After a few knock backs following budget cuts the work was finally given the go ahead and planning approved at the beginning of 2012.

The overall cost, £6.8 million, was funded through a Defra grant of 46% with the remainder coming from a local authority local levy and direct contributions from Cambridgeshire County Council and Huntingdonshire District Council.

The scheme provides protection to over 560 residential and commercial properties and has reduced the flood risk from a 1 in 25 year event to a 1 in 100 year event, taking in account the anticipated effects of climate change.

The Scheme

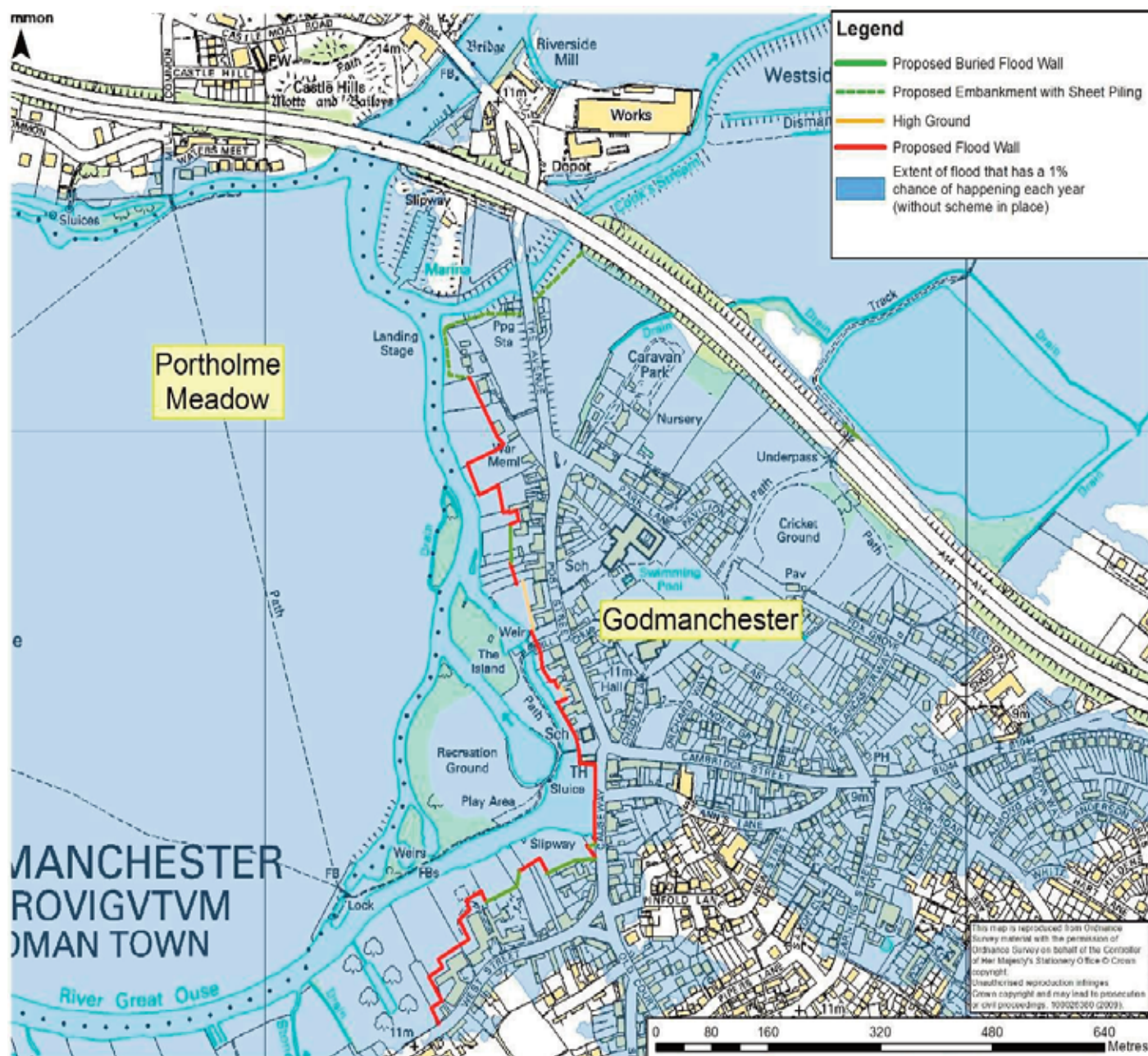
The scheme comprises three main elements:

- 1 A 1.5km continuous line of engineered defences, mainly through residential gardens backing onto the River Great Ouse.
- 2 River widening and dredging around the Cooks Bridge crossing to improve conveyance.
- 3 Two pumping stations to control seepage through the underlying soils.

Construction began with a sod cutting ceremony held in April 2012 and the scheme was officially opened on the 28th February 2014.

The flood defences tie into the A14 embankment which runs across the floodplain to the northeast of the town, and follow a path close to the river through private gardens until it reaches high ground to the south of

ATKINS



the town. The defences, ranging in height from 0.4m to 1.8m, are a mixture of walls and embankments in public realm areas, private gardens and open fields.

Peak flood flow of the river during the design event is approximately 450 cubic metres per second. Dredging around Cooks Bridge, an 18th Century masonry multi-arch crossing and Grade II* listed structure, maximised conveyance of the river and reduced water levels upstream along the line of the defence.

Part of the town at risk from flooding lies across a shallow valley. The valley is underlain with River Terrace Deposits (RTD) comprising a 3-4m thick coarse granular band at the centre of the valley, reducing in grade and thickness towards the edges. At

the centre of the valley, where the RTD is most coarse, a sheet piled curtain was installed to prevent floodwater from seeping through the underlying soils into the town. Piling along the full length of the scheme was neither practical nor economically viable. Two pumping stations have been installed to collect and discharge any remaining seepage.

Constraints

Godmanchester is an attractive market town steeped with Roman history. The works were carried out within a Conservation Area made up of mature trees, historic architecture and landscape views. There are 94 Listed Buildings, two of which are Grade II* which presented a key

constraint to the scheme. The new flood defences pass through the rear gardens of 30 private properties running alongside the river. The majority of gardens are landscaped and contain many curtilage listed structures and walls.

Godmanchester lies adjacent to Portholme Meadow, Europe's largest area of natural wet meadow and a designated Special Area of Conservation (SAC). It is also a Site of Special Scientific Interest (SSSI) for the grassland communities it supports, which are typical of an alluvial flood meadow.

Stakeholder engagement

Dialogue with local residents, councils and other third parties had been ongoing since the initial study in



Buried flood wall and widened channel

2005 and the project team held public exhibitions, presented to the local Town Council and maintained a relationship with residents, interest groups and statutory bodies. The project team also visited local schools to present the scheme, host engineering workshops and deliver health and safety messages. Access and sequencing of works presented a challenge because of the linearity of the site and the constraints imposed by retaining as many trees as possible. By careful programming and planning with an emphasis on segregating the main construction activities, the contractor managed access constraints and gave better resource utilisation across the scheme.

The acute shortage of space is illustrated by the contractor's policy of excavating site fencing feet flush with the surface. Segregated pedestrian routes were established in areas where space was at a premium, avoiding the trips hazards normally associated with site fencing.

Good relationships with landowners helped secure access. Initially, one area was available only from the river, but a landowner gave access,

at great inconvenience to themselves for over a year, providing significant savings to costs and programme.

Flood walls

The designs through the private gardens were tailored to complement existing features and avoid disturbing significant trees. A composite masonry and concrete standard wall detail, developed between Atkins and Jacksons Civil Engineering during the ECI stage, was used throughout. Discussions were held with the local

authority and residents to agree all finishes and materials to preserve the historic local character.

Throughout construction, the design was continuously monitored. On several occasions significant condition and stability issues to adjacent structures were brought to the attention of landowners. Additional works were undertaken to reinstate ageing structures.

Works to raise walls throughout the main public realm areas near land

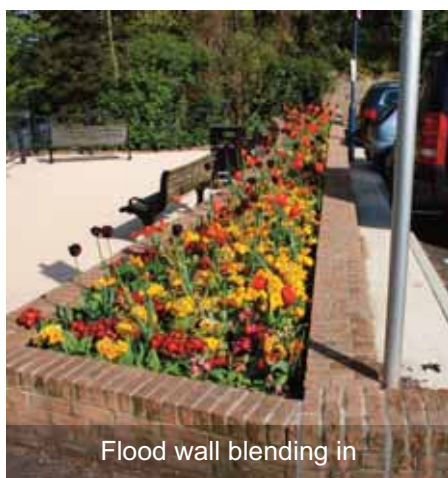


Flood wall running through garden



Some of the gardens that the flood wall runs through

mark structures such as the town hall and the ancient Chinese Bridge were managed closely by the team. The original auger pile foundation supporting the southern face of the town hall was changed to a mass concrete solution. The benefits included shorter construction time and reduced risk of damage to the town hall.



