Black Sluice Catchment Works Consultation Response Document

Report – IMAN002364/R2

Report version 1

January 2016

Environment Agency (EA)

We are the Environment Agency. We protect and improve the environment and make it a better place for people and wildlife.

We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local authorities, other agencies, civil society groups and the communities we serve.

Black Sluice Internal Drainage Board (BSIDB)

BSIDB is one of those partners, an authority set up to control water levels and reduce the risk of flooding within the Board's area. They operate 34 pumping stations; with 22 of these lifting water into the EA controlled South Forty Foot Drain (SFFD). They also maintain c500 miles of watercourses within the lower catchment.

The lower and upper SFFD catchments totalling c160,000 acres are totally reliant on the effective actions of the SFFD and Black Sluice Pumping Station (BSPS).

The Board, with the correct finances in place, have said that they would welcome the opportunity to maintain and operate the BSPS along with all the current main river assets within their catchments.

They state that "We must now investigate the fundamental challenges with our partners in order to confirm and secure a way forward to assist us to manage and control all the fluvial assets within our catchments in order to help safeguard homes, businesses, land, buildings and infrastructure, all in tandem with an evolving environment."

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Executive summary

Introduction to the project

The Black Sluice Catchment Works (BSCW) project is examining the way that flood risk management is currently undertaken in this river catchment. There is flood risk from a number of sources in the area. The current flood risk management structures and practices for both flood risk and drainage are extensive. Some of the flood risk management infrastructure now requires significant investment. We are therefore taking this opportunity to review the whole system - the structures and their management. We aim to ensure that we and our partners operate the system to provide the optimum standard of protection against future flooding in the most sustainable, efficient and resilient way

Consultation

A six week formal consultation took place between 17 August and 27 September 2015, to seek people's views on emerging options for managing flood risk in the future within the catchment. Those who live or work in the catchment know it best and we proactively sought their contributions. Officers from both the BSIDB and the EA staffed events and meetings, held at village halls and at the offices of the BSIDB. This document outlines how we ran the consultation and summarises and analyses the responses, providing responses to the key themes that were expressed. A total of 71 responses to the formal consultation were received.

An analysis of the responses reveals that:

- Most people support transferring the BSPS to the BSIDB, followed by replacing two pumps to keep the current capacity. The options least supported are do nothing and do minimum i.e. removing the pumps.
- For the Lower Catchment, most people support protecting low points along the raised embankments from erosion, followed by making flood products available to homes most at risk. The options least supported are do nothing and do minimum i.e. continue with current maintenance.
- For the Upper Catchment, most people support increased channel maintenance downstream of villages, followed closely by ‘slowing the flow’ upstream to hold water back, and make flood products available to homes most at risk. The options least supported are do nothing and do minimum i.e. continue with current maintenance.
- Furthermore, a total of 25 consultees indicated they are interested to work with us to help deliver some of the options.
- Consultees identified a large number of views, questions and concerns. In order to address all of these, we have grouped similar points into a number of key themes and provided a response to each of these. The key themes that we have responded to are:

Theme		Theme	
1	Consultation process, documents and evidence	13	Other plans
2	Property Level Protection (PLFP)	14	Discharge from the SFFD during high flows on the River Witham
3	Community Resilience	15	An all sources plan for the catchment combining options
4	Impact on environment	16	Climate change
5	Risk of flooding and perception of risk	17	Development planning
6	Protecting the Low Points	18	Impact on agricultural land
7	Black Sluice Pumping Station	19	Natural Flood Management

8	Widening the SFFD	20	Partnerships
9	Funding	21	Somerset Levels
10	No change to historical practices	22	Costs
11	BSIDB activities	23	Boston Barrier and future water level management for navigation
12	Maintenance	24	Transfer of assets to BSIDB

Next steps

Work on this project has produced the following key points:

- The Black Sluice Catchment currently benefits from a historical legacy of drainage works and infrastructure that reduce flood risk in the catchment.
- Current owners and operators of some of these watercourses and infrastructure are either not set up, or funded, to allow them to continue to operate these into the future. Others may be able to manage them to better effect.
- The EA is not able to deliver all the aspirations that partners and the community have for flood risk management and linked growth ideas, such as water resource security and navigational development, alone.
- There are many other projects that both BSIDB and the EA need to link with as the BSCW project is progressed. For example the Fens Waterway Link and a potential water transfer scheme.

The EA and the BSIDB have agreed to seek to move forward jointly in the following way:

The South Forty Foot Catchment Steering Group has been created. The group will represent the key RMAs operating within the SFFD catchment. The Steering Group will focus on four areas for development:

1. Catchment wide asset management for land drainage and flood risk management

- A transitional arrangement for BSPS
- Interim capital works undertaken by EA and BSIDB
- A joint operation and maintenance plan

2. Water Resource

- Opportunities will be sought to optimise the use of water within the catchment to generate economic growth.

3. Water Level Management for Navigation

- Existing and new aspirations will be considered when developing works arising from the above to ensure Water Level Management for Navigation is incorporated or as a minimum, not precluded for the future.

4. Water Framework Directive

- Opportunities will be sought across all works arising from the above to collectively deliver in accordance with the Water Framework Directive and enhance the environment where possible.

Organisations will be able to bid for funding from sources other than FCRMGIA and coordinate development and risk management activities within the catchment.

Contents

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The Black Sluice Catchment

The Black Sluice Catchment covers 640km² (247 miles²) in south Lincolnshire. All rivers and streams in the catchment flow, or are pumped into, the main watercourse - the South Forty Foot Drain (SFFD). This watercourse in turn flows out to the tidal River Haven in Boston, via the 'Black Sluice' outfall. The outfall comprises 2 gravity sluices (one of which doubles as a lock) and the Black Sluice Pumping Station (BSPS).

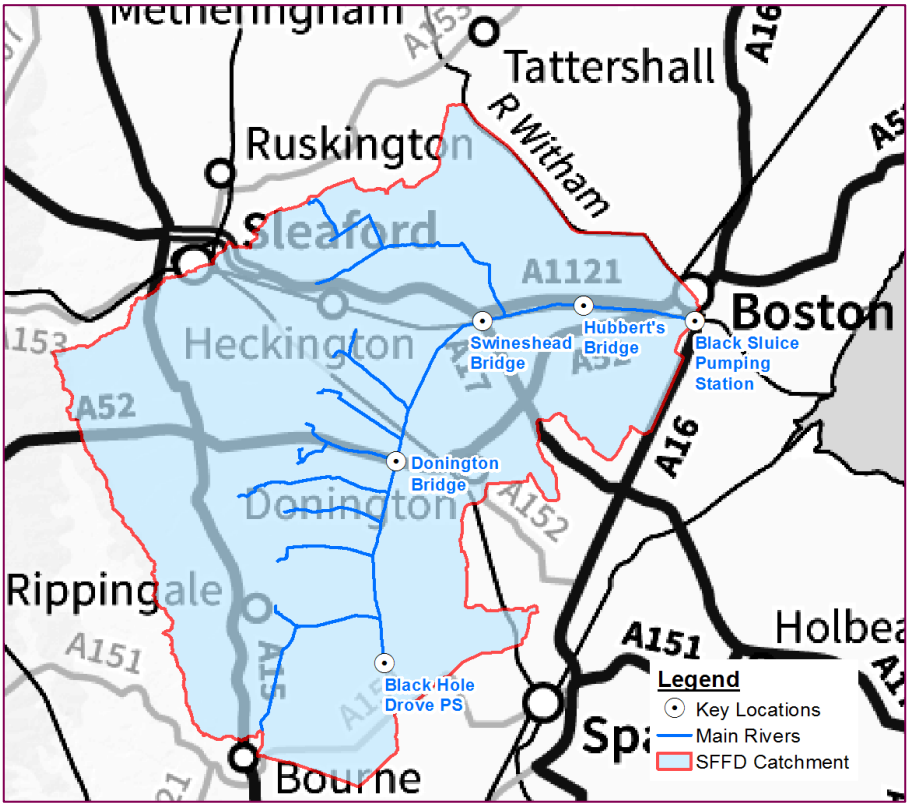


Figure 1: The Black Sluice Catchment showing the main rivers (which are operated by the EA).

Consultation

A six week formal consultation took place between 17 August and 27 September 2015, to seek people's views on emerging options for managing flood risk in the future within the catchment. Officers from both the BSIDB and the EA staffed events and meetings, held at village halls and at the offices of the BSIDB. This document outlines how we ran the consultation and summarises and analyses the responses, providing responses to the key themes that were expressed. For a full transcript of all consultation responses please visit:

https://consult.environment-agency.gov.uk/portal/area/ne/flood/black/sluice?tab=list

How we ran the consultation

We were keen to promote the formal consultation as widely as possible so that communities and other important stakeholders, such as councillors and landowners, were aware that it was taking place and could get involved. Their participation is vital because managing the risk of flooding in the future will be most effective with the support of others. We cannot work in isolation. We recognise that other people may have ideas we have not thought of and allowed space in the consultation for them to be raised. Those who live or work in the catchment know it best and we proactively sought their contributions.

We promoted the consultation using traditional media including local newspapers and radio. We also used social media like the EA's Twitter account. BSIDB publicised the consultation on their website. We put together a briefing note and posters about the events that we sent to local MPs county, borough, district, town and parish councils within the catchment, seeking their help to promote the consultation. We sent these to people who came to informal drop-ins and partners who were invited to a workshop that we held in March, as well as local flood wardens. We were pleased to learn of posters being displayed in shops and on parish notice boards, and information on the consultation being included in local newsletters and on websites. We are grateful for the support from the Association of Drainage Authorities (ADA), National Farmers Union (NFU) and Crown Estate, who helped us to spread the word about the consultation.

