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Isle of Axholme Flood Risk Management Strategy

Preferred Option Document

September 2011

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Published by:

Environment Agency
Rio House
Waterside Drive, Aztec West
Almondsbury, Bristol BS32 4UD
Tel: 0870 8506506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

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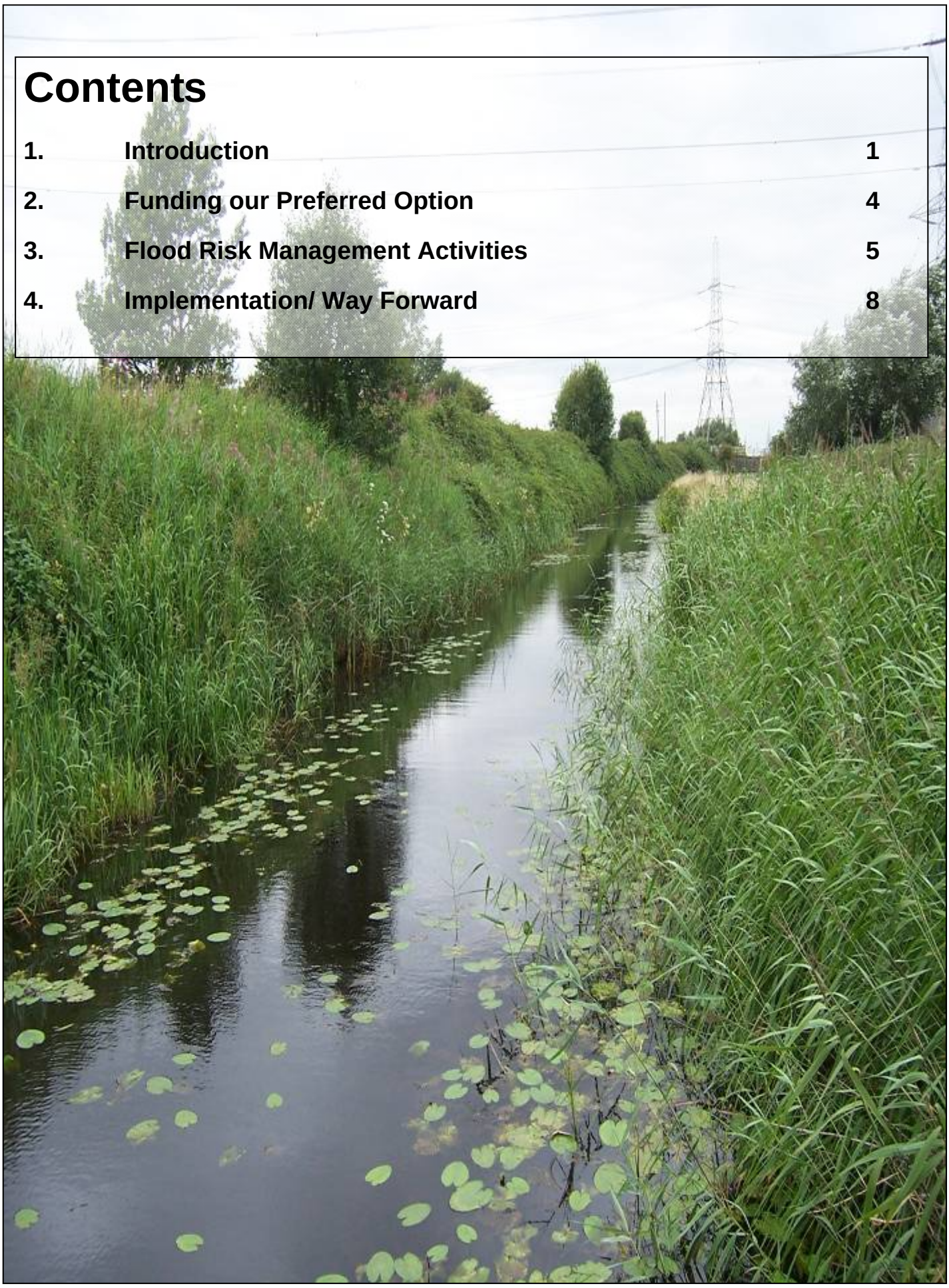


1. Introduction

We are nearing completion of the Isle of Axholme Flood Risk Management Strategy (FRMS) to decide how to manage the risk of flooding from the Rivers Torne and Idle in this area for the next 100 years. Flooding to the area from other sources (the Rivers Trent, Don and Ouse) is being considered in strategies developed specifically for these rivers and our commitment to maintaining the tidal defences and taking account of climate change on the River Trent and other rivers are set out in the Trent Catchment Flood Management Plan, Tidal Trent Strategy and Humber Flood Risk Management Strategy. The tidal Trent banks will be maintained and improved in line with sea level rise to provide a 0.5% (1 in 200) year standard of protection.