Flood wall blending in

Pumping stations

Two pumping stations installed at Cooks Stream and Rectory Gardens control seepage through the underlying gravels. Cooks Stream pumping station, with a capacity of 500 litres per second, lies within the embankment profile, reducing its visual impact on the rural setting. Rectory Gardens pumping station has a capacity of 300 litres per second and connects to the main surface water network within the town. It discharges through a single 400mm diameter rising main installed

under the A14 embankment, discharging to a receiving watercourse downstream. The rising main was installed using a thrust bore technique, emanating from a 14m x 8m thrust pit on the upstream side, travelling under the 7m high embankment using a laser guided auger boring machine.

The thrust bore was installed through a dense gravel layer below the water table. The system enables earth pressures at the cutting head to be balanced to prevent cavitations during the boring operation. However, it did not require a reception pit to install the outer steel sleeves as all works were undertaken from the launch site. Once the steel sleeves were installed, a slit trench was excavated to facilitate installation of the 500mm diameter outfall pipe which was grouted into position within the outer sleeve.

Environmental mitigation

A suite of mitigation measures were implemented, including a public exhibition, a drop-in session and notice boards advising of the works.

Mature trees and planted areas were retained where possible, and tree protection fencing was erected throughout. Ecology surveys identified Great Crested Newts within a nature reserve pond. During construction, one Great Crested Newt found within the working area was successfully relocated by a licensed ecologist to the pond

outside the site.

Nesting birds and waterfowl are a regular feature of Godmanchester. Swans use the causeway in the centre of town, which is also an important fish spawning habitat. All vegetation and tree removal activities were undertaken outside of the nesting bird season. However, nesting ducks and other birds were encountered within the working areas. By ensuring access routes to and from active nests, viability of the nests has been managed whilst maintaining the overall construction programme. A temporary improved area for nesting swans within the causeway was also been installed.



Ducklings on the new embankment

Flooding

2012 was one of the wettest years on record, and much of the site was regularly waterlogged. Loss of construction time was mitigated through effective re-sequencing. On more than one occasion after prolonged flooding, Atkins and Jacksons Civil Engineering collaborated to redesign foundations in saturated soils, allowing construction to recommence as quickly as possible.

Health, safety and environment Management of health, safety and the environment was achieved to an extremely high level, for which the team won a Gold Award in the Considerate Contractors scheme.

The contractor's policies are fully integrated with the Environment Agency's own 'Safety is Paramount' Code of Practice and its Beyond Zero campaign. The contractor's unique 'marginal gains' approach breaks everything down to finite detail and



improves everything by a small margin, significantly increasing overall standards and performance.

The project team was awarded the Environment Agency's Exemplar Award for Health, Safety and Environmental performance. ECO units identified up to 74% in potential energy savings and up to 91% in water usage savings. Access and attendance was recorded using a biometric workforce management and reporting system. Inductions were short and punchy with regular toolbox talks, daily briefings, quizzes and behavioural-based incentives, supplemented with a hard copy induction brochure.

Conclusion

This challenging scheme has reduced the risk of flooding to over 560 residential and commercial properties in Godmanchester. The project has overcome many environmental and heritage constraints. Considerate design and attention to detail has minimised impact to private gardens and the historical landscape.

Excellent teamwork is at the heart of this project's success, which was completed ahead of programme and below budget. The team has received the highest Environment Agency award for health and safety management, and some of the highest team performance (KPI) scores across the region.

Below, the award winning project team





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Rob Cunningham
*Head of Water Policy,
RSPB*



Richard Ashley
*UNESCO IHE Delft
Flood Resilience Group*



Martin Baxter
*Policy, Institute of
Environmental
Management and
Assessment*

Schemes and Funding

Additional £140m Flood funding announced in Budget

In April's Budget, the Chancellor announced an additional £140m Flood and Coastal Risk Management funding over the next two years. This is in addition to the £130m previously announced by the Government in early February and includes some revenue money as well as capital. It will fund repairs to flood defences damaged by the exceptional winter weather since early January, identified by the asset inspections carried out over recent weeks. This is good news for communities at risk of flooding, and means that we can protect jobs in our flood risk management delivery teams.

Over the same period, an additional £5m will be available for environmental crime and enforcement work. This will enable the Environment Agency to undertake additional enforcement initiatives to tackle waste crime, including the deliberate mis-description of waste.

£40m Flood funding made available in Scotland

Homes across Scotland are to get better protection from flooding with the award of almost £40 million Scottish Government funding.

Environment and Climate Change Minister Paul Wheelhouse announced, in April, that the Scottish Government has reached agreement with COSLA to cover 80 per cent of the total cost of two major new flood protection schemes – one in Brechin and one in Selkirk.

The Scottish Government is contributing more than £38.5 million to the projects through the flooding component of the General Capital Grant. The projects have already been granted planning permission, meaning work can get underway later this year.

In addition, the Scottish Government is separately contributing £500,000 towards the cost of fixing damage caused by severe tides and flooding in Dumfries and Galloway earlier this year. This one-off award will help pay for repairs to river banks, sea walls and coastal paths.

Work starts on £50m Flood Defences for Leeds

A major new flood defence in Leeds, which will protect hundreds of homes and businesses and safeguard the future economy, has begun construction.

The new £50 million defences are the first of their kind for the area. In total, they will protect over 150 businesses and reduce the potential disruption caused by flooding for 3,000 city centre flats.

The scheme includes new gates to control the flow of the river Aire, removing the island between the river and the nearby canal, and building new raised defences.

Almost 19,000 jobs are estimated to be created within the protected area over the next 10 years, so the new defences will play a vital role in protecting the Yorkshire economy.



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Visualisation of Crown Point, one of the 2 weirs being replaced with moveable weirs

Funded by £35 million worth of government funding, together with contributions from both Leeds City Council and the private sector, this scheme is an example of the success of partnership funding in creating new defences to make the country more resilient.

Speaking at the launch of the construction, Environment Secretary Owen Paterson said:

“Creating jobs and getting people into employment are central to building a stronger, more resilient economy.

In addition to protecting existing homes and businesses we expect to see a substantial number of new jobs created in Leeds over the next ten years so it is vital we invest in infrastructure to protect the area.

We are spending more than ever before to protect our economy from the risk of flooding and this new defence will do exactly that.”

This project has come into effect thanks to contributions from central government, together with partnership funding contributions from Leeds City Council and the private sector.

Early indications from new independent research into partnership funding for flood defence schemes show up to a quarter (25 per cent) more schemes will go ahead in the coming years than if project costs were met by central government alone.

Across the country, 55 flood defence schemes will begin construction this year, better protecting 43,000 properties.

The government is spending £3.2 billion on flood management and protection from coastal erosion over the course of this parliament.

That is more than ever before and the record investment will continue. By the end of the decade, at least 465,000 households will be better protected from the risk of flooding.



12,000 homes and businesses in Lancashire will be better protected from the risk of flooding thanks to £85 million of government funding towards two new major sea defences.

The new sea defences near Blackpool form part of one of the UK's biggest coastal defence schemes. In total, they will protect 12,000 homes and businesses as well as vital infrastructure like roads and railways.

The sea defence in Rossall will be 2km long, from Rossall Hospital to Rossall Point. The Anchorsholme sea defence will stretch 1km from Kingsway to Little Bispham.

Both sea defences are starting construction ahead of schedule.

Partnership funding contributions from Wyre Council, Fleetwood Town Council and Regenda Housing have also helped to fund the works.

The government is spending £2.4 billion on flood management and protection from coastal erosion. That is more than ever before and the record investment will continue. By the end of the decade, at least 465,000 households will be better protected from the risk of flooding.

Across the country, 55 flood defence schemes will begin construction this year, delivering better protection to 43,000 properties.

“These new sea defences will provide vital protection to homes and the local economy and I’m delighted to see construction starting today.

This winter’s extraordinary weather showed just how important it is to invest in infrastructure to build a stronger economy.

We are spending more than ever before to protect homes and businesses from the risk of flooding and build a more resilient country for the future.”

Environment Secretary Owen Paterson

Revive rivers to reduce flood risk in London



The London Assembly Environment Committee has published a summary of the flood risks facing the capital.