We asked people via the response form, how they found out about the consultation. Fifty four people responded to this question. The top three ways were: from the EA (22 responses), through a meeting they had attended (8 responses) and through the media e.g. local radio, newspaper or television (7 responses). Other responses included via parish newsletter (5), or through an organisation they are a member of (4).

We held a total of six events within the catchment for people to come and talk to us – three at village halls in Rippingale, Bicker and Billingborough, and three at BSIDB offices at Swineshead. We produced exhibition boards to show information about the different options to help manage flood risk that were emerging, and associated cost estimates and percentage of government funding we think we can attract. We also shared maps that show the difference in flooded land depending on whether the BSPS is operating or not. More than 150 people attended these events. In addition we were pleased to be invited to attend a meeting with South Kesteven District Councillors and local MP Nick Boles, as well as a meeting with NFU Bourne Branch members. We also had an opportunity to be present on one occasion in the Members' Foyer at Lincolnshire County Council for county councillors to come and talk to us. There were a number of ways in which people could comment on the formal consultation. A dedicated email address was set up: BlackSluiceCatchment@environment-agency.gov.uk Alternatively, people could respond online directly using our e-consultation portal https://www.gov.uk/government/consultations/manage-flood-risk-in-the-black-sluice-catchment They could call 01522 785904 for a hard copy of the consultation document and response form to be posted to them, along with a freepost envelope. A further option was to pick one up from Lincolnshire County Council in Lincoln, their local district or borough council office or from the BSIDB office at Swineshead. People were encouraged to call or email with any queries.

Summary of key findings

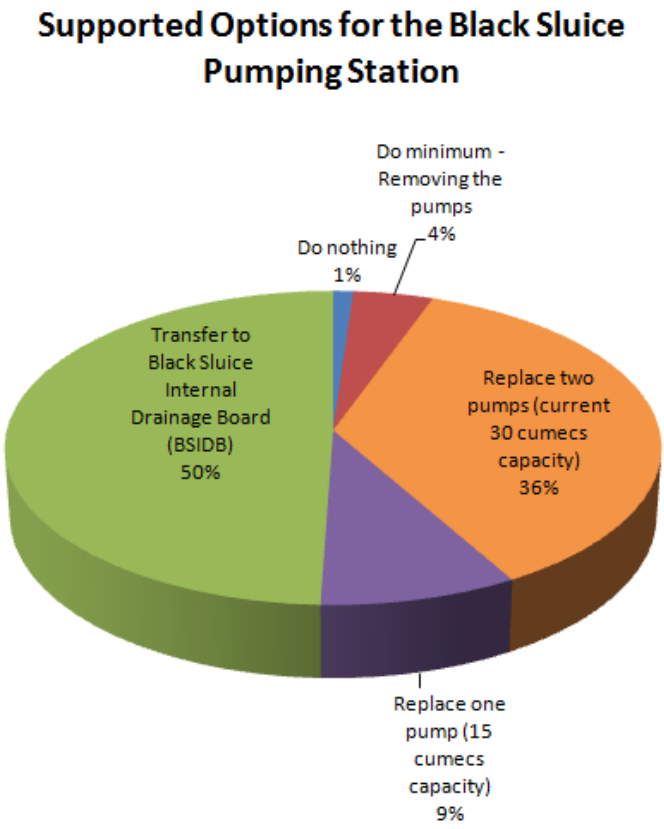
A total of 71 responses to the formal consultation were received. A total of 35 of these responses came from people who attended one of the events.

Although not everyone ticked the boxes on the response form to indicate their support for, or against, a particular option we want people to know their comments are still being taken on board. A number of organisations including Anglian Water, Natural England, Historic England and National Grid did not tick any boxes, but provided a general response.

An analysis of the responses for those who did tick the boxes reveals that:

- Most people support transferring the BSPS to the BSIDB, followed by replacing two pumps to keep the current capacity. The options least supported are do nothing and do minimum i.e. removing the pumps.
- For the Lower Catchment, most people support protecting low points along the raised embankments from erosion, followed by making flood products available to homes most at risk. The options least supported are do nothing and do minimum i.e. continue with current maintenance.
- For the Upper Catchment, most people support increased channel maintenance downstream of villages, followed closely by 'slowing the flow' upstream to hold water back, and make flood products available to homes most at risk. The options least supported are do nothing and do minimum i.e. continue with current maintenance.

  Furthermore, a total of 25 respondents indicated they are interested to work with us to help deliver some of the options. We received some additional evidence of historic flooding with respondents sharing past experiences and photographs with us.



Key themes identified and our responses

Consultees identified a large number of views, questions and concerns. In order to address all of these, we have grouped similar points into a number of key themes and provided a response to each of these. We have also included a selection of representative quotes from our consultees, to set each theme response in context. Each quote is referenced to the unique BSCW consultee number. The type of consultee for each BSCW reference is listed in annex 1, although we are not publishing any personal details. For a full transcript of each consultee's response please visit:

https://consult.environment-agency.gov.uk/portal/area/ne/flood/black/sluice?tab=list

The key themes that we have responded to are:

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Theme 1: Consultation process, documents and evidence

You told us:	
"…disappointed by the nature of the language used in the covering statement, press releases and consultation document, which appear to strongly disfavour replacement/repair of the pumps." (BSCW_51)	
"Doing nothing makes no sense, doing minimum or only installing one pump is a half baked solution." (BSCW_06)	*"Your computer models were undertaken in times of neglect and do not give accurate information of what actually happens after high rainfall." (BSCW_18)*
"…I have been actively involved in trying to ensure that this consultation is carried out adequately, and fairly. There are aspects of the consultation document which are misleading and unfair, and it is only right that these are highlighted…" (BSCW_21)	
"I don't support any of the above and am disappointed at the deliberate direction this consultation response form is 'designed' to force us down." (BSCW_60)	*"…it was extremely hard to see any difference on the very large scale maps at the consultation event." (showing the difference in flood extent) (BSCW_61)*
"This situation seems at times to have been overcomplicated and the suggested options very confusing for anyone without in depth knowledge of the design and function of the drain network in the catchment." (BSCW_71)	
"The work by the EA at the time of the first round consultation showed 13 homes affected by flooding with a 'no pumps' option. So the 'replacing pumps' option showed a benefit of £3m – the cost of buying up those properties. In the current consultation that number was increased to 16, then reduced to zero and we hear latterly increased to 5! This smacks of incompetence or more likely contriving the answer to show a low financial benefit thus skewing any cost-benefit analysis." (BSCW_61)	

Our response:

It might seem odd to have a 'do nothing' and 'do minimum' option but this is something that is required when putting together a business case for funding. We need to show and quantify that it is worth doing something, rather than nothing, and also what the implications are if we carried on doing what we do currently i.e. the minimum. We also tried to keep the language as simple as possible, recognising the challenging technical nature of some of the options. We split the consultation into what seemed like three logical parts; the BSPS itself, and the Upper Catchment and Lower Catchment because flood risk is managed differently in each. We received some suggestions we had not previously considered.

We started a study of the catchment back in 2012 to look at how flood risk from the SFFD main river can be managed in the future. It's very much a live and ongoing process, of which the consultation is a key feature. Most large scale projects evolve and are refined as they progress, sometimes elements change, which is entirely usual. We do not have fixed solutions that are pre-determined, but we are limited by the government funding formula we are required to use. This means that we attract more funding where lives and property are at flood risk, compared to the funding that we can attract to protect land. The limit on available funding restricted the realistic options we could take forward and we aimed to explain this to people within the consultation. This is a long term approach that we are taking, working together with partners to develop a way forward. There are no immediate overnight solutions.

The consultation utilised the best flood modelling and mapping evidence that is available to us, but this doesn't mean that people living and working in the catchment can't contribute their knowledge too. We specifically asked people for any information of historic flooding in the catchment. The modelling work undertaken has been calibrated using real life high flows recorded in the SFFD, giving us confidence that the flood outlines produced are an accurate representation of what would happen. The modelling work has been reviewed and checked by a second independent consultant

and also by our modelling specialists within the EA. We also undertaken a sensitivity analysis to make sure our key decisions would not change by changing parameters. The modelling assumes the best standard for channel condition and is not based upon the current condition of the SFFD.

Some people fed back that they could not see any difference in the maps we used that indicated the difference in flooded areas if the BSPS pumps operated or not. A total of 814 hectares are predicted to flood with the pumps operating in a 10% (1 in 10 chance of happening in any given year) flood. An additional 178 hectares would flood if the pumps did not operate in this scenario. It is hard to show this meaningfully on a map because the areas are small and quite spread out. This is one of the reasons why government funding is not available to the EA, to fund the pumping station.

At the informal community drop-ins in March, where we shared an initial long-list of options about how flood risk could be managed in the future, we understood the risk of flooding for 16 properties may increase slightly if the pumps did not operate during a flood with a 1% (1 in 100 chance of happening in any given year). We needed to seek permission from the property owners to carry out detailed threshold surveys to establish whether this was the case. We knew the extent of flooding i.e. where the water would cover and how deep it would be, what we didn't know in March was the exact height of the 16 properties shown to be within the flooded area. Once the onsite surveys were completed, we were able to prove that all 16 properties were set up above the flood waters, and would suffer no change in their current flood risk. It took until just before the formal consultation started to complete this, and rule out any increase in flood risk to properties As soon as we were able to rule out any increase, we updated our briefing note and reissued it to help reassure people.