Approach

The final strategy needs to provide the most cost effective approach for flood risk management over the next 100 years, whilst demonstrating resilience in the face of extreme events and/or future changes. It also needs to provide environmentally sustainable flood risk management by managing resource use, maintaining existing biodiversity, and looking to make biodiversity gains where possible. We are committed to ensuring that the final strategy is understood and supported by the local community.

Having listened to your responses during previous consultations we have:

- identified activities which do not meet our objectives and, therefore, they will not be considered further;
- identified flood risk management activities that we feel should form part of our strategic recommendations;
- reached a decision about the overall approach which we believe can be funded, although we will still need to identify where efficiencies can be made and any contributions that can be included in our calculations;
- addressed flood risk issues with long-term solutions which we believe are environmentally sustainable, take account of the range of environmental issues within the study area, improve the environment and reduce flood risk management operating costs;

We have prepared this document to tell you about our preferred option and what it involves. Your views have been important throughout the

development of the draft strategy and we hope you can see how we are going to continue to provide you with a good standard of flood protection.

Our Study Area

Our draft strategy concentrates on flood risk from the Rivers Torne and Idle where they flow across the lowland area; the Rivers Trent, Don and Ouse are being dealt with by other strategies and our commitment to flood risk management is detailed in these documents. The area contains 28,000 properties including the towns of Crowle and Thorne, over 30,000 hectares of high-grade agricultural land, significant infrastructure and many businesses. The area also contains nationally and internationally important habitats and is within the Humberhead Levels landscape character area, comprising flat low-lying land characterised by large river plains.

The Environment Agency is responsible for managing flood risk from rivers and the sea. However, in this area the Internal Drainage Boards (IDBs) and Local Authorities also take an active part in managing flood risk through the operation and maintenance of their land and surface water drainage assets. The existing system of rivers, drainage ditches, flood defences and pumping stations work in an integrated way to both manage flood risk and drain the land.