24,000 properties in London are at significant risk of river flooding and the Environment Agency estimates that plans currently under development could protect 10,000 of these.

A shortfall of 14,000 homes. Many thousands more, housing 140,000 Londoners, are at high risk of surface water flooding.

The Committee also warns that the risks of flooding may be increasing. The effects of climate change in southern England could mean drier summers and wetter winters. More heavy rain in the Thames region would increase surface water risk and may lead to more river flooding in London.

Ways to reduce flood risk include sustainable drainage and river restoration, which create space for flood waters to be held higher in the river catchment and soak back into the ground. Allowing low-lying areas to flood safely at times of high water flow should protect homes, roads and businesses.

"London needs to bring back its rivers to protect itself from inevitable flooding in the future. The more we can restore natural banks to London's rivers, the less likely heavy rain will cause the degree of flooding we saw in the early part of this year."

"Heavy or prolonged rain locally or upstream can cause rivers to flood. Tens of thousands of properties are at high or medium risk of river flooding. This is not just from the Thames, but also from the many smaller rivers that flow into it. A lot of people don't know where their local rivers are, until they escape their channels."

Murad Qureshi AM, Chair of the Environment Committee

Flood Risks in London Report - click



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The River Thames Flood Scheme Proposals

Reducing flood risk from Datchet to Teddington

The River Thames scheme is a proposal to reduce flood risk in communities near Heathrow, including Datchet, Wraysbury, Egham, Staines, Chertsey, Shepperton, Sunbury, Kingston and Teddington

The River Thames between Datchet and Teddington has the largest area of developed floodplain in England without flood defences, with over 15,000 homes and businesses within the area at risk from flooding from a 1 in 100 flood (ie a flood with a 1% chance of occurring in any one year).

Major flooding would cause severe disruption to the road network, suspension of several major drinking water abstractions supplying the south-east and threaten up to 20 electricity sub-stations.

The Environment Agency has calculated that damages from a major flood could exceed £850 million. It is predicted that the effects

of climate change will double flood damages in a 1 in 200 year (0.5% chance of occurring in any year) flood from the current level of £850million to some £2 billion by 2055, with the number of properties at flood risk reaching 35,000.

Many of the communities in this area have been affected by several major floods, with a notable flood in 1947, which was approximately a 1 in 50 flood (2.0% chance of occurring in any year). A further large flood occurred in 1968 and more recently in 2003, when approximately 256 properties were affected. In early 2014, many communities again experienced prolonged and widespread flooding from the River Thames.

The River Thames scheme

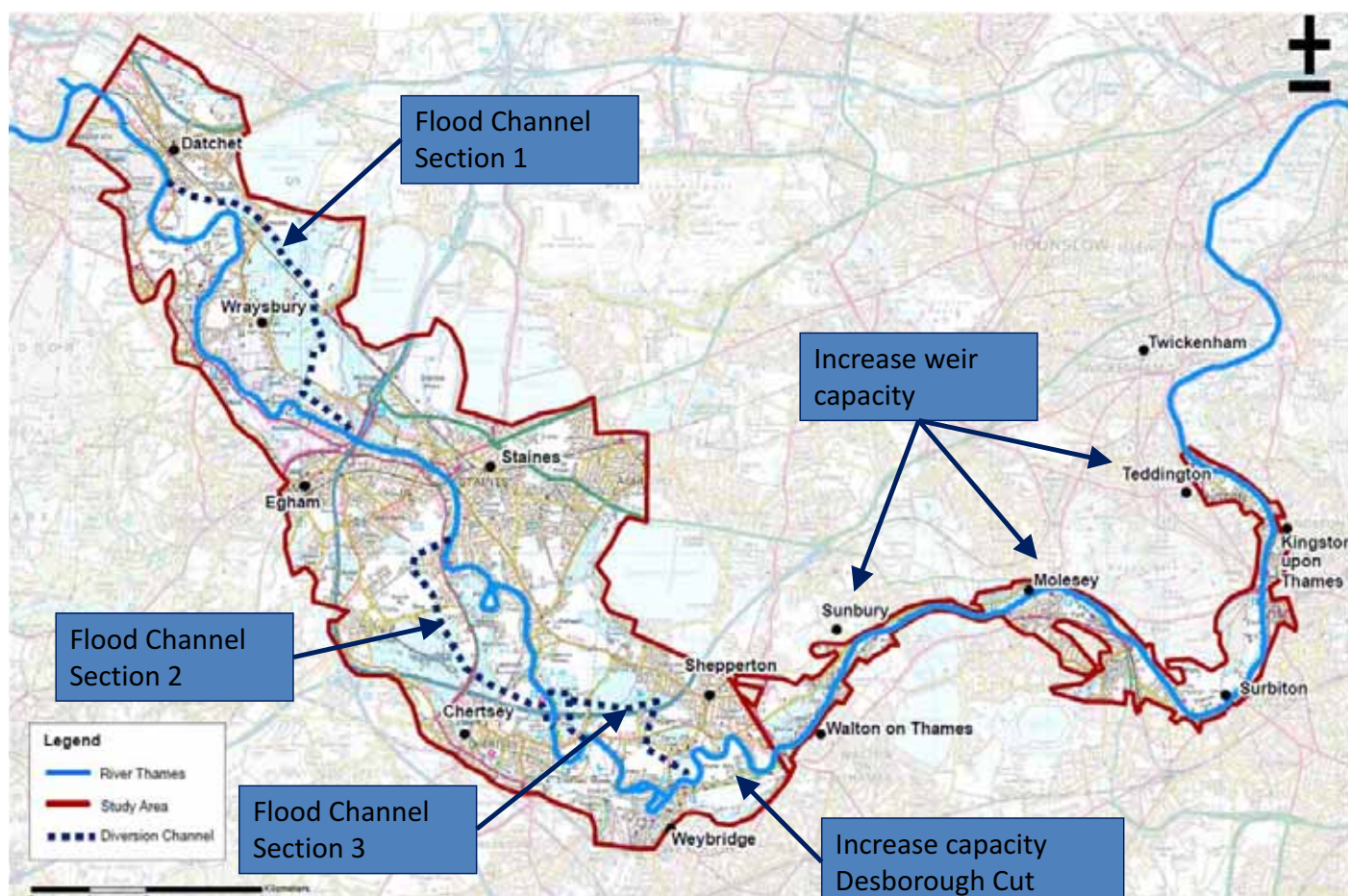
The River Thames scheme will meet the recommendations set out in the Lower Thames flood risk

management strategy finalised in 2009 after consultation with other public bodies, businesses and residents, and published in November 2010.

The scheme consists of a new flood channel, improvements to 3 of the existing Thames weirs, installation of property level products for up to 1,200 homes (to make them more resistant to floods) and improved flood incident response plans. The flood channel will be between 30 and 60 metres wide and 17 kilometres long, built in 3 sections.

The proposed scheme will protect 9,500 properties to a 1 in 75 flood (1.33% chance of occurring in any year). In total around 15,000 properties, local infrastructure (eg roads, sewerage network) and many businesses will be better protected from flooding.

All communities between Datchet and Teddington will benefit from the



scheme. This includes the communities downstream of the flood channel, as modifications to the weir will also reduce water levels between Walton Bridge and Teddington.

Flood risk cannot be eliminated completely, therefore some homes benefiting from the scheme are also being offered property level products to make their property resistant to flooding.

The Environment Agency is working on the scheme with 7 local authorities and the partnership's vision is 'protecting our communities; securing our economy; enhancing our Thames'.

The Scheme

Subject to funding, the scheme will be carried out in 2 phases.

Phase 1 includes:

- developing a funding strategy for the scheme
- a hydrology and modelling study
- ecological surveys of the River Thames and specific sites
- installation of property level



The Thames at Shepperton in flood, 2003

- products in some homes
- major incident planning to improve preparedness and response to flooding
- increasing the flow capacity of Sunbury, Molesey and Teddington weirs
- obtaining planning consents for the enabling works on the weirs
- securing government assurance and approvals

Phase 2 includes:

- detailed design of the scheme
- securing full, detailed planning permission and other consents for the work
- building all 3 sections of the flood channel and associated structures, and increasing the capacity of Desborough Cut



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Timescales

The Environment Agency will be appointing consultants in summer 2014 to work with the partnership on the outline design of the flood channel and capacity improvements, and produce environmental assessments. This stage will take approximately 3 years and enable the flood channel to be submitted for planning consents and authorisations.