With no properties adversely affected, it does make it harder to attract any government funding. We could not spend £3m to 'buy up' any properties that might have been affected. Government funding is only provided as a percentage of the total benefits attributed to a flood defence structure. As the actual benefits (£3million) of the pumping station result from damage prevented to agricultural land and business we can only claim 5.56% of these as a grant, i.e. £168,000 over a 50 year period. This is why the options that the EA have for the BSPS appear limited in the consultation document. The way the EA are funded and instructed to undertake flood risk work means that unless other parties get involved, the EA cannot continue to maintain and operate the facility.

Theme 2: Property Level Flood Protection (PLFP)

You told us:	
"… is bolting the door once the horse has fled. This will also make flooding "acceptable" which should never, ever be the case." (BSCW_06)	"We support the provision of "flood products" for properties in the catchment area as a last resort when despite all efforts some flooding risk remains." (BSCW_46)
"I do not believe flood products will be viable for this level of flood risk. It could be fifty or even one hundred years before flood products are required and would they still be in place and operational if installed now." (BSCW_29)	

Our response:

There are around 1,000 properties at risk of flooding from the main rivers within this catchment and many more at risk from surface water and tidal flooding. This risk exists whether the BSPS operates or not. There is no increase in the current risk to homes if the pumping station does not operate. For those residents whose properties have already experienced flooding or that are at a higher risk of flooding, flood products, such as flood gates and air brick covers, are something that can be considered, as a way to reduce the impact of any flood water on their homes and businesses. Those organisations with responsibility to help manage flood risk will continue to seek ways to reduce the risk of flooding, but the risk cannot be removed completely.

There are some products that you can 'fit and forget' such as doors that are water tight when closed. Others are designed to be installed when flooding is imminent. We believe we can attract some government funding towards flood products for properties most at risk. This funding could be made available to properties prior to any longer term plans for larger flood risk management schemes that can take several years to fund and build. These products can provide some peace of mind for residents in the interim. If a larger scheme meets treasury funding rules, PLFP would never be used as a cheaper substitute, as it does not remove the risks of flood water surrounding properties. In some cases however, PLFP may be the only viable option (particularly where there are small numbers of properties that experience flooding and funding for a larger scheme is less likely to be available).

If a householder would like to install their own PLFP measures, we cannot recommend specific branded products. Instead we refer people to the National Flood Forum. This is a charitable organisation that can give advice of flood products and services available. They have a directory of flood protection products and services on the 'Blue Pages' section of their website www.nationalfloodforum.org.uk. They can also give advice to those who have trouble finding insurance at reasonable cost. They can be contacted on 01299 403055. People may consider a professional survey on their home to help identify where water is more likely to enter. We would advise that products should have appropriate kite marks purchasing. Although the risk of flooding from the rivers or sea can never be entirely removed, it can be reduced with appropriate maintenance activity, flood defences, or flood products.

We would advise all property to owners to check if they are at risk of flooding by calling Floodline on 0345 988 1188 or looking online www.gov.uk/flood You may be able to register for free flood warnings to your mobile, home phone numbers and email addresses, to let you know when any flooding from the rivers or sea is expected in the area. You can also complete a flood plan available here https://www.gov.uk/prepare-for-a-flood/make-a-flood-plan, with handy phone numbers and advice, so that you know what to do if a flood warning is issued.

Theme 3: Community Resilience

You told us:

"Exercising increased maintenance, improved use of flood wardens in rural villages and engagement with the farmers to manage the system more effectively is more appropriate than using hydraulic structures of efforts to slow flow and delay problems." (BSCW_21)

Our response:

Part of the consultation was around the best use of money within the catchment. We suggested that more money would be available for increased watercourse maintenance if the EA no longer has to fund the upkeep of the BSPS.

We work closely with our emergency planning colleagues at Lincolnshire County Council, and other organisations within Lincolnshire's Local Resilience Forum, to help communities prepare for any kind of emergency. We encourage them to form an Emergency Planning Group to develop a Community Emergency Plan that identifies local risks, places of safety, resources, and those who may need help. This usually involves the Parish Council. Interested members of the community can obtain further information about Community Emergency Planning, by looking online, www.lincolnshire.gov.uk/lincolnshire-prepared, within the 'Preparing for an emergency' section. This has a good template that can be used.

Many places around the country have Flood Wardens, or Community Emergency Volunteers, who can support their community during a flood, or any other kind of emergency e.g. heavy snowfall. They have a key role to play, building a community's resilience and raising awareness of different risks. These volunteers may be part of the Emergency Planning Group. Interested community members can approach their Parish Council to see how they can get involved with the Community Emergency Plan. If one doesn't exist, then they can be involved in preparing one. The EA can help with this by providing relevant information about flood risk. Once a Community Emergency Plan is in place, it is important that it is reviewed regularly, particularly as contact details may change. It

should also be practised, to check it works as intended. It may take longer than anticipated to assemble the Emergency Planning Group for example, or to knock on doors down a particular street. No two emergencies will be the same in reality, but it really can help to practise putting the plan into action. Please call 01522 785904 or email blacksluicecatchment@environment-agency.gov.uk for more information, or with any queries.

Theme 4: Impact on environment

You told us:	
"…suggest that opportunities should be taken to incorporate Green Infrastructure into the proposals… (this) can perform a range of functions including improved flood risk management, provision of accessible green space, climate change adaptation and biodiversity enhancement. If there are any possibilities of allowing flooding on land within the catchment this may be an opportunity to create areas of valuable wetland habitat." (BSCW_13)	"There is also the value of the way of life of people who live in the area – their employment on the land, their recreation and their enjoyment of the environment." (BSCW_61)
"I appreciate the environment has to be protected in this day and age but would the comment that all aspects including birds, insects and wild flowers etc thrived a lot better years ago when IDB's only had to consider drainage. Maybe there was a short era when some people could blame farming practices including sprays for a decline but today things are well controlled and farmers have a responsible vision and I think the important thing for IDB's is to go back to concentrate on drainage" (BSCW_18)	

Our response:

We are very keen to incorporate green infrastructure as a way of managing flood risk. Indeed the 'slowing the flow' option aims to utilise natural features to attenuate surface water flows and thereby reduce flood risk. A number of landowners have expressed interest in working with us to achieve this. We are looking into the detail of how this might happen. It could create additional wetland habitat. A strategic plan for the catchment will be developed that could potentially identify opportunities to combine flood risk management with habitat creation, water resource storage and recreational sites.

Under the European Water Framework Directive both the EA and BSIDB have key roles and responsibilities in managing the water environment. This means that they have legally binding objectives to improve, and where already good, sustain the environmental status of the watercourses they manage.

The value of the way of life of people who live in the area is not something that can be included within the economic assessment for government FCRMGIA, however this can be a very good justification for securing other forms of funding that our partners can use. By working more closely with our partner organisations, we will try to assist them in applications for funding sources such as Local Enterprise Partnership funds.

Theme 5: Risk of flooding and perception of risk

You told us:	
"If a property is flooded would the Environment Agency provide compensation including accommodation costs whilst remedial work is carried out." (BSCW_12)	"All plans must be on the basis of NO increase in flood risk and this must be managed accordingly. Residents will NOT accept any increase in flood risk." (BSCW_44)
"Home owners and farmers should recognise that they accept a flooding risk if they choose to buy a property or business in an area with flood risk and unless there are changes to the risk caused by poor maintenance or changes of policy the public purse should not be required to fund protection." (BSCW_14)	
"To suggest that a few fields and houses flooding is not justification enough to keep the pumping station is also flawed as one small flood becomes a surge in extreme conditions as has been experienced in the past." (BSCW_37)	"Perceived risk is considered as bad as real risk, especially for anyone who had been flooded before, or witnessed it, as we have in this area. We accept these floods were not from land drainage, but we know that the stress of flooding or fear of flooding causes serious health problems." (BSCW_37)

Our response:

The EA's focus is to find ways to reduce the risk of flooding to people and property. We are however bound by the treasury funding rules which apply to all investments that we wish to make to reduce flood risk. This also includes the renewal of assets that the EA has inherited from predecessor organisations. We are not permitted to continue to invest in assets that provide a small flood risk benefit for a very large cost to the public. We must invest in a way that gives the best return for the tax payer, even if it means changing the way we have operated in the past.

We have undertaken to identify any properties that could have been placed at increased risk in the event of a decision to withdraw from funding the BSPS. Detailed site surveys have shown that there are no properties that would be at increased risk from changes at the BSPS. If any had been placed at increased risk, we would have put in place measures to reduce this risk, prior to any change to the BSPS arrangements.

There are fewer 1,000 properties at risk of flooding from the main rivers within this catchment and many more at risk from surface water and tidal flooding. This risk exists regardless of whether the BSPS operates or not. There is no increased risk to people's homes if the pumping station does not operate. This current flood risk is determined using the best modelling and mapping evidence that is available to us.

There would be a small increase in the amount of land that floods if the pumping station did not operate at any point in the future. There are 814 hectares of land that flood currently in a 10% or 1 in 10 chance flood, with the BSPS pumps operating. If the pumps did not operate, there would be an additional 178 hectares that would flood, bringing the total to 992 hectares.