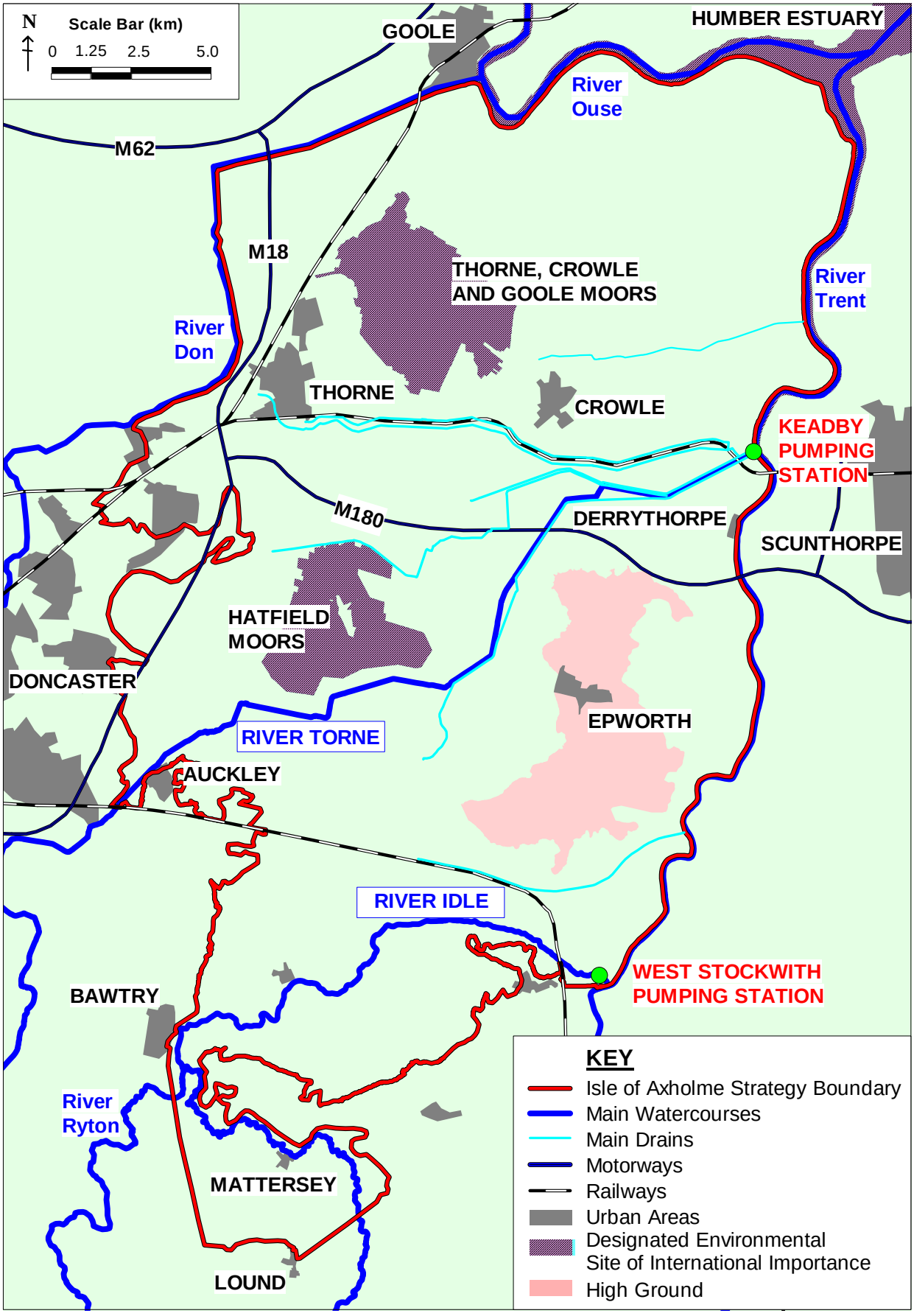
The current annual cost of the day to day maintenance activities by ourselves and our partners is around £2.5million (this excludes existing refurbishments and work on the tidal defences). In addition to maintenance costs, keeping the system in its present form will require a significant increase in capital expenditure as flood defences and pumping stations will need replacing as they reach the end of their current lives. Investing to keep things as they are would cost, on average over 100 years, a further £9.4million per year.

In parallel to the development of the strategy we have undertaken a strategic environmental assessment (SEA). This is documented in the SEA environmental report, which is available on request. The SEA report documents the key features within the study area, how the draft strategy will impact on these features and how the impacts can be mitigated. The two most significant features of the study area to be considered are its potential to support native biodiversity, such as wetland birds and flora, and the presence of large areas of high-grade agricultural land. Agriculture, including arable crops and high value horticulture, salad and organic crops, is an important sector of the local economy and the area is recognised as a significant contributor to UK Food Security. We also need to consider legal requirements such as the Water Framework Directive (WFD) and Eel Regulations as part of any new interventions we make. Throughout the strategy development we have sought the views of key stakeholders on how a balance between these factors can be achieved. We will continue to work with key stakeholders during the implementation stages of the strategy to ensure this continues.

There is also a need to reduce the energy use (and thus the carbon footprint) of the flood risk management system where possible, in line with the move towards reducing the carbon footprint of the UK as whole.

Based on current investment rules, the standard of protection* currently provided in the study area is higher than would normally be expected for similar rural agricultural areas. Our proposed approach therefore has to consider ways to provide a standard of protection which would be likely to obtain government funding in the future, while delivering our commitment to maintaining the tidal defences on the River Trent and other rivers as set out in the Trent Catchment Flood Management Plan, Tidal Trent Strategy and Humber Flood Risk Management Strategy. We recognise that there may be opportunities to work with local interested parties to secure additional sources of funding that could enable a higher standard of protection to be provided.

standard of protection is the expected frequency of flooding that a flood defence will protect against.



The Isle of Axholme Flood Risk Management Strategy Study Area

2. Funding our Preferred Option

Our preferred option is to continue to provide and maintain flood defences but to a 1.3% (1 in 75) chance of flooding happening each year. We do however recognise and share the local community aspiration to provide higher defences. We will work with the local community to find contributions to fund defences to a 1% (1 in 100) chance of flooding happening each year.

Under the preferred option the vast majority of properties will experience no change to their risk from flooding. For the very small number of properties where there are flooding impacts from the preferred option, we would work with individual property owners to seek cost effective solutions for those specific properties; these properties are only at risk from more extreme floods events in excess of the 1.3% (1 in 75) chance in each year.