Subject to funding, construction work could begin as early as summer 2016 on the modifications to the first Thames weir. Construction of the flood channel is expected to start in 2020 and take approximately 5 years to complete.

Partners

Working in partnership is important to the success of the River Thames scheme. Partners include:

- Environment Agency
- Elmbridge Borough Council
- Royal Borough of Kingston upon Thames

- London Borough of Richmond upon Thames
- Runnymede Borough Council
- Spelthorne Borough Council
- Surrey County Council
- Royal Borough of Windsor and Maidenhead
- Defra

Cost

The estimated cost of the proposed scheme is £256m (value cost at 2009 prices). It is expected to qualify for a central government grant of £136m, and the remaining funding of approximately £120m needs to be secured from other sources, including local enterprise partnerships and businesses.

The Thames Regional Flood and Coastal Committee is currently funding the development stages of the scheme.

Progress

The 3-year programme of ecological surveys began in April 2012. Their findings will be used in the outline

designs of the flood channel and support the environmental impact assessments.

Local authority emergency planners, the Environment Agency and the emergency services are working together to prepare a major incident plan for flooding. This plan will improve the emergency response to flooding from the Thames in these communities, based upon the experiences of 2003, 2012 and 2014.

Property level products (eg door barriers, non-return valves and airbrick covers) are being offered to residents along the Datchet to Teddington stretch of the River Thames, who will remain at significant risk (at a 1 in 40, or 2.5% chance of flooding in any given year) after the flood scheme is complete.

The Environment Agency has carried out some property surveys at properties where home owners have already expressed an interest in the products.

For more information Click [HERE](#)

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Putting the citizen at the centre of flood prevention

Predictions indicate that over the next 70 years there will be a doubling in both the number of people affected by flooding each year

WeSenseIt is a four year European Framework 7 funded project. The project will develop a citizen-based observatory of water, which will allow citizens and communities to become active stakeholders in information capturing, evaluation and communication. The project will bring together the expertise of 14 European Partners ranging across Academic Institutions to Research Centres and Industry from 6 countries.

Partners

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HydroLogic Research Delft
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Advantix Sistemas y Servicios
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Software Mind S.A.
Doncaster Metropolitan Borough Council
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Quinary Spa



An EU-funded project is seeking to enable citizens to monitor and report on their own environment, using social media and thus become the first line of defence against flooding.

Recent events in England, central Europe and elsewhere have once again underlined the human and economic costs of flooding. The number of people who will be affected is predicted to double over the next 70 years, with annual damages increasing from EUR 7.7bn to EUR 15bn. Europe's ability to mitigate and adapt to the effects of climate change is therefore one of the challenges of our time.

The EU-funded WeSenseIt project was launched in October 2012, with the aim of strengthening Europe's response to water management and to directly engage with citizens and communities on the front line.

So far the project team has successfully tested the concept of engaging citizens to monitor water levels. And one of the project partners is seeking to market a social media analysis tool developed by the team in 2013.

A citizen's observatory

When it comes to floods, citizens have often been thought of as mere consumers of information; potential threat warnings would trickle down from authorities to those living in areas at risk. But couldn't citizens and communities be given a more active role and become part of the solution to better water management?

This is why WeSenseIt is developing the concept of a citizen-based water observatory, where communities form part of a two-way information chain. The advent of mobile phones and social media means that citizens can be fully

active in capturing, evaluating and communicating valuable information on water levels, creating cost efficiencies and acting as early warning systems for over-stretched local authorities.

"There are so many rivers that it would be impossible to monitor them all with sensors. Not all necessary information can be captured with sensors. Moreover, cost is a major issue: often the cost of the communication infrastructure to transmit data dwarves the cost of the sensors themselves."

Fabio Ciravegna, Project coordinator, University of Sheffield

Citizens – such as volunteer flood wardens in the UK or civil protection volunteers in Italy – can help by taking measurements using new apps currently being developed by the project and sending information and images by phone.

They can also help by reading existing sensors and sending authorities the data via mobile apps. The collected data will be made available through the Global Earth Observation System of Systems (GEOSS).

New technologies and approaches to water management are being tested and validated in three EU countries: the UK, the Netherlands and Italy. "For example, we are developing mobile apps so that flood wardens in the UK can walk along river banks, and take tagged pictures if they think there is something of concern," says Prof Ciravegna. "We have already received hundreds of pictures from Doncaster."

In Italy, an evaluation involving some 500 volunteers simulating a flood in the city of Vicenza was completed at the end of March 2014. The project has also been

Observatories Evolution in water.

asked to provide assistance in supporting the city of Vicenza during the evacuation of some 50 000 people, in order to allow an unexploded World War Two bomb to be diffused.

Sensing business opportunities

WeSenseIt also has a strong focus on creating new economic opportunities, which is why eight small to medium-sized enterprises (SMEs) are involved. One company is already commercialising a tool developed during the summer 2013, just 10 months into the project.

The tool, which carries out large scale social media analysis to help emergency responders during large scale floods, found an application in monitoring large city wide events in England. Events involving over 600,000 citizens were monitored with excellent results, reflecting the breadth of potential applications of this kind.

Overall, the citizen observatory concept will provide solid infrastructure within which SMEs can create and test applications and services at low cost, in a project setting that will give them high visibility. Businesses stand to benefit hugely from being able to apply developed technology to such an important issue.

"The long term impact of this project will be the development of a new way of understanding the environment; that it is something shared by us all. The real lesson here is that it is not just about monitoring emergencies, when everyone wants to help; monitoring and measuring on a daily basis enables preparation, prevention and understanding. I think, with this project, we are getting there." Prof Ciravegna continued



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SuDS Implementation Delayed Again

After countless delays, yet another postponement to the target start date for SuDS legislation in England and Wales has hardly raised an eyebrow of surprise.

Despite a winter of floods misery and high-profile media attention, measures to bring in compulsory National Standards for Sustainable Drainage Systems have once again been postponed by DEFRA. Key stakeholders who have been involved in detailed consultations over SuDS implementation were told in a letter that the Government will not be in a position to implement Schedule 3 of the Flood and Water Management Act from October 2014.

Instead, the letter says, an announcement will be made in the summer which will set out in detail the plans for implementation. In addition, the Government will still keep its promise to provide six months' notice to enable Local Authority SuDS Approving Bodies to be ready to start work approving SuDS schemes.

"The Government remains committed to implementing SuDS at the earliest available opportunity, but not in a way that has any adverse impact on development," the letter states. Like me, you might be wondering what this short half a sentence implies exactly... and how many volumes it actually speaks?

You might also calculate that, with parliament in Summer session between 4 June and 22 July, and a General Election on May 7 2015, the "window" for implementation is starting to narrow (given a six months' lead-time) especially if there are any further delays. This could surely not be ruled out on past experience.

So, with a much-needed imperative to

increase the UK's housing stocks front-of-mind will the Government ever be able to reconcile fears of so-called 'adverse impact on development', despite its stated commitment? Surely the prospect of stalemate is not out of the question? Of course, nothing must stand in the way of providing much-needed affordable homes. However, the perceived threat of any so-called 'adverse impact' of natural SuDS features for housebuilders must not be allowed to become the elephant in the room that paralyses SuDS implementation altogether

It has always been the case that well-engineered SuDS designs which combine manufactured systems with above-ground biodiversity through natural features can provide cost-effective solutions for developers.

Practical SuDS solutions using innovative proprietary systems can deliver repeatable performance with clear and predictable maintenance schedules. Taking a down-to-earth practical approach is surely the answer to finding a compromise with which developers can feel comfortable? Predictability is the key to delivering SuDS schemes that local authorities can have the confidence to adopt with clear maintenance schedules

After all, the demand for SuDS is not going to go away any time soon - either through other legislation, local planning or Environment Agency stipulations. Even the targets of the European Water Framework Directive should continue to pull through environmental water quality improvements.

SuDS legislation is a vital element of measures to combat surface-water flooding. It is imperative that the Government implements this legislation before the 2015 General Election

Contact Alex by email: alex.stephenson@hydro-international.co.uk
Telephone: 01275 878371



Building a sustainable drainage infrastructure for a development of more than 3,000 homes to serve the expanding Cambridge city conurbation has provided important lessons for housebuilders as they prepare for new regulations for SuDS in England and Wales – whilst demonstrating that the solution for every site must be individual.

The SuDS solution at Great Kneighton shows how effective masterplanning, combined with a practical approach to designing effective trains of SuDS from a versatile toolbox of engineered and natural solutions, has delivered a workable solution despite challenging ground conditions.