It is not possible for a small flood in the river to become a surge, which is more commonly used to describe tidal events. A tidal surge happens as a result of a combination of specific weather and tidal conditions. The tidal surge in Boston happened due to a combination of high tides, low pressure and the direction of wind. This led to a two metre surge in the tidal Witham Haven and resulted in more than 850 properties flooding in the town. The BSPS was flooded, damaging three pumps. It had, and has, no role to play in preventing a tidal surge from the North Sea. The pumping station was built to help with land drainage, not protect people or property, or help to manage water levels in the tidal Witham Haven. What will make a real difference in the future to the tidal flood risk for people and property is the construction of the Boston Barrier in the town. If the barrier and associated defence improvements had been in place, the town would not have been flooded on 5 December 2013.

From a general point of view, the EA has powers to carry out maintenance works on rivers designated as Main River. However, the exercise of these powers is discretionary so we do not have an obligation to maintain watercourses. There is generally no liability to pay compensation if properties are flooded as a result of us not maintaining a watercourse or not maintaining a watercourse to a certain standard.

We would encourage everyone to check if their property is at risk of flooding and can receive flood warnings. These warnings will give you advance notice if property in the area could be affected by flooding from the rivers or sea. You can do this by calling Floodline on 0345 988 1188 or checking online www.gov.uk/flood It is possible to register five ways to receive the warnings including home phone, mobile phones or as a text message. We also advise people to check their house insurance covers them adequately for flooding. You can also make a flood plan for your home or business to help you know what to do if a flood warning is issued and to make sure you have important phone numbers to hand.

Theme 6: Protecting the Low Points

You told us:	
'Protecting low points along the raised embankments from erosion is essential as the breach in the defence can cause areas of flooding' (BSCW_40)	'The option here does not go far enough. Erosion protection should be at the heart of soil conservation, See EU Life project SOWAP and the relevance of this to any slope and erosion risk' (BSCW_21)
'The most vulnerable points along any raised banks with the lower catchments are the low points and/or the narrow in width raised bank lengths. Lifting the bank heights to a uniformed level and reinforcing bank strength by bank width enlargement are both strongly supported' (BSCW_51)	
'Most cost effective way of providing flood protection to property and land' (BSCW_32)	'May save money in the short term but not a sensible course of action in the long term. To move the water away quickly is far better in my opinion particularly where holding water back will impact heavily on agriculture if fields are left under water for any length of time' (BSCW_07)

Our response:

Erosion protection is how we propose to 'protect the low points' along the raised embankments of the SFFD and its tributaries.

The purpose of protecting the low points is not to encourage or hold any more water on the floodplain, but to prevent a breach or failure of the embankment when overtopping does occur.

Raising banks uniformly along the entire 33km length of the SFFD would be expensive due to land take and material volume required and is therefore not considered feasible or affordable in the short term. This may be an option if significant channel alterations are proposed for some other project, such as the Fens Waterway Link, to which we could contribute.

Theme 7: Black Sluice Pumping Station

You told us:	
'The EA should repair or replace the pumps at the Black Sluice Pumping Station to provide a combined 60 cumecs pumping capacity'	'The watercourse system has been interfered with since Roman times and if there was once a need for the pumps they should remain unless the base for their need is removed (e.g. the construction of an alternative station).'
'the issue is the need to keep the levels in the SFFD below critical levels. There are arguments in the EA presentation that a pumping solution could result in the water level in the SFFD dropping below the level where gravity would become effective but this is a poor argument because the issue is to reduce the level and it does not matter which system, pump or gravity is the cause. A series of float switches would prevent over pumping'	
'Replacement Pumps -- High cost for apparently very little advantage + some disadvantage'	'the pumping station is necessary as there are times when the high tide prevents water being discharged in to the Haven by gravity'
'Retain all 5 pumps. The 2 newest pumps have many more working hours left in them. Keep them well serviced and maintained. One of the older pumps needs to be kept in working order in case of emergency. If possible the other 2 made workable. The 5 pumps where not put in for no reason. I am led to believe in heavy rainfall in 1967 not quite sure if that is the year but if you check records all 5 pumps where used 17 hours pumping at a time to stop flooding of farmland and properties. You cannot gravitate when tide locked for many hours. River never empties low enough when fresh water runoff'	

Our response:

The overwhelming response to the question of whether the BSPS should remain operational has been that it should, with only one or two responders accepting the economic case that the pumps do not offer enough economic benefit to justify the huge expense to the tax payer.

This does not change the funding position of the EA, and so we must seek to transfer the BSPS to a partner who can secure the necessary investment. The EA cannot secure government funding for a full refurbishment prior to transfer. The EA will therefore provide investment scenarios for the pumping station to be able to negotiate the most viable option. BSIDB have arranged for a third party to survey the pumps and they believe that there is a viable option for them to extend the life of the pumping station without replacing the pumps.

In tide lock, if the pump station is switched off, the water in the South Forty Foot catchment will store in the river system to slightly higher levels than if the pump station was operated. It would then discharge earlier and faster as the tide goes out and would discharge almost as much water as if the pumps had been operated during the high tide.

The original purpose of the BSPS was to prevent the water level of the SFFD increasing during high flow events and tide lock, to allow the BSIDB to continue drainage pumping. 20 years after the construction of the BSPS, additional areas of the fens were drained through pumping, increasing the amount of water the IDB pumped into the drain. This meant that the BSPS as it was, no longer kept pace with the quantity of water the IDB could pump. In order to allow the BSPS to continue to benefit the catchment, a package of investments was proposed which included extending the pumping capacity at Black Sluice, but to make this effective the SFFD had to also be widened to allow water to reach the pumps. As stated in the consultation document, the pump station was extended but the widening did not take place. So it could be argued that the BSPS extension has never been fully utilised.

The BSPS does still provide a small benefit to the system, and there is an understandable nervousness to decommission it whilst not all parties are convinced of its ineffectiveness in reducing flood risk. It would also be desirable to have other strategic options in place, more

effectively reducing flood risk further, if a decision to decommission does eventually have to be made.

Theme 8: Widening the SFFD

You told us:	
'The most important option is to widen the South Forty Foot as originally planned'	'Further studies should be carried out on desilting and/or widening part of the South Forty Foot Drain from Swineshead Bridge to Donington High Bridge'

Our response:

The costs of widening the SFFD option are beyond the government FCRMGIA funding available to the EA. This would need to be delivered as part of a multi-organisational project with wider benefits e.g. Fens Waterways Link, to allow collaborative funding. Consideration would need to be given to the impact of increasing flows towards the town of Boston, where discharge rates are fixed even with the presence of the pumping station. This will be included in the strategic options for the future for the catchment.

Theme 9: Funding

You told us:	
'If the EA are quite confident that 'doing nothing' will not cause flooding they should back their judgement by putting in place a compensation scheme'	'DEFRA financial grants awarded to BSIDB and/or a reduction in the EA precept to assist with the additional maintenance costs associated with the BSPS and main rivers'
'I understand from looking at the catchment areas only about half the farmers are paying drainage rates. This should have been changed years ago. The drainage rates should be spread evenly between all farmers that their water runs into the South Forty Foot Drain. This would provide more revenue to do more maintenance on the Drainage system. Also maintain the pumps at Black Sluice. In my opinion B.S.D.B. would be able to qualify for more funds than the EA to maintain the Drainage System in the manner it was designed for'	
'It seems that the Government/EA simply want to save money by not investing in rural Lincolnshire'	'If the BSPA had been properly and adequately insured. The flood damage costs would be dramatically less'
'Funding should be found from National and Local Government, by raising the drainage rate, collecting arrears and from the National Lottery. The National Lottery is there to fund good causes.'	

Our response:

Many government assets are self insured. Where it is decided that a self insured asset should be repaired or replaced, the presumption is that the costs will be met from within FCRM budgets with a business justification. The 3 older pumps were damaged in the 2013 tidal surge; however the pumps were already old and required significant investment to sustain them into the future.

The policy of the government is that there can be no right to compensation for damage from flooding or coastal erosion, as defences are provided under permissive powers and not duties. It is not proposed that the 'do nothing' option is selected. As explained previously this option is provided as a baseline in order to compare all other options and to demonstrate that it is worth while doing something. It is clear that to protect the landscape, economy and communities of the Black Sluice catchment risk management authorities must continue to 'do something'. The challenge we are seeking to address is what can be achieved for funding that is available.

The EA spends all the money the Government makes available to it for the catchment. If more money were available it would spend more. Lincolnshire flood risk management schemes must comply with the same funding rules as the rest of the country, however because the county is largely rural, with dispersed small communities, there will be less grant available to spend on flood risk work than heavily populated areas. Partners other than the EA can attract other sources of funding. Working with them, the EA will support them in bids to all available funds including the National Lottery fund.

If a transfer of the BSPS, and possibly other assets within the catchment, is agreed between the EA and the BSIDB we would seek to rebalance the funding arrangements between the two organisations accordingly. BSIDB can already apply for FCRMGIA from the government in the same way as the EA, and would be able to claim a proportional amount of this funding depending on how much of the system it takes over and what benefits these assets provide to reduction in flood risk.