The current funding system means that the costs of flood risk management are almost entirely borne by the taxpayer meaning that only the most economically justifiable schemes receive funding.

A different system being proposed by Government means that the taxpayer may only pay for a share of the costs of achieving flood risk management outcomes when the economic case is not as strong. Where schemes are only protecting a small number of properties or costs are very high they may only go ahead if costs are reduced or additional funding is found from other sources. Where benefits and outcomes significantly outweigh the costs involved, projects may remain fully-funded by the taxpayer.

Over much of their length the standard of protection currently provided by the raised flood defences on the Rivers Torne and Idle is higher than would normally be expected for a rural area such as the Isle of Axholme. This remains true even when the impacts of climate change are taken into account.

Using evidence gathered during the Isle of Axholme FRMS, the results of previous consultations and the constraints upon us for the future management and operation of the area's flood defences we have now identified our preferred option for the strategy area which will consist of a number of flood risk management activities. Our preferred option is to continue to provide and maintain flood defences to the 1.3% (1 in 75) chance of flooding happening each year. As nearly all of the defences along these rivers will need to be replaced in the next 100 years as their condition deteriorates; this makes changes to the standard of protection provided possible.

Our investigations have shown that this would be the programme of works most likely to receive government funding, although additional funding from other sources will still be required.

We recognise the local community aspiration to provide higher defences, such as 1% (1 in 100), but to do this we will need additional funding contributions. To provide a 1.3% (1 in 75) standard of protection (SOP) we will need to find contributions from landowners, residents or other bodies towards the full life cost of the scheme. To provide a 1% (1 in 100) scheme we will need to find a slightly larger contribution. The 1.3% and 1% SOPs protect against rare flood events but are typical standards of flood protection. The SOP they provide is less than the current system, but the impacts of flooding are relatively low when compared to the system as a whole. Using the 0.5% (1 in 200) flood for comparison, the 1.3% SOP would result in additional flooding to approximately 500 hectares of agricultural land and less than five properties. However, the justification to continue protect against such rarer events becomes increasingly difficult and costly. To continue to provide the existing standard of protection we would need to find contributions of up to £2million per annum. The difference in costs and impacts moving from the 1.3% to the 1% SOP is much less, with £60k contributions per annum required to protect approximately a further 50 hectares of land; the impact on properties remains similar. For the very small number of properties where there are flooding impacts from the preferred option, we would work with individual property owners to seek cost effective solutions for those specific properties.

Table 1 summarises the annual costs for these options.

Table 1: Average annual costs of providing a 1.3%, 1.0% and current situation

Standard of protection	Average Annual cost over 100 years (£k)*
Preferred Option as 1.3% (1 in 75) SoP	10,330,000
Preferred Option as 1.0% (1 in 100) SoP	10,387,000
Preferred Option as current situation	11,869,000

*Average annual cost accounting for appropriate discounting over a 100 year period

3. Flood Risk Management Activities

In general, works to implement the appropriate standard of protection of defences would be undertaken when their deteriorating condition warrants their replacement. Before implementing these works, there would be a need to carry out more detailed assessments to minimise any adverse hydraulic and flooding impacts associated with the order in which they are undertaken. We would also carry out an environmental assessment of these works to ensure any adverse impacts are mitigated and positive impacts are maximised. The replacement defences would start to be constructed within the next ten years in line with the condition-based implementation programme. However, it is likely that some more urgent works would take place in the next two to five years to reduce the likelihood of further breaches in the existing defences.

The following cost-effective and environmentally acceptable flood risk management activities, which we explained in previous consultation documents, will form part of the Isle of Axholme FRMS helping us provide you with robust protection:

Reducing Overcapacity 	*Adjust inland pumping stations capacity and layout without increasing flood risk or reducing land drainage capabilities* – currently there is significant redundancy in the capacity of the pumping station network. By reducing this redundancy, costs can be reduced and environmental improvements such as better fish and eel passage achieved without increasing the flood risk both now and in the future. The cost reduction can be achieved in a number of ways; we have identified up to 18 pumping stations which can either have lower capacity pumps installed when the pumps need replacing or be combined with another pumping station; by reducing the operating regime of the pumping stations costs may be reduced and standardising equipment used in the pumping stations could potentially provide a more cost-effective approach to management of the pumping network. Environmentally, such a solution will reduce energy consumption and contribute to a smaller carbon footprint.
Flood Storage 	*Provide flood storage to hold water in times of flood, reducing pressure on the defences elsewhere* – existing flood storage areas on the River Idle should be maintained and an area downstream of Kilham Farm should be formalised as a flood storage area. This will reduce the volume of water available to flood properties and agricultural land. We will look to manage the storage areas to provide maximum biodiversity benefits.