Exemplary SuDS Infrastructure for Cambridge's Major Housing Expansion

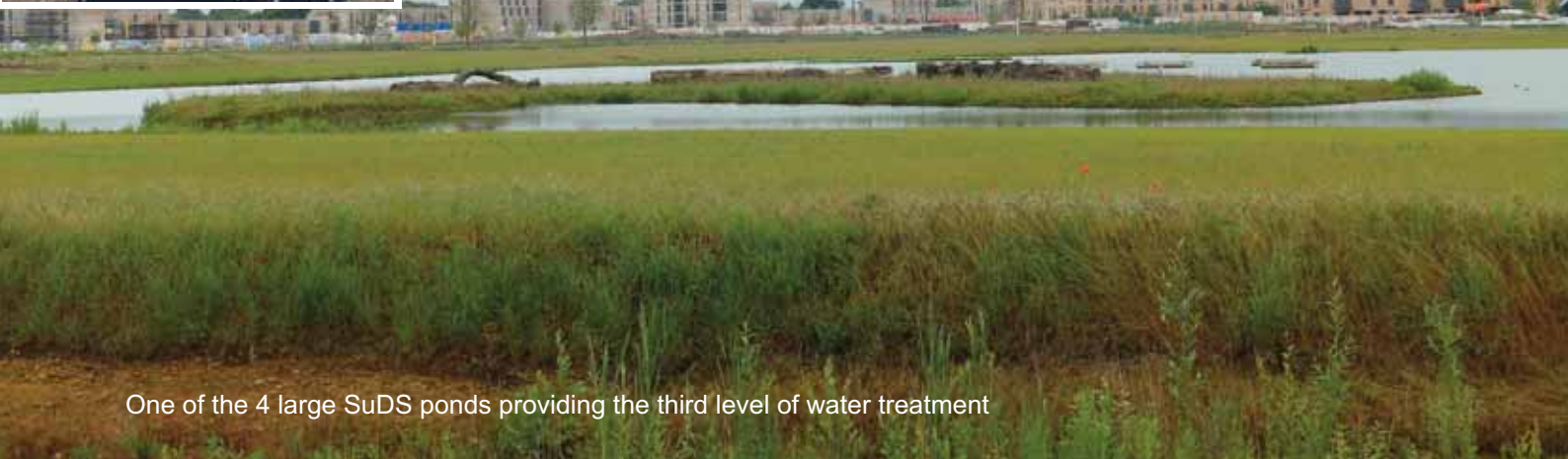
By Sharon Lindsay

About 4km south of Cambridge City Centre, a major expansion to the Cambridge City conurbation is being developed between Trumpington Village and Addenbrooke's Hospital next to the futuristic- new medical research facility. Known as Great Kneighton, the development will provide 2,536 homes together with a 120 acre country park and a community square that will host essential facilities and services including a new community / health centre, library, shops, offices, new primary and secondary schools and a transport hub. The new area is much-needed to serve Cambridge's rapidly-growing population. Cambridge's famous guided busway – the world's longest – crosses the site.





A Hydro Downstream Defender® providing the 2nd level of water treatment



One of the 4 large SuDS ponds providing the third level of water treatment

Following an £8 million infrastructure investment by Countryside Properties on the former farmland, over half of the development land will remain as open space with a generous green corridor running through the site. From the earliest stages of planning, minimising environmental impact and providing public amenity value was a priority for the former Green Belt land and the resulting site will have extensive mature tree planting, playing fields and community allotments.

Ponds

Four large SuDS ponds form part of the open space, each providing a different type of amenity and ecology as part of a strategic drainage plan.

Construction began in Spring 2010 and it could be 12 years before the site is fully completed. However, masterplanning for the site began many years before, with determined expectations for a sustainable drainage infrastructure being led by the Environment Agency together with Cambridge City Council – one of most forward-thinking local authorities on SuDS which has produced its own design guide.

Consulting Engineers URS developed the drainage strategy and URS' Tracey Neal is keen to stress that ground conditions and topography meant the drainage solution developed was very unique to the needs of the site:

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“Every site is individual and that puts different characteristics and demands on the surface water strategy,” says Neal.

“Like much of Cambridgeshire, the site is extremely flat. It has a very high water table and a band of clay with some sands running under much of the site just a metre below ground level. Consequently, an assumption of 60% impermeable area for the development parcels was used. The drainage strategy therefore had little opportunity to use infiltration as part of the solution and there was no option but to discharge the majority of the surface water offsite.”

However, the receiving watercourse is the Hobson's Brook, an historic watercourse dating back to 1571 and originally built to take freshwater from Nine Wells Spring to Cambridge City Centre before meeting the River Cam. The welfare of the brook is carefully protected by a local Trust who were closely consulted and involved in the drainage strategy from the earliest stages.

The Environment Agency set discharge limits to achieve greenfield run off rates of 2 l/s per hectare and a drainage infrastructure designed to cope with a 1 in 100 year storm event was required, into which a 30% allowance for climate change was added.

“Developing a drainage solution was quite a challenge as it is so flat in all directions and the water falls in a very flat gradation,” adds Nigel Borrell, Senior Technical Manager for Countryside Properties. “We therefore ended up dividing the site into 4 separate stormwater drainage catchments. The Hobson's Brook runs through each of the four catchments, with the development all built on one side and green open space on the other with surface water drainage centred on four attenuation ponds, each with its own distinct ecology.”

Ecology

The largest of the ponds is designed to be a public amenity and wetland for wading (and other) birds such as Lapwing and Golden Plover. One pond is a dry detention basin, but the others are relatively large with permanent water because of the flat topography and shallow margins for controlled flooding. The area of permanent water covers 1.9 ha.

“We looked at the market for flow control products to control the discharge out of the ponds into Hobson's Brook at the strict two litres per second per hectare requirement” says Neal.

Hydro-Brake® Flow Controls were chosen. Downstream Defender® hydrodynamic vortex separators from Hydro International provide an essential second level of the SuDS strategy. They are installed at the inlets to the pond from each of the four catchments. They remove sediments, floating detritus and hydrocarbons. This protects the ponds' ecology and prevents the ponds from



Installing a Downstream Defender[®]

silting up. Pond 1 also incorporates a sedimentation forebay as additional protection, especially during construction phases.

The four large SuDS attenuation ponds are fed from the Downstream Defender® units via syphonic drains (thrust bores) under the Brook. The four ponds form part of the open space on the non-housing side of the Brook, each providing a different type of amenity and ecology as part of the strategic drainage plan.

Treatment Train

“The Local Authority required three levels of treatment of the water in the SuDS train before it discharges into Hobson's Brook. The first will be required at individual plot level; Downstream Defender® units provide the second level of treatment and the ponds provide the third,” explains Neal.

All of the strategic drainage for the site will be adopted by Anglian Water including the ponds and the Downstream Defender® separators which will need minimal twice yearly inspection and maintenance as part of the management programme.

Initial monitoring of the strategic drainage has been overseen by the Hobson's Brook trustees: *“Ongoing monitoring of the water quality and water levels of the brook was important to the trustees. The results have proved that the strategic drainage infrastructure is working and no result has come back negative,”* says Neal.

Nigel Borrell continues: *“Development on the Great Kneighton site is now well underway with the schools scheduled to open in September 2015. The housing development is divided into land parcels and three developers, Countryside themselves, Skanska and Bovis have begun work on site.*

“Because of the gently sloping site and the ground conditions, we don't expect fantastic rates of infiltration on the development plots. However, it was nevertheless important to develop a SuDS strategy from individual plot level to avoid the possibility of available discharge limits being reached too early in the development phases.

"We knew we had to pay attention to this from day one. So, it was part of the strategy to make developers responsible for incorporating source control on individual plots and to limiting the discharge from each land parcel."

Drainage Strategy

The drainage strategy suggests a hierarchy of measures starting at individual plot level such as harvesting rainwater into water butts; incorporating permeable surfaces for infiltration and storage; and shallow vegetated swales for runoff storage and conveyance where possible.

At planning stage, developers have to demonstrate that SuDS features are in line with the SuDS design code for the site, which in turn reflects the design preferences of Cambridge City Council which was one of the first local authorities to publish its own SuDS Design Guide.

The strategy also requires that historic drainage ditches cut through the former farmland be maintained and even reintroduced into the drainage network to encourage a healthy ecology across the site.

"The ditches were an ecological feature, but many had dried up over time and captured minimal water during rainfall events. Where suitable we have encouraged the reintroduction of these features as part of overall pattern of flows into the drainage network," explains Borrell.