Theme 10: No change to historical practices

You told us:	
'If the pumps at the Black Sluice are – as your studies suggest – of no real value in alleviating flooding why were they ever installed and maintained?' (BSCW_06)	'As an absolute minimum current maintenance practices must continue in the catchment including periodic grass cutting on embankments and reactive maintenance following breaches.' (BSCW_57)
'When one looks at the extreme efforts since drainage of the fens was established to keep flood water at bay and the basic equipment that our fore fathers had for this purpose; then it is pitiful that with the equipment and resources now at our disposal that the up keep drainage of some of the best agricultural land in Europe is now questioned!' (BSCW_40)	
'You must consider the obvious question – if pumps are not necessary or even counter-productive how come our ancestors have invested and maintained pumps here since 1946? Were they wrong?' (BSCW_62)	

Our response:

The predecessors of the both the EA and BSIDB were a rivers board with responsibility for land drainage, which led to the installation of the pumping station. The pump station is now old and in need of refurbishment for which the EA is not funded. The history of the Black Sluice Catchment drainage is one of continuous change and innovation, with previous arrangements and assets being altered to maximise the return on the investment. The Black Sluice Catchment Works project is no different. It seeks to retain and enhance the assets and systems that provide good flood risk reduction and where funding no longer provides a flood risk benefit, to redirect that funding within the catchment. It is important that we ask ourselves whether continuing with an investment just because those who came before did so is the right way to proceed.

The original purpose of the BSPS was to prevent the water level of the SFFD increasing during high flow events and tide lock, to allow the BSIDB to continue drainage pumping. 20 years after the construction of the BSPS, additional areas of the fens were drained through pumping, increasing the amount of water the IDB pumped into the drain. This meant that the BSPS as it was, no longer kept pace with the quantity of water the IDB could pump. In order to allow the BSPS to continue to benefit the catchment, a package of investments was proposed which included extending the pumping capacity at Black Sluice, but to make this effective the SFFD had to also be widened to allow water to reach the pumps. As stated in the consultation document, the pump station was extended but the widening did not take place. So it could be argued that the BSPS extension has never been fully utilised.

The BSPS does still provide a small land drainage benefit to the system, and there is an understandable nervousness to decommission it whilst not all parties are convinced of its ineffectiveness in reducing flood risk. It would also be desirable to have other strategic options in

place, more effectively reducing flood risk further, if a decision to decommission does eventually have to be made.

Theme 11: BSIDB activities

<table>
<tr><th colspan="2">You told us:</th></tr>
<tr><td>‘Prior to completion of the transfer of main river and associated assets to Black Sluice IDB we would strongly support BSIDB undertaking all main river maintenance works for the EA within their Public Sector Co-Operation Agreement (PSCA).’ (BSCW_57)</td><td>‘We are farmers and want our land protected from flooding - we pay our rates to get service & not to get flooded.’ (BSCW_18)</td></tr>
<tr><td colspan="2">‘The switching off of the Horbling pumping station is a great concern for the land owners and farmers. This pump keeps the water flowing into the South Forty Foot from many acres of valuable farmland and failure to move the water from this land will result in flooding, loss of crops and grazing for livestock. If all pumps on the west and east side of the South Forty Foot are no longer functional then we could have a major problem for many acres of farmland.’ (BSCW_58)</td></tr>
<tr><td>‘In high rainfall Pumping stations feeding into the South Forty Foot Drain should be fased in so they are not overloading the Drain’ (BSCW_20)</td><td>‘The thirty nine pumps housed within twenty two pumping stations can lift 50.2cumecs, therefore a greater pumping capacity than this is required at the Black Sluice Pumping Station due to the eight unrestricted main river highland runners also running into the SFFD.’ (BSCW_51)</td></tr>
</table>

Our response:

There are no proposals to change the IDB systems or decommission BSIDB owned and operated pumping stations. These are essential to the land drainage of the area. BSIDB already operate a ‘high level cut off’ at their pumping stations so they don't overload the SFFD. This involves the phased switching off of pumping stations as water levels reach 2.7mAOD at Black Hole Drove Pumping Station, to reduce the chance of overtopping of the embankments that could lead to a risk of breaching.

Drainage rates are paid to provide exactly that, drainage of the lowland area. Drainage infrastructure is important in reducing flood risk, but it cannot prevent flooding completely. BSIDB and the EA are continuously working to reduce the risk of flooding, but neither organisation can ever offer complete protection from flooding.

Under the Public Sector Co-operation Agreement (PSCA) BSIDB is already undertaking some main river maintenance work on behalf of the EA. We will explore the possibility of extending this arrangement in our strategic operation and management plan for the catchment that will be jointly prepared by both organisations. This arrangement could aid any agreed asset transfer in the future.

The statement that in excess of 50.2 cumecs pumping capacity is required to discharge the SFFD, assumes that there is no other outfall. The gravity discharge of the Black Sluice can discharge a maximum of 90cumecs (cubic metres per second) around low tide, and can adequately discharge the flows that arrive at the outfall during these periods. If the feed from the SFFD were larger, then additional flows could either outfall or be pumped out, but this is currently the limiting factor with regards to how much water can exit the system.

Theme 12: Maintenance

You told us:	
'At least current maintenance should be sustained, more extensive maintenance should be carried out to ensure the existing infrastructure is kept in top working order.' (BSCW_40)	'We also believe that the South Forty Foot should be improved by dredging and/or additional banking particularly to improve the channel between Swineshead Bridge and Great Hale and other low points which may give rise to flooding south of Great Hale.' (BSCW_46)
'Enhanced maintenance - It is important that appropriate maintenance of the South Forty Foot Drain is undertaken periodically. Prior to completion of the transfer of main rivers and associated assets to Black Sluice IDB we would strongly support BSIDB undertaking all main river maintenance works for the EA within their Public Sector Co-Operation Agreement (PSCA).' (BSCW_50)	
'Increasing channel maintenance downstream will be an essential part of 'slowing the flow', to allow for water to steadily move away from the area and downstream, rather than accumulating in an unplanned location. A more natural feature will inevitably overgrow without attention.' (BSCW_47)	'By increasing the capacity of the SFFD, through effective maintenance and offering continuous pumping into the Haven the Boards thirty nine pumps alongside the SFFD can continue to lift water from the catchments instead of having to be switched of (sic) when the SFFD water levels reach +2.70m ODN.' (BSCW_51)

Our response:

The EA and the IDB both undertake maintenance within the system. However the two organisations have differing remits and funding arrangements. The BSIDB are funded to maintain and operate the network of drainage infrastructure. The EA are funded to maintain flood defence infrastructure, but the maintenance of main rivers is the responsibility of riparian owners, or their tenants, dependent upon the terms of tenancy agreements. The EA can undertake maintenance using permissive powers, but there is no obligation to do so. This situation is complicated by the fact that in the Black Sluice Catchment, the EA own most of the main river embankments, although this land is mostly occupied by tenant farmers.

Historically the EA have had a maintenance programme, but we are now aware some programmed work has not been carried out. We are planning to catch up with this work. There is no proposal to stop or reduce this maintenance, and work is underway to assess the condition of the channel and embankments to inform both future EA maintenance work and enforcement of riparian or tenant responsibilities.

For the past two years the EA has employed the BSIDB, under our PSCA, to undertake some of our maintenance programme for sections of watercourse in the catchment. We are looking at whether use of the PSCA for maintenance could be extended. Increased maintenance is an option if we can secure additional money or savings.

The modelling undertaken to look at the effectiveness of the BSPS, assumed that the SFFD was in an optimum condition in terms of its maintenance. Which we know is not the case today. Yet despite these perfect conveyance conditions, the BSPS still did not provide a significant increase in discharge of water into the Haven. To achieve this, the channel would need to be widened. Therefore the BSIDB high level cut off at 2.7mAOD would still need to be implemented to reduce the risk of breaching.

Maintenance in the upper catchment also needs to be reviewed as part of this ongoing work. It is the intention to focus on critical locations, downstream of communities that need to operate as efficiently as possible to pass flows away. This will be part of the overall approach to managing water more effectively in the upland area.

Theme 13: Other plans

You told us:	
'It would seem to be prudent to maintain the capacity to discharge by pumping for a period sufficient to prove that the cessation of pumping did not increase the risk of flooding, impact negatively on outputs from the local food growing sector or restrict WLM options for the Boston Haven.' (BSCW_68)	
'There does appear to be an interest and need to consider the benefits of multi-functional reservoirs in the South Forty foot area. Our group can potentially help facilitate such a plan.' (BSCW_70)	'Need to confirm benefits of providing additional gravity discharge – to both flood and day to day winter flow/level management.' (BSCW_57a)
'Other IDB`s in the area successfully maintain and update their pumping discharge systems to meet their responsibilities for Land Drainage and Flood control. This Consultation fails to consider the relevant Enclosures Act of 1767 and 1799 of the South Forty Foot and Risegate Eau Drainage patterns. Also fails to consider the rights of Navigation in the Black Sluice Drainage and Navigation Act of 1770' (BSCW_59)	
'2 stage channels may be an option balancing access for low flow maintenance and flood storage' (BSCW_57a)	'...could a basin be created along the drain, this would hold a volume of water and provide a mini marina which could possibly bring private enterprise into the scheme?' (BSCW_39)
'We must bear in mind any future implications the Fens Waterways Link and navigation would have on our catchment, in particular alterations to the SFFD relating to increased capacities, flow directions and water storage.' (BSCW_51)	

Our response:

There appear to be a lot of potential plans that could offer significant benefits for flood risk management in this catchment. The EA and BSIDB must ensure that they are fully engaged with the teams proposing and progressing these projects. In this way a lot more could be achieved for flood risk management in the catchment, than can currently be funded by the EA using FCRMGIA alone. We will proactively seek to join forces with our partners in a co-ordinated way, to develop these opportunities further.