Flood Warning 	*Continue to provide flood warning services, seeking improvements as appropriate* – This draft strategy concentrates on fluvial flood risk from the Rivers Torne and Idle. Flood warning associated with flood risk from the surrounding tidal Rivers Trent, Don and Ouse will continue in line with the recommendations of the strategies for these watercourses.
Land use and development control	*We will continue to influence planning proposals* – by working with Local Planning Authorities and developers to ensure the appropriateness of development in areas at risk from flooding, in line with current planning policy.
Preparing for Flooding 	*We will work with local communities to manage the remaining risk from flooding* – no flood risk management activities can totally remove the risk of an extreme event or failure causing a flood. We will continue to work with local communities to provide advice on ways that they can reduce the consequence of remaining flood risks by applying suitable resilience measures.
Improvement of pumping station plant and equipment 	*Standardise plant and equipment to provide future efficiencies* – this would offer a more cost-effective procurement approach and will allow equipment to be interchangeable between the different pumping stations. The carbon emitted while operating the pumping system is directly linked to energy consumption of the system and is a major contributor to the carbon emissions from the system as a whole The Energy Hierarchy below shows how improvements to the system can target carbon savings most effectively, 1 being most effective: 1 Reduce Energy Demand – achieved by reducing the number of pumps or changes in operational rules. 2 Increase Energy Efficiency – achieved through replacement pumps or modifications. 3 Use of Renewable Energy - e.g. solar and direct wind power. 4 Use a mix of renewable and non-renewable energy 5 Carry on as at present with minor improvements. This thinking should be applied during all future asset refurbishment, replacement and maintenance activities. These activities may also provide opportunities to improve fish and eel passage in line with the requirements of the Eel Regulations and the WFD.

Operational responsibility 	*Review future operational responsibility to identify potential efficiencies* - currently the pumping stations and watercourses are maintained and operated either by the Environment Agency or the Internal Drainage Boards. When Government-led recommendations for amalgamating Internal Drainage Boards are implemented fully, operational responsibility for some of the assets could be transferred, potentially delivering significant savings. However, this is likely to be a complex process which could take several years to complete. Initially it is likely that the Environment Agency would contract the IDBs to provide the services which we currently undertake ourselves. Alongside this we would commence the legal process which will eventually lead to the formal transfer of assets. These discussions are at an early stage and the full extent is not yet determined. However, there is the potential to eventually transfer all of the Environment Agency assets apart from the tidal banks and the two terminal pumping stations. Transfer of responsibility to the IDBs could potentially provide a ready-made mechanism for securing contributions for maintaining a higher standard of protection.
Pumping stations as mining subsidence mitigation	*Review current requirements relating to pumping stations legally required as mitigation for mining subsidence* – we have not been able to recommend an approach to these pumping stations funded by the Coal Authority under statute. We understand that the statute is under review which may make future potential savings possible.
River channel improvements 	*Channel Profile Improvements* - on a project-level basis, when defence or channel work is required, further investigation will be carried out into the feasibility of channel realignment or improvement in order to achieve environmental gains. This may include the construction of a two-tiered channel with appropriate vegetation planting to provide better habitat during low flow conditions or the reprofiling of an existing engineered channel to provide a more natural profile. We will also seek to implement WFD mitigation measures for areas impacted by capital works as we start to do significant works to defences.
Seeking opportunities to improve wetland habitat 	*River Idle Washlands SSSI* - during consultation with landowners we have identified opportunities for increasing the overall area of wetlands adjacent to the SSSI. We have recognised that there is a major opportunity to extend the wetland area adjacent to Unit 2 Misson West, which is currently in Unfavourable Recovering condition. We will be working with Hanson Quarries and Nottinghamshire Wildlife Trust to link opportunities for gravel quarry restoration with the removal of sections of the minor embankments. Elsewhere we will work with landowners to assess the potential for further wetland creation, potentially linked to improving irrigation water supply by further removal of the minor banks.