Lessons Learned

Reconciling the commercial needs of developers with the regulatory water quality requirements and local planning policies can cause conflict. In the case of Great Kneighton the resulting drainage strategy is something that all stakeholders are satisfied with.

A key lesson learned is that the early involvement of all interested parties in formulating the drainage strategy was a key factor in the success. There was early involvement from the Environment Agency, Anglian Water as the drainage authority,



Small Reed Pond

Cambridge City Council as well as the Hobson's Brook trustees.

Simon Bunn leads the Sustainable Drainage Design Team at Cambridge City Council. He comments: *"It was important to set out the needs of the site at Master Plan stage. We had an opportunity to extend the SUDS strategies adopted in the City to a major development; all the more important because the discharge ends up in the City. The Environment Agency took the early lead and we worked closely with them and the Hobson's Conduit Trust particularly with the initial model development."*

"Amenity value is a recognised selling asset now for any development, and the area is Green Belt which is reflected in the master plan and design guidelines. We found the best way to gain acceptance is through incorporating the SuDS solutions as part of the landscape to enhance the amenity value."

Versatile SuDS Toolbox

At Great Kneighton close co-operation with stakeholders and careful attention to the unique topography of the site has resulted in a sustainable drainage strategy that provides thousands of much-needed homes while minimising environmental impact.

"If the site had been more sloping, with more opportunities for infiltration, then maybe the drainage strategy would have been different," concludes Countryside's Nigel Borrell.

"For many housebuilders incorporating SuDS without compromising on building land is a challenge. This was not the case for us. With access to a versatile toolbox of SuDS techniques, including a mix of natural and proprietary features we are able to ensure the ecology of the whole area is protected and can continue to thrive as an important public amenity."

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River restoration & management





The River Improvement Fund Programme

The Rivers Trust, the umbrella body of the rivers trust movement, recently celebrated World Fish Migration Day which took place on the 24th May, by announcing completion of its' £8.3m River Improvement Fund Programme.

The River Improvement Fund Programme, in partnership with Defra (Department for Environment Food and Rural Affairs) and in collaboration with the Environment Agency, has been delivered in three phases over the past four years. The Programme has been managed centrally by The Rivers Trust and actioned and delivered by 28 community river trusts throughout England. More than 200 river improvement projects, ranging from weir removal to habitat enhancement, have been completed, tackling long term fisheries and environmental problems with a focus on removing barriers to fish migration.

There are many historic in-river structures remaining from the industrial revolution and before, where watercourses were modified to provide water for industry. These barriers frequently prevent fish and other aquatic wildlife from moving up and downstream. This can be very detrimental to migratory species such as salmon and sea trout that need to spawn in the clean gravels found in the upper reaches of streams. Eels also need access to freshwater systems to mature before returning to sea to breed. Even coarse fish, that spend all their lives in the river, need to be able to move around the system to access different feeding and breeding areas and to colonise.

"Many migratory fish are fighting for survival as a result of their migration routes being blocked. The Rivers Trust's River Improvement Programme, in partnership with Defra has been an outstanding example of how government, rivers trusts and community volunteers can tackle even technically challenging obstructions and deliver massive improvements benefiting people, fish and wildlife"

Arlin Rickard, CEO, The Rivers Trust

Local rivers trusts used their unique catchment knowledge, community contacts, professional and volunteer base and social capital, attracting co-finance and in-kind contribution valued over £2.3m, complementing a £6.0m grant from Defra to deliver the programme of work.

The Rivers Trust has managed works progress and financial information from rivers trust partners, together with providing administration, audit, financial guidance, training and technical support and liaison at national level with the Environment Agency, Natural England and the Wildlife Trusts.

These works have made a major contribution to delivering Eel Management Plans, Salmon Action Plans and meeting commitments under the EU Water Framework Directive (WFD) and North Atlantic Salmon Conservation Organisation (NASCO)



A full summary document of The River Improvement Fund Programme and an interactive map can be found on The Rivers Trust website at

Achievements to date:

146 Multi fish species barriers eased, passed or removed

87 Eel barriers eased, passed or tidal flaps installed

88 Complementary riparian habitat improvements

44 Feasibility studies for further improvement work

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An alternative to sheet piling

Weir removal opens up Gayton Brook for fish migration

A weir that was preventing fish from migrating on the Gayton Brook in Staffordshire has been removed by the Environment Agency.

The work has been carried out as part of the Gayton Brook Catchment Restoration Project which was set up to tackle issues in the failing watercourse, in partnership with Staffordshire Wildlife Trust

The project was launched in 2010 and identified two weirs in the Gayton Brook catchment that were barriers to fish migration, and major contributory factors to the watercourse falling below good ecological status. The final weir, which has been removed in stages to minimise the impacts of sediment in the water, now opens up the entire Gayton Brook catchment and will allow fish to migrate throughout the whole watercourse. The first weir was removed in 2013.

The Environment Agency will be measuring the success of removing the weirs by incorporating the Gayton Brook in future fish surveys and analysing the number of macro-invertebrates* within the water.

Dan Johnson, project lead at the Environment Agency, said:

"In addition to all of the excellent work the partnership has delivered, removing Gayton Mill Weir represents a significant step towards achieving Good Ecological Status in a failing water body."



"The Gayton Brook project is an excellent template for habitat restoration schemes at the catchment level and demonstrates what can be achieved by working strategically with partners."

The project has also involved carrying out ecological surveys, holding advisory workshops for local farmers, and making improvements to habitats including de-culverting and enhancing water quality.

Nick Mott, Senior Wetlands Ecologist at the Staffordshire Wildlife Trust, said:

"We are delighted with what has been achieved over the past four years along the Gayton Brook and its tributaries. Significant progress has been achieved for wildlife and water quality. We would like to take this opportunity to thank all the farmers, private landowners, estates, fishing clubs and other organisations who

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Unique solution for Bitton Pumped Eel Pass lands environmental award



Nick Williams, Kingcombe Aquacare

Client: The Environment Agency
Location: Bitton, Bristol Total
Contract Value: £31,450.00 Contract
Duration: 3 weeks including
fabrication
Contact: Nick Williams, Estimator/
Contracts Manager E-mail:
nw@kingcombe.com

An ingenious new method of helping baby eels (elvers) migrate up UK rivers has just been voted joint winner of the Environment Agency Project Excellence Awards 2014 for Innovation.

Hundreds of sites that have been almost impossible for elvers to reach in the past could, potentially, be opened up thanks to this groundbreaking technology.

Agency officers faced a major challenge when they were asked to design an eel pass for Bitton Weir on the River Boyd between Bristol and Bath. Surrounded by 9m high steel sheet piling river walls with a 4.5m vertical drop, the weir was a major obstacle to migrating fish. To add to the difficulties, there was no mains electricity at the site.

Undeterred, officers teamed up with Kingcombe Aquacare Ltd and came up with an original solution. Using technology dating back to the 18th Century, they installed a series of hydraulic pumps to provide a steady flow of water down a custom-made eel pass. A special fuel cell and solar panels provide the electricity for monitoring cameras and equipment on the site.

Kingcombe Aquacare fabricated sections of the eel pass at their workshop in Crewkerne, Somerset before fixing it to the vertical sheet piled wall of the weir channel. The bottom of the eel pass channel is covered in a bed of bristles that

'This eel pass is British engineering at its best. Working closely with the Environment Agency, we've produced a successful working prototype that has significant implications for similar sites across the UK and abroad. There are 26,000 recorded obstructions to fish passage in the UK. About 500 could be resolved using this solution. It could also be used at thousands of other sites across Europe. It's carbon-neutral, sustainable, and cost effective.'

John Colton,
Kingcombe Aquacare.

enables elvers to wriggle up over the weir. They are attracted by the constant flow of water coming down the eel pass.

Remarkably, elvers started using the eel pass almost immediately. Within 24 hours of its completion, several baby eels were filmed on the site's CCTV cameras ascending the channel and reaching the upper waters of the river for the first time in decades.

The pass has opened up another 10 miles of the River Boyd to elvers and should help restore eel numbers that have suffered a major decline in recent years. The Boyd is a tributary of the Bristol Avon. Previously, the young eels only had access to less than a mile of habitat.

By harnessing energy from water tumbling down the weir to power hydraulic pumps, the scheme designers avoided the far more expensive option of having mains electricity installed at the site.

This was a challenging project that called for an innovative solution. We knew that if we could design and install an eel pass at this site would could put an eel pass in anywhere. We are very pleased our efforts have been recognised through the Environment Agency's Project Excellence Awards 2014 for Innovation and that we have been selected as joint winner.'

Gareth Varney, Project manager,





The return of Sea Trouts

A sea trout has been caught by an angler on the River Leven in Teesside – marking a huge milestone in efforts to bring migratory fish back to the area.

In what is believed to be the first rod catch of sea trout on the Leven since the Industrial Revolution, the angler who landed the fish reported the exciting catch to the Environment Agency.

The Leven is a tributary of the River Tees, where salmon and sea trout catch data show that migratory fish are returning to the catchment following decades of absence.

Water quality in the River Tees, following the Industrial Revolution, used to be so bad that fish could not live in it.

But the Environment Agency and its partners have worked hard to improve water quality and ensure that fish can move upstream.

This involved the construction of a fish pass on the lower River Leven in 2007, allowing fish to reach spawning grounds upstream.

The catch on the Leven comes after a fisheries survey in 2010 recorded a salmon in the river.

Paul Frear, Fisheries Technical Officer at the Environment Agency, said:

"I'm really excited about this catch. There have been rumours among anglers that sea trout are back in the Leven, but now we have cast-iron proof."

"We constructed a fish pass on the lower River Leven in 2007 that would allow fish from the River Tees to return to spawning grounds on the upper Leven, which had previously been cut-off for over a century."

"Salmon and sea trout are in important part of our rivers' ecology and they are a valuable economic fish stock – so this is fantastic news for the North East."

Rod catch data show a significant rise in salmon and sea trout on the Tees since the early 1990s. It is predicted that the Tees rod catch will meet its catch target of 485 rod caught fish by about early to mid 2020s if it follows the same pattern of recovery as the Tyne and Wear.

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The need for environmental flows

Nataša Smolar-Žvanut
Institute for water of the Republic of Slovenia



Water abstraction and diversion from rivers can cause ecological changes through altered flow regimes, morphological adjustments, loss of habitats, changes in physico-chemical parameters, and changes in diversity of flora and fauna. To reduce these impacts, a number of different methods and approaches have been developed to define regulated flow regimes, which are termed as environmental flows, instream flows or ecologically acceptable flows. There are a number of their definitions, but the most used is definition by Dyson et. al 2003, who defined environmental flows as the amount of water needed in a watercourse – a river, wetland or coastal zone – to maintain a healthy, natural ecosystem and the benefits associated with this where there are competing water uses and where flows are regulated. The basic components of environmental flows include channel and habitat maintenance flows, minimum flows that preserve aquatic and riparian ecosystems and enable habitats for target species; and flows that enable the seasonality of flood flows.

The quantitative determination of environmental flows is a difficult task, because of the lack of predictive linkages between water use and ecology and also the lack of data about thresholds in nature. In the last 40 years, the world-wide problem of determination of EAF has been tackled through the development of a number of different methods and these have been reviewed by a number of authors. Methods can be categorised into four groups reflecting the main attributes of the approach used to define the environmental flows; hydrological, hydraulic rating and habitat simulation methods and also holistic methodologies, which are under development in the last ten years and include the whole river eco-system.

The first definition of minimum flows on running waters in Slovenia was defined in a Decree in 1976, as a quantity of water that enables the survival of aquatic organisms. With the implementation of the Water Framework Directive, a new Water Act in Slovenia was accepted in 2002. The "Decree on the criteria for determination and on the mode of monitoring and reporting on ecologically acceptable flow" was pre-pared on the basis of Article 71 of the Water Act.

The Decree consists of six chapters including general provisions, criteria, the mode of monitoring, supervision, penal provisions and transitional provisions. The Decree prescribes the use of either one of two approaches for the determination of an Ecologically Acceptable Flow (EAF), i.e., the hydrological approach and the holistic approach. The hydrological approach is based on the reversibility, quantity, length and duration of water abstraction, the ecological type of watercourse, and the ratio between the mean flow and mean low flow. A lower value of EAF may be determined on the basis of an holistic approach at the request of the applicant for the water right. The holistic approach evaluates the hydromorphological, biological and chemical characteristics of the river where the water diversion/abstraction occurs. The final determination of the EAF should also include the protection arrangements. In Slovenia, we have made significant progress in developing the Decree on EAF, but it is need-ed to start with its implementation through monitoring.

Restoring the status of river ecosystems with the environmental flow regimes is a big challenge to fulfil objectives of the Water Framework Directive and to achieve good ecological status. It ensures the long term availability of water for the various users and contributes to the community's livelihood.

Connecting River Restoration Thinking to Innovative River Management

ERRC2014!

Through the combined effort of a number of (partner) organisations the inaugural 2013 European Riverprize and European River Restoration conference were highly successful events attracting a large number of participants and having a very positive feed-back. This year's organizers, the SEE river project and the ECRR are optimistic, that the 2014 conference and riverprize gala can - again with support of many (partner) organisations - build upon this success and continue to strengthen the recognition and support to good river management in Europe.



Key challenges for Integrated River Basin Management and River Restoration

This year's conference deals with some key challenges for the future:

How can we innovate Integrated River Basin Management using;

- Green Infrastructure,
- Natural Water Retention; and
- Contemporary River Corridor Management.

The **Green Infrastructure** (GI), a strategically planned network of (semi) natural areas designed and managed to deliver a wide range of ecosystem services is now



ERRC2014!

2014 European River Restoration Conference
27th - 29th October 2014

Organised by the ECRR and
the SEE River project

www.errc2014.eu

being supported as the cross-sectoral approach by the EU. This solution for climate change and disaster risk reduction may one day form the basis for sustainable growth in Europe. The EU is developing both strategy and technical guidance, establishing research priorities and improving the access to finances for GI.

Another cross-sectoral approach is the **Natural Water Retention Measures (NWRM)** aimed at reducing vulnerability to natural disasters, namely flooding and drought. Ecosystems and their service provision should be maintained and restored by agricultural buffers and environmental flows. The EU will develop guidance for NWRM and ecological flows by 2014 and promote the NWRM in the IRBM planning cycle.

Conference sessions will also focus on an innovative new approach called **Contemporary River Corridor Management (CRCM)**. Over the period of the last two years, the SEE River project has worked in 12 countries of Central and South East Europe to develop a new

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approach of cross-sectoral cooperation in river management. The project focused on the river corridor as the part of river basin where most pressures are likely to occur.



By bringing different actors together, like experts, administration representatives and people living and working in the river corridors, they worked towards new concepts and tools enabling to reconcile the water management, conservation, restoration and development interests. By facilitating this stakeholder dialogue, the project has improved the awareness and capacities on contemporary river corridor management of over 500 stakeholders in the region supporting river restoration for a sustainable future management of rivers. In various sessions conference delegates can learn about the inspiring experiences and lessons learned from 6 pilot rivers in the region.

Ecological River Restoration is one of the cross-cutting themes and solutions for supporting GI, NWRM and

CRCM. Best practice approaches of river restoration have already been developed for most sectors. Existing web database and wiki tools, like the ECRR RESTORE River Wiki, can easily be refined to support GI, NWRM and CRCM. But first of all, NWRM and CRCM need awareness raising, outreach, ownership and capacity building. Networking events like the ERRC2014 – See River Project final event, can play an important role for this.

In this framework the conference will showcase and discuss the realization of new river restoration initiatives and approaches on a focused number of river restoration themes; urban resilience, sustainable land use and hydropower, hydro-morphological continuity, fish migration and ecological and economical benefits. Moreover the conference will also examine the overall approach to integrated river basin management by examining cross-sectoral engagement and stakeholder dialogue. Furthermore, cooperation on local, regional, national and international levels will be discussed. EEA's plenary session and WI's, GWP's and EEA's thematic sessions will specifically deal with these new approaches.



The conference is organised by ECRR and the SEE River project



The ECRR is a European network consisting of national centres and individual members united in their mission to enhance

and promote river restoration best practice throughout greater Europe. The ECRR counteracts the threats to natural riverine habitats by fostering the establishment of national river restoration networks, and by disseminating information on river restoration through the website, the newsletter and by organising events like the European River Restoration Conference.



SEE River project is led by the Institute for Water of the Republic of Slovenia and involving 25 more partners

from 12 countries. The project aims at developing innovative approaches to contemporary river corridor management by engaging stakeholders along 6 international rivers in the South East Europe. It is co-funded by the EU in the framework of the Territorial Cooperation Programme South East Europe.

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Change the law to control invasive species

Current Wildlife legislation

Invasive species, such as Japanese Knotweed, the Oak Processionary Moth, the Ruddy Duck and Zebra Mussels, can have detrimental effects on the native species they supplant, as well as on human health and business.

In April the EU voted on new proposals to tackle the problem at a continent-wide level. Following the vote, the Environmental Audit Committee has called on the Government to revamp the system for controlling invasive species in England and Wales. Current Wildlife legislation has never been used to prosecute anyone and is unlikely to provide the level of protection now needed.

Surveillance

Better prevention, surveillance, monitoring, eradication and long-term control measures are all needed in the fight against invasive species. The Government currently has no formal surveillance system in place to trigger action to ensure early eradication. Defra needs to develop a surveillance system that integrates voluntary wildlife recording with professional monitoring and identification.

Species control orders

The current system of 'listing' species to be monitored and controlled is too slow. The Govt must implement legal changes recommended by the Law Commission and replicate the Scottish system of species control orders to provide a mechanism for eradicating invasive species before they become established. Species on the existing national lists that are already well established here should be reviewed, according to the Committee. Where habitats cannot be restored or biodiversity

protected, the invasive species should be removed from the list and control measures re-evaluated.

EU regulation

Invasive species enter the country via the same routes as new plant and animal diseases, such as ash dieback. To effectively address biosecurity risks, the relevant regulatory frameworks should be integrated to ensure a unified approach to managing routes of invasions into the EU. The Committee welcomes a proposed EU regulation on invasive species, which will help bring greater consistency to these actions across Europe. One action our Government can take straight-away is to ratify the international Ballast Water Convention, aimed at reducing the likelihood of inadvertently bringing in invasive aquatic species through the ballast water of ships.

Climate change is already shifting the global distribution of species. Britain, along with other countries, will have to increasingly focus on conservation, where those changes in species distributions have to be managed rather than simply resisted.



WWT Urges the Government to act

The WWT has welcomed the recommendations and is urging the Government to act on MPs' concerns that not enough is being done.

It's estimated that invasive plants and animals cost the British economy more than £1.7bn every year and that the cost of eradicating South American water primrose could rise hundredfold to £1/4bn if current infestations spread

"Our much-loved wildlife is under constant threat from damaging non-native species.

"Invasive species are too often mistakenly dismissed as tomorrow's problem, by which time damage and cost has already risen exponentially. I'm pleased the MPs have raised the urgency of this issue today and made really effective recommendations to prevent problems before they get out of hand.

"The Committee Report sets out quick wins as well as the longer term issues the Government needs to address. I hope Ministers will act on those recommendations quickly and confidently, in support of which WWT offers our conservation expertise."

Carrie Hume
WWT Head of Conservation Policy



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Fish Friendly Pumps go Direct Drive for Cam Pumping Station

Lucy Ogden

Bedford Pumps, the UK's leading manufacturer of large submersible and conventional pumps for the Land Drainage industry, has recently installed and commissioned a Direct Drive Variant of their Fish Friendly pumps for Cam Pumping Station in the South Level Cambridgeshire Fens.

The Fenland area is comprised of mainly high grade agricultural land, much of which is below sea level, considerably below flood level, and therefore totally dependent on pumped drainage. Cam Pumping Station is one of three stations within the district and part of a 7,000 acre (2857ha) pumped catchment, managed by Waterbeach Level Internal Drainage Board.

Cam Pumping Station, located close to the village of Streatham, discharges directly into the River Cam. The pumping station had been operating with a combination of old diesel driven and one electric pump, but with a requirement for the pumps to be upgraded combined with new legislation requiring that measures be put into place to reduce eel mortality at pumping stations, the decision was made to install two new pumps from Bedford's Fish Friendly range.



In addition to the pumps, Bedford Pumps also supplied Siphon Breaker Valves and Sub Bellmouth Flow Splitters for the units. They also undertook the M & E works for the site, taking out the old control panel and replacing it with a new Motor Control Centre. This will operate both the new pumps and an existing pump, which was retained as a stand-by.



Diesel Engine driving the old pumps at Cam Pumping Station

Bedford Pumps manufactured, installed and commissioned two DAF (Fish Friendly Direct Drive Axial Flow) pumps for Cam Pumping Station through consultants Hannah Reed.

The pumps have been installed in a vertical suspended position with below floor discharge, in a new sump on the existing site.

The pumps are powered by electric motor through a gearbox with an external PTO facility. This offers the ability to drive the pump by tractor in the event of a power failure. Each pumpset will discharge 1,150 l/s at 5.6m head.

Bedford Pumps' new range of Fish Friendly pumps are a complete solution for eel regulation compliance. There need be no changes to the civil structure, nor additional fish scare tactics. Utilising a Fish Friendly pump will even improve hydraulic efficiency with an 8% reduction in power absorbed. Bedford Pumps' Fish Friendly pumps cover from 400 to 9,000 l/s at 2m to 14m head. Fish Friendly pumpsets are available as a submersible, mixed flow or direct drive variants.



Bedford Pumps Fish Friendly pumps have proven credentials awarded from independent research consultants in the field of water management, VisAdvies BV, following extensive and stringent trials. The tests prove conclusively that Bedford Pumps' range of submersible and direct drive pumps are fish and eel friendly with no direct mortality observed from exposure to the pump. Copies of the official report which state that Bedford Pumps have manufactured the "best fish friendly pump on the market" are available on request.

Bedford Pumps range of Fish Friendly pumps offer a complete solution for eel regulation compliance. There need be no changes to the civil structure, nor additional fish scare tactics. A Fish Friendly pump can be retrofitted in place of an existing pump and can be installed in a variety of configurations. Utilising a Fish Friendly pump also demonstrates a significant improvement in hydraulic efficiency with up to 10% reduction in power absorbed. Bedford Pumps were delighted to work with consultants, Hannah Reed, in upgrading Cam for Waterbeach Level IDB to supply the best Engineered and Fish Friendly solution for this Land Drainage station.

For further information please contact Lucy Ogden at Bedford Pumps.

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iCut4

demos impress

It's now 4 years since viable remote control slope mowers made an appearance in the market so you could say that Italian company Ferri have been slow off the mark. But they have looked at the performance of 3 cylinder machines, and re-designed the concept from the ground up, subsequently launching the 4 cylinder 50 Hp diesel engine iCut4 as the next generation of these highly versatile machines.

UK importer Pro Mach Environmental is currently demonstrating the new machine to amenity contractors, internal drainage boards and Environment Agency.

Those seeing the iCut4 in action are universally impressed with its unique hydraulic floating flail head system which allows the operator to follow the contour of the terrain, avoiding the common risk of the flail head getting stuck on the ground.

Operators also appreciate the new model's direction track control achieved by the use of 2 joysticks combined with a flow sharing distributor which controls the hydraulic flow to the individual tracks. This ensures consistently smooth and easy directional control without constant correction.

The intuitive control box visualising operations step by step and has an effective range of 150 yards.

At the end of the day it is overall performance that will ensure the market's take up of the iCut4 and this starts with its 4 cylinder engine providing added power to tackle slopes and difficult terrain with a surprising low level of noise. It is also securely mounted to minimise vibration. A large area radiator keeps iCut4 cool in challenging conditions. Access to the engine and all pipe work is very good thanks to two wide opening covers.

The flail head oil priority control has proven effective and constant oil temperature is maintained while working.

iCut4's sure footedness on slopes up to 60 degrees is also aided by its extra weight and expandable tracks from 1.32m down to 1.02m for restricted sites where access is further assisted by a tilting/locking flail head.

The iCut4 is available in two configurations: FLEX with expandable tracks and STANDARD with fixed tracks. A generous gap between the engine and tracks avoids vegetation blockages. Tests have shown tracks stay in place no matter what the ground conditions.



Current attachments:

Universal blade, brush, rotovator, stump grinder, trencher, sprayer, snow blower and chipper.

Ferri see the new iCut4 as the most powerful, remote control slope mower in its category, providing top performance in the most challenging ground conditions. It's ideal for embankments, riverbanks, parks, wind farms and sport facilities. Optional extras include heavy duty hammers for gorse and heavy shrub clearance.

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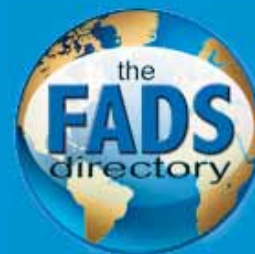
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River Management and Restoration

Flow Control Structures

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River & Lake Engineering works

Engineering
Contractors
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River Management and Restoration

Erosion Control

Hard / soft engineering
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Dredging & De-silting

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Weed Control

Bank cutting
Weed removal
Weed management
Intrusive species



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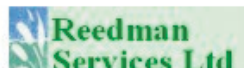
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