The option of installing additional gravity discharge was ruled out for the time being, as modelling of this showed that without improvements to the SFFD to allow an increase in flows to Black Sluice, the flood risk benefit would be negligible. This is because the current gravity outfalls are sufficient to allow current flows out at low tide. If in the future the channel is widened as a result of one of the above projects, then this option could be revisited.

Widening or a two stage channel is beyond the available funding of the EA or BSIDB alone, but could be very beneficial as part of a collaborative project.

Theme 14: Discharge from the SFFD during high flows on the River Witham

You told us:
'...in a high rainfall situation the water from the Witham which will be coming down the haven will impede the gravity feed rate of water trying to leave South Forty Foot Drain.' (BSCW_39)

Our response:

Ever since the construction of the pump station, it has never been run during low tide, as however much water the Witham discharges into the Haven, there has always been gravity discharge through Black Sluice gravity doors at low tide.

Theme 15: An all sources plan for the catchment combining options

You told us:	
"Must do something positive endeavour to find solution with better outcomes and best value. Need to adopt long term plan! To cater for future flood risk management." (BSCW_42)	
"...we would like to see creation of multi-functional water storage areas, providing water for wildlife (habitat creation) alongside provision of water for agriculture and other uses. Within the 'uplands', slowing the flow could be linked to channel enhancement and habitat creation..." (BSCW_31)	"A balance of all measures listed above will be necessary in the future to manage flood risk within the catchment." (BSCW_51)

Our response:

The purpose of the work currently being undertaken on the catchment is to agree a long term plan for managing flood risk within the catchment, with all Risk Management Authorities. The future impacts of a changing climate on flood risk are being taken into account. For the first time we are aiming to co-ordinate all partners management and maintenance activities, and to allow those best suited to the different tasks to take the lead in the future.

It is recognised that there is no one solution or option that will alone achieve the best for managing flood risk in the catchment, and we will work closely with our partners to develop a suit of options and approaches that will work in combination to reduce the risk as much as possible. By understanding other aspirations for the catchment we hope to draw in additional funding that can further improve flood risk management, allowing us to move above and beyond that which is possible within the current funding constraints of our traditional funding sources.

The South Forty Foot Catchment Steering Group has been established to ensure a continued dialogue between all risk management authorities and other organisations and individuals interested in shaping the future flood risk management and sustainable development of the Black Sluice Catchment. For further details on the remit of the Steering Group please see the section at the end of this document on 'Next Steps'.

Theme 16: Climate change

You told us:	
"The pumps must be repaired and or replaced at BSPS. With more erratic climate conditions future generations would think it irresponsible to do otherwise" (BSCW_24)	"How robust and credible is EA's modelling? What are the sensitivities of EA's model outcomes to EA's assumptions, and known variables and anticipated weather and climate changes?" (BSCW_47)
"Despite the pumps having been rarely used over the past couple of years, does not detract from their purpose in dealing with the potential 'extreme' event that is ever more likely to happen as our climate changes." (BSCW_60)	
"Fresh water flooding in the Fens, though quite undesirable, is one from which recovery would, in time be achievable. But sea water flooding would certainly ruin the land for agriculture forever." (BSCW_63)	"It's inconceivable that your view as the environment agency is that we don't have global warming and climate change issues, and therefore our limited and weak flood defences should be removed" (BSCW_66)

Our response:

There is clear scientific evidence that global climate change is happening now. Over the past century we have seen sea level rise around England and more of our winter rain falling in intense wet spells. Climate changes can affect flood risk in several ways and the impacts will vary depending on local conditions and vulnerability. As risk management authorities we consider climate change within the development of all our plans.

Wetter winters and more intense rainfall may increase river flooding and cause more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the extreme events. Rising sea or river levels may also increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses. Even small rises in sea level could add to very high tides so as to affect places a long way inland.

The Black Sluice Catchment is within the driest region in the country and a large proportion of the land is at or below sea level, which means it is more susceptible to tidal and river flooding. It is vulnerable to the effects of climate change. Extremes in weather will have a significant effect on water-related issues such as an increase in people and properties being at risk from the effects of flooding, and a decrease in water availability, particularly during summer months when water is most needed for the key economic activity in the district, agriculture.

The impacts of climate change have been included within the computer modelling of this catchment. The Black Sluice model included the most up to date estimates for climate change, as of 2012, when the bulk of the modelling was undertaken. Fluvial flows were increased by 20% and sea levels increased by around one metre as per guidance current in 2012. This approach was supported by the new consultants to the project, Mott MacDonald, who reviewed the methodologies used in the preceding Halcrow modelling.

We have stated that the pumps are rarely used and have not been used to remove fluvial water during high flows in the SFFD since 2012. We have received consultation responses that suggest that this is evidence to support the pumps being retained as they are there to deal with rare events. Our modelling has demonstrated that for all the times that the pumps have been used in the past, a similar outcome would have been witnessed with regards to any flooding and water levels in the SFFD, had gravity discharge only been relied upon. It is very important to note that a large area of fenland (up to 4222ha) within the Black Sluice catchment has an annual chance of flooding of between a 10% (1 in 10 chance) and a 1% (1 in 100% chance) flood whether the BSPS operates or not. This area at risk will increase (up to 4773ha) as a result of climate change (using 2012 allowances), and our evidence strongly suggests that investment must be focused upon the

resilience of the defences within the lowland catchment as the priority, due to the time that water takes to reach the pumping station.

Water resource scarcity, is another effect of climate change that will have a significant effect upon this catchment. Yet at present all rainfall that falls on the catchment is channelled and pumped out to sea as quickly as possible. Through the consultation, concerns about future water resource availability have been expressed by a number of consultees. This supports the view that the current approach to managing water may need to change to address this climate change impact.

Within the Catchment Flood Management Plan for the Witham Catchment, the Black Sluice Sub Catchment is covered by the following policy:

Policy 4: Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change

This policy will tend to be applied where the risks are currently deemed to be appropriately-managed, but where the risk of flooding is expected to significantly rise in the future. In this case we would need to do more in the future to contain what would otherwise be increasing risk. Taking further action to reduce risk will require further appraisal to assess whether there are socially and environmentally sustainable, technically viable and economically justified options.

So in conclusion, Climate Change is a significant factor that has been taken into account in the Black Sluice Catchment Works Modelling and appraisal work. However, for the reasons outlined within the consultation document, the BSPS does not offer enough protection to the catchment, even with climate change (at 2012 allowances) factored into the calculations, to allow enough investment from government grant in aid funding to sustain this facility, without the bulk of the investment coming from elsewhere.

The seriousness of the threat from climate change must continue to be included in planning for investment decisions within the catchment, and it is our aim to ensure that the management, investment and maintenance plan for the catchment will at the very least ‘keep pace with climate change’.

Theme 17: Development planning

You told us:
“Bicker Fen has suffered high building projects such as two electricity sub-stations and 13 wind turbines which have raised the water table..... the EA should be examining the effect in the Bicker Fen and flooding risk. Comment must be made to the planning inspectorate” (BSCW_44)
“These areas should be included in Local Authority Local Plans to ensure appropriate development” (BSCW_57a)

Our response:

The EA is a statutory planning consultee for all development proposals within Flood Zones 2 and 3 which show the risk of flooding from main rivers. Comments have been submitted and continue to be submitted to the planning authorities regarding the developments mentioned, regarding the above flood risk. Other impacts of these developments such as land drainage impacts and groundwater and surface water flood risk are covered by our partner Risk Management Authorities - BSIDB and the Lead Local Flood Authority (Lincolnshire County Council).

It has been suggested that the flood maps produced for this project should be included within Local Authority Plans to ensure appropriate development. In fact maps titled The Flood Map for Planning (from Rivers and the Sea) which show a worst case scenario, should all defences fail, are used for all development decisions.

Theme 18: Economic impact on agricultural land

You told us:	
"Removing the pumps or failing to maintain them will lead to flooding of high grade productive arable land." (BSCW_43)	"It is essential that the full extent of the risk and potential losses from farmland, farm buildings, IDB pumping stations and other important infrastructure is quantified" (BSCW_51)
"This whole issue should be about far more than how many houses might be affected by flooding. This is some of the best arable land in England and there is a big multiplier effect into the valuable Lincolnshire food industry." (BSCW_61 & 62)	
"Black sluice pumping station that protects so many villages from flooding; including my village of Billingborough and vast expanse of our important food growing fen area." (BSCW_67)	"Crops are sensitive to root submersion (ground water levels and saturation not just flooding) and typically 5 to 7 days submersion = 50% reduction in yield." (BSCW_68)
"the premise for the EA review of water level management for the Black Sluice catchment area, which is based primarily on flood risk protection to residential property, does not take account of the overall purpose of the Black Sluice Pumping Station or of the catchment which drains through it. The reclamation of this land and its ongoing management in terms of land drainage is undertaken for the purpose of growing food and other crops as well as for habitation." (BSCW_68)	

Our response:

There is an increased risk of flooding to agricultural land if the BSPS were to be decommissioned. There will be no increase in risk to individual properties or villages within the catchment, as these are set up on higher ground. The flood risk to agricultural land has been included in the economic appraisal, as prescribed by government guidance on valuing potential damages known as the 'Multi Coloured Manual' (MCM - http://www.mcm-online.co.uk/), in the following way.

Agricultural land was classified based on spatial data from Natural England 2010[1]. This divides agricultural land into quality groups.

Land values for the agricultural land in the Black Sluice study area were estimated based on the latest (first quarter 2015) average land values from land agents[2]. The permanent loss of future agricultural output can be expressed in terms of a loss of land value.

Land Classification	Land Value (per acre)	Land Value (£/hectare)
Grade 1 - Excellent – intensive arable cropping	£9,721	£24,021
Grade 2 - Very good – arable cropping/intensive grassland	£8,927	£22,058
Grade 3 - Good to moderate – extensive arable cropping	£8,132	£20,095
Grade 4 - Poor – permanent grassland	£7,352	£18,167

Table 1: Estimate of current land values in the Black Sluice Catchment (source: Savills, 18th July 2015)

[1] Natural England agricultural land classification, accessed May 2015: http://publications.naturalengland.org.uk/category/5954148537204736
[2] Email: Savills, June 2015

Where land becomes permanently inundated with water or is flooded frequently (i.e. at least once annually), agricultural production would effectively cease on that land leading to land being written off. These damages were considered for the 'Do Nothing' option only.

Where land isn't written off (for all other options other than the 'Do Nothing' baseline option), damages were based upon loss of crop production for each individual flood event that could be expected to affect the land during the 50 year assessment period.

These damages have been included fully within the economic assessment. However we can only apply for flood and coastal risk management grant in aid for 5.56p per £1 of damage prevented to agricultural land as with all other businesses and economic impacts. This compares to between 20p to 45p of grant per £1 of damage caused to residential properties (the available grant increases as the level of deprivation of properties increases). This funding is also dependent upon a cost benefit ratio of higher than 1 being achieved.

The agricultural damages calculated for each option are shown in the table below.

Option	Estimated Agriculture Damages (over the next 50 years)	Total Estimated Economic Damages (including agricultural damages, over the next 50 years)
Do Nothing	£421.6 million (61%)	£689 million
Do Minimum	£14.9 million (62%)	£23.8 million
Decommission BSPS (includes protecting embankments)	£11.0 million (62%)	£17.8 million
Refurbish BSPS (includes protecting embankments)	£8.8 million (60%)	£14.8 million

Table 2: Agricultural damages calculated for each proposed option compared with the total economic damages for the catchment (please note figures are high level and will be subject to refinement as the project progresses)

The following table attempts to explain the costs and benefits of continuing with a pumping station at Black Sluice and why FCRMGIA grants cannot be claimed for this.

Costs			Benefits		
BSPS Replacement Option assessed over 50 years	Initial capital spend	£5 million	Total damages avoided by sustaining the BSPS (50 years)	Agricultural	£2.2 million
	Maintenance	£15 million (based on £300,000 per year ongoing maintenance costs)		All other economic damages (no property damage)	£0.8 million
	Total	£20million		Total	£3 million
Least Cost BSPS repair of existing pumps assessed over 50 years	Initial capital spend (based on IDB estimates of £36,000 per pump)	Up to 5 x £36,000 = £180,000			
	Maintenance	£15 million (based on £300,000 per year ongoing maintenance costs)			
	Total	£15.18 million			
Cost Benefit Ratio of Replacement Option	£20million:£3million = 0.15		Cost Benefit Ratio of Repair Option	£15.18 million: £3million = 0.20	
What these costs and benefits mean for funding					
Total grant that could be available from government to implement flood risk management to avoid these damages (5.56pence per £1 of damage avoided)			£3million x 0.056 = £168,000 (although C/B Ratio <1 so £0 grant could be claimed)		

Table 3: to show the costs and benefits associated with the replacement or repair of the BSPS pumps – including agricultural and other economic impacts; how this relates to the investment required and government grants available (please note figures are high level and will be subject to refinement as the project progresses)

If the economic impact of flooding as a result of decommissioning the BSPS is to be avoided through flood risk management investment during the 50 year period assessed, all funding would need to be found locally. Funding needed is likely to be 5 or 6 times the economic damages avoided.

In the wider catchment benefits (damages avoided) would allow significant investment of government grants. A large proportion of these benefits are derived from damages avoided to agricultural land. The following table explains what could be available for the EA and other risk management authorities including BSIDB to claim to reduce the risk of flooding.

	Do Nothing Scenario			
	Estimated damages over the 50 year assessment period		**Level of grant per £1 of damage avoided**	**Maximum grant that could be available to avoid flood damages in the wider catchment**
Total grant available from government to implement flood risk management to avoid these damages	Agricultural	£412.6 million	x 0.056	= £23.1 million
	Other Economic (business, infrastructure etc)	£31.6 million	x 0.056	= £1.77 million
	Residential	£235.8 million	x 0.20 to 0.45	= £47 million to £106.11 million
	Total FCRMGIA Grant available			**£71.87 million to £130.98 million**

Table 4: to show the damages (agricultural + other economic + properties) and grant available to 'do something' in the whole catchment (please note figures are high level and will be subject to refinement as the project progresses)

There may be other economic impacts, to agricultural land, that we have not been able to include in our assessment. Root submersion damage was highlighted by the consultation. There may also be wider knock on impacts to the associated businesses in the area, such as reduction in supply of crops to the food processing industry as a result of a flood, which again has not been included in the above figures. Additional economic damages like these, can be included within other funding applications, for example to the Greater Lincolnshire Local Enterprise Partnership (GLLEP). It is these opportunities to secure additional funding that the newly formed South Forty Foot Catchment Steering Group will seek to progress (see 'Next Steps' section at the end of this document for further details).

Theme 19: Natural Flood Management

You told us:	
"It is recognised that urban and open farmland retains less water than traditional countryside and I can see how upstream flow control will reduce the surge effects in the Lower Catchment and can support the theory." (BSCW_14)	
"Slowing the flow means planting trees. Always a good thing!" (BSCW_72)	"Slowing the flow upstream would appear to cause upstream flooding which will not solve the problem." (BSCW_43)
"I'm sure farmers will cooperate with flood storage areas where they are proposed to protect local villages, such as Swaton..... However, the offer to landowners and farmers needs to be fair and payment needs to be prompt." (BSCW_09)	
"Any solution which considers water storage must be fully modelled and the risks identified before that technique is considered as a solution for other problems." (BSCW_14)	"There are several areas of 'set aside' that would be ideal for tree planting/reservoir development along the course if the stream" (BSCW_41)
"Slowing the upstream water flow through the use of ponds and small dams will naturally increase the water content and I am concerned about heave which can cause substantial structural damage to roads, property and infrastructure." (BSCW_14)	

Our response:

If we are to successfully apply natural flood management techniques to alleviate flood risk in the catchment, we need to secure the agreement and co-operation of land owners and managers in the area. Through careful design, we hope to be able to place the majority of attenuation features on non-productive or less productive land. Farmers will be able to claim Countryside Stewardship payments for allowing their land to be utilised for this purpose.

The design of the attenuation systems used in natural flood management is critical, and there are lots of factors to be taken into account. As raised by a consultee the issue of ‘heave’ will be one thing that we must guard against in our designs. If water is attenuated adjacent to buildings or road infrastructure the moisture contained in the soil increases, the surface level will rise and expand laterally. This can be damaging to buildings and other structures unless the foundations have been strengthened or designed to cope with the effect.

We also need to take into account the ease with which storm water will infiltrate (drain into) the ground, or whether water needs to be retained at the surface in the features. We must understand the impacts of increasing infiltration upon groundwater levels (this could be a good or bad thing depending on the levels). We must also be careful where we place the features, so as not to cause a synchronisation of floods from different tributary watercourses, where previously they would have occurred separately. Features will need to be designed to be robust and resilient to the wear that they are likely to receive as part of a working farm, and at the same time to require minimal maintenance. We will also need to ensure that in the event of failure of a feature, that it ‘fails safe’ where possible, and that the hazard caused is low if water is released.

We have approached the Forestry Commission, for their assistance in providing incentives and expertise on expanding tree planting for commercial purposes in the upper catchment area. They have responded positively and we look forward to working with them in the future to prepare a joint approach for managing flood risk through landscape change.

Theme 20: Partnerships

You told us:	
“We have land in the upper area that could be suitable for holding ponds.” (BSCW_23)	“We would be happy to be involved with any future opportunities relating to water resource security in the catchment.” (BSCW_28)
“Swaton Parish will support the body responsible for drainage within the Parish and locally in the immediate area to alleviate flooding risk. Swaton Parish have been involved in meetings and workshops with the Agency during the last few years. Information, photographs etc. have been provided. If any further information is required as a result of this present consultation we would do our best to provide it.” (BSCW_46)	
“ADA have stated they are committed to working with both our organisations [BSIDB & EA] to assist us in finding a mutually agreed solution to deliver a sustainable catchment wide solution” (BSCW_51)	“As a parish council with influence over a section of the catchment we can help discuss options with farmers, landowners and villagers. We can assist in bringing other bodies into the frame. We can work with the Black Sluice Drainage Board. We can use our own volunteer time.” (BSCW_61)
“...the Council would be keen to see a closer link between the consideration of the Black Sluice Catchment, the objectives and spirit of the Joint Flood Risk and Drainage Management Strategy, and the role of the Flood Risk and Drainage Management Partnership in jointly developing strategic solutions for flood risk and drainage management across Lincolnshire.” (BSCW_68)	
"There appears to be a total breakdown in communications between the EA and the BSIDB as your proposals are poles apart, meaning that one is probably following austerity measures whilst the other is providing the best solution for the area." (BSCW_16)	"There must be close cooperation between the Black Sluice IDB and the Environment Agency." (BSCW_41)
"Environment Agency seems to be responsible for flood protection but not water level management. The two subjects are connected. I would like to see more co-operation and joined up thinking of the two together." (BSCW_42)	

Our response:

We are very pleased with the quantity of organisations and individuals who have stated that they wish to work with the EA and BSIDB to progress this work into the future. It is envisioned that a formal partnership for the catchment could be formed, allowing all funding opportunities and other catchment aspirations not directly within the remit of the EA or BSIDB, to be progressed.

When it comes to the partnership between BSIDB and the EA, it may help to explain why we seem to be coming at the project from different angles. Whilst both organisations have a role to play in flood risk management in the catchment, the remit, focus and funding arrangements for each are different. The EA has one main source of funding for flood risk management, known as Flood and Coastal Risk Management Grant in Aid (FCRMGIA). The application of these funds is weighted towards reducing flood risk to people and homes. The EA receive c£278k per annum additional funding from the BSIDB, known as the IDB precept, which is used to contribute to the up keep and maintenance of the SFFD main river to allow drainage water to flow out to sea. The BSIDB is 51% funded through drainage rate payers (land owners and tenant farmers) and 49% funded collectively from Boston Borough Council, North Kesteven District Council, South Kesteven District Council and South Holland District Council, who pay to ensure the ongoing land drainage of the catchment. BSIDB are also able to claim FCRMGIA for work that reduces flood risk, and they are able to make bids to other funding sources, for example Local Enterprise Partnership funding. As a government body, the EA cannot apply for these other funds.

It may seem that the two organisation proposals are different, but this is based upon the above funding arrangements. The consultation has attempted to explain why the EA cannot continue to

fund certain activities within the catchment. For the BSPS, unless the EA can transfer this to another organisation, they would be left with no choice but to decommission it. The consultation has confirmed the strong desire that the local community have for retaining the pumping station and so we are fortunate that, the BSIDB are a willing partner wishing to take on the upkeep and liability of the asset. We are continuing to work closely on this aspect of the project and together work through the practicalities of transferring responsibilities.

Theme 21: Somerset Levels

You told us:	
"We don't want a Somerset levels event. Which could happen if left in EA hands?" (BSCW_05)	"Austerity measures do not protect lives, livelihoods, houses, valuable farm land and infrastructure, with a recent example being the Somerset Floods." (BSCW_16)
"The example of the Somerset Levels should serve a warning of lack of adequate maintenance and capacity of the drainage facilities." (BSCW_24)	"The Somerset flooding is a prime example, and the agencies' decision to remove flood defences caused that disaster." (BSCW_66)

Our response:

There are similarities between the Black Sluice Catchment and the Somerset Levels. Land levels are low lying, typically between 0m and 5/6m above sea level, in both locations. Within the Black Sluice catchment a total 33.6km² of land is at risk of flooding up to a 1 in 100 plus climate change chance flood. During the floods of the winter of 2013/14 65km² of land in the Somerset Levels was flooded, but 200km² was protected from flooding. Rainfall averages for the two locations do vary. Black Sluice catchment, being in the drier region of the country, receives an average of 500mm of rainfall each year; the Somerset Levels normally receive around 700mm of rainfall. During the winter of 2013/14 Somerset received almost 300% of the normal expected rainfall.

Due to the flood risk on the low lying Somerset Levels the land use is dominated by grassland grazed by sheep and cattle, though some arable production is present on land that can be kept drier. In certain areas the water levels are now being managed on a seasonal basis for wildlife conservation purposes (mostly for wetland and wet grassland interests). In contrast Lincolnshire is home to some of the highest grade agricultural land in the country, growing large amounts of wheat, barley, sugar beet, and oil seed rape. In South Lincolnshire, where the soil is particularly rich in nutrients, some of the most common crops include potatoes, cabbages and cauliflowers, and onions. There are far fewer areas managed on a wildlife conservation basis.

The upper Black Sluice catchment is dominated by arable production, with only occasional grassland, woodland and small villages. Whilst in Somerset on the higher surrounding hills there is a much greater range of land uses present, including arable crops, grassland, woodland and dispersed settlements.

The main difference between the two catchments is the way that the watercourses within the catchments are managed. The 21mile (34km) long SFFD is non-tidal, due to the presence of the Black Sluice tidal gates. The gates close during high tide, excluding the tide and estuarine silts that would enter the system with the tide. Therefore the SFFD suffers far less from the effects of tidal siltation. The 37-mile (60 km) long river Parrett is tidal for 20 miles in land, and has a 13m spring tidal range. This leads to large estuarine silt deposits, which reduce fluvial conveyance.

The BSIDB operate 26 lowland pumped catchments, which all discharge via board run pumping stations to the embanked SFFD. In Somerset the river Parrett is also elevated above adjoining land, and has 39 pumping stations along its length draining the surrounding land. There are also lowered spillways, so that selected moors flood first (in line with historical practice). This has not been the practice in the Black Sluice catchment, due to the arable use of the land.

Co-ordination between BSIDB and the local EA operational teams is good. It is helpful having just two main bodies involved in day to day management of the catchment. We hope that through this

project our working relationship will improve still further, and we will develop a clear plan together for managing flood risk in the area to address all future challenges that we will encounter.

The key points that resulted in the extreme flooding seen on the Somerset Levels during the winter of 2013/14 are:

- The unprecedented rainfall quantities received over the catchment (up to 3 times what would normally be expected) – resulted in the flooding initially
- The fact that the rivers are tidal for a long way in land, and have a very large tidal range, leading to a build up of estuarine silts – meant that water could not flow away to sea very quickly and flooding was prolonged
- A differently arranged land drainage system that does not protect high grade agricultural land. Meant that water could not or was not supposed to get off the land very quickly and flooding was prolonged.

Black Sluice catchment benefits from both a tidal control and a highly effective land drainage system, however if it received triple the average rainfall it too would be significantly affected. It is likely that if a similar extreme rainfall event were to occur over the Black Sluice catchment, significant flooding would result, but the length of time that the water would stay on the land would likely be far shorter than that experienced on the Somerset Levels. Flood water would be removed into the drainage system and SFFD by IDB pumps. Water could pass reasonably quickly out to sea, staying on the land for less than a week. The BSPS would make little difference to the impacts of such a flood.

It is not the case that the EA decided to remove essential flood defences in Somerset, which resulted in the severe flooding. The EA still spend £1.5million on maintenance alone. The extreme rainfall was the primary reason for the flooding. The river and drainage systems in Somerset are arranged differently, as the quality of agricultural land has not warranted the significant additional investment that would have been required. Large areas of the levels are designed to flood.

At the moment capital expenditure on flood defence infrastructure has not been subject to austerity measures. The treasury rules governing how we spend public money remain unchanged, the main principles of which are that we must show that benefits outweigh costs and that we can secure a higher level of funding to protect homes, but can still secure some funding to protect businesses, infrastructure and farmland.

Theme 22: Costs

<table>
<tr><th colspan="2">You told us:</th></tr>
<tr><td>"There appears to be a selective description of the costs of operating and replacing the pumping station and insufficient consideration of repairs that may be feasible for a fraction of those costs." (BSCW_51)</td><td>" ...we believe that the diesel pumps at the Black Sluice pumping station might be capable of refurbishment for a fraction of the cost of £25 million quoted for their replacement, literally just tens of thousands of pounds" (BSCW_09)</td></tr>
<tr><td colspan="2">"I find it hard to understand why the cost of replacing the pumps is so high. The Dutch company which provided diesel pumps to clear the Somerset levels have an electric pumping solution at a fraction of the EA stated cost." (BSCW_14)</td></tr>
<tr><td>On property level protection "I see that an estimated provision of £30,000 has been listed. To me that appears somewhat over generous." (BSCW_63)</td><td>"I find it unacceptable that several detailed quotes have not been submitted by the EA re the repairing or replacing of the pumps in the consultation." (BSCW_16)</td></tr>
<tr><td colspan="2">"We understand that modern electric pumps are very efficient and two should cost considerably less than the £10m estimated by you." (BSCW_61)</td></tr>
</table>

Our response:

The methodology for developing the option costs was to use previous experience where possible and to supplement this with unit costs from suppliers or from engineering price books for early 2015. Costs associated with planning constraints, environmental surveys, temporary works and inflation were not included in the estimates. A contingency of 30% was allowed for as a starting point as is recommended by EA guidance, in order to ensure that the scheme was economically justifiable despite the uncertainties in the costing elements.

The appraisal, capital, operational and maintenance costs were all developed separately as detailed below:

- The appraisal costs were provided by the EA and did not vary per option.
- The capital costs were developed through a variety of methods with the cost estimates for the civil engineering works, such as the low spot armouring, being produced using Spon's Civil Engineering and Highway Price Book 2015. The mechanical and electrical costs were developed through a combination of suppliers and costs associated with experience of similar construction work (e.g. St German Pumping Station replacement).
- Design costs were assumed to be 10% of the capital costs and were included in the total capital cost for each option.
- Operational costs were developed by approximating 100 hours per year of pump usage and then pricing based upon the electricity or diesel fuel consumption per hour depending on the option being considered.
- Maintenance costs comprised the maintenance of the pumps where applicable and the existing maintenance per year of the catchment which was based on the EA 2014/2015 Operation and Maintenance budget. Maintenance costs for the pumps were developed by approximating the number of 'man-days' that would be required, both routine and unplanned and assuming a cost of £250 per day for an EA operative to carry out this maintenance.

The £30,000 allowance for PLFP, is an upper limit on what can be claimed per property. For the purposes of this economic assessment a more realistic figure of around £6,000 per property has been allowed for.

In the consultation one option to continue a