Setting back of defences	*Setting Back of Defences* - further assessment of the potential to set back existing flood defences during raising or lowering works. In addition we are investigating the potential to either reduce pumping capacity or remove pumps altogether at a number of locations by providing storage capacity in enlarged channels. This will be subject to a detailed appraisal at a project level, landowner agreement and obtaining the appropriate funding. Setting back of defences is likely to provide ecological benefits by creating new washland areas and wetland habitats.
Legal compliance – Eel Regulations	*Eel Regulations* - under these Regulations we will look to implement screening and passage solutions on our own structures by 2015. We will also be contacting owners of third party structures to provide details of what is required to comply with the regulations. The Isle of Axholme strategy area is being developed as one of a small number of pilot areas looking at the implications of implementation of the Eel Regulations.

4. Implementation/ Way Forward

Initial Works

We have identified an initial programme of refurbishment of raised defences and pumping stations which includes the following works in the short-term (first 10 years):

- seven sections of raised defences with a total length of almost 27km, require refurbishment in the next five years.
  River Torne – on the right bank downstream of Tunnel Pits Pumping Station (PS)
  South Soak Drain – on the right bank upstream of Crook o Moor Bridge and Goodnow Bridges and downstream of Thorne
  North Soak Drain – on the left bank upstream of Crook o Moor Bridge
  Hatfield Waste Drain – left bank downstream of Wood Carr Farm
  North Engine Drain – right bank downstream of Dirtness Bridge
  South Level Engine Drain – right bank between Greenholme PS and Stockholes Turbary and downstream of Bull Hassocks PS and Greenholme PS
  River Idle – on the left and right banks of the Idle, including in the Newington and Everton areas

- All inland pumping stations will be subject to a rolling programme of refurbishment. Pumping stations in the poorest condition are likely to require the earliest works. This includes refurbishment works to the following 11 inland pumping stations: Armthorpe; Dirtness; Snow Sewer Drain Head; Woodcarr; Cross Drain; Bewcarrs; Black Dyke; Greenholme; Heckdyke; Trentside and Four Bridges. Improvement schemes will take account of potential opportunities to reduce capacity and/or combine pumping stations. This will be subject to more detailed studies in the short-term. These more in-depth localised studies will also assess opportunities for biodiversity improvements associated with the pumping system.

- The terminal pumping stations at Keadby and West Stockwith will be subject to a rolling programme of refurbishment with each asset requiring improvements. In the short-term works are likely to include refurbishment of penstocks, flood gates and valves, works to mechanical and electrical systems and replacement of the diesel engines at Keadby.

- Kilham Flood Storage Area involves improvement works to the existing cross embankment upstream of Kilham Farm to formalise the upstream flood storage area.

- Works to defences along the Rivers Trent, Ouse and Don will continue in line with the recommendations of the strategies developed specifically for these rivers.

- Approximately six outfalls will require works within the short- to medium-term.

- The wetland area adjacent to Unit 2 Misson West, currently in Unfavourable Recovering condition, will be extended as we work with Hanson Quarries and Nottinghamshire Wildlife Trust.

Future Works

Once the initial works have been undertaken implementation of the draft strategy will continue. We will carry out further works required in addition to reviews of the final strategy every five years. Some of these future works will require further study as follows:

- Review of the Idle Washlands SSSI Water Level Management Plan (WLMP). This is due for a major review starting in 2012. We will be re-engaging with landowners and other key stakeholders to review the work which has been undertaken to date and to plan future works to meet the objectives of the WLMP. Elsewhere we recognise that there are more complex impacts on existing land use which would need to be resolved as part of the review of the WLMP.
- Minor banks – linked to the WLMP we are keen to work with farmers and landowners to assess the potential for a transfer of responsibility for the minor banks which provide a low standard of protection to agricultural land along the River Idle. This would allow considerable cost savings to be made on future refurbishment, but we need to understand the implications for the areas of land which are protected and for the Environment Agency's obligations under the Reservoirs Act.

Strategy Approval

- Final approvals – we will be seeking approval for the final strategy which we hope will be in place by April 2012. Following this we will be starting work on the detail of the first phase of refurbishment and improvement schemes set out in Section 3 above, working with the IDBs on transfer of assets and seeking contributions for the works required to maintain a higher standard of protection.

How to Contact Us

If you have any comments you would like to make then please contact us by post to **John Pygott, Environment Agency, Phoenix House, Global Avenue, Leeds, LS11 8PG** or via email to: **john.pygott@environment-agency.gov.uk**

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08708 506 506 (Mon-Fri 8-6)

email
enquiries@environment-agency.gov.uk

or visit our website
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incident hotline 0800 80 70 60 (24hrs)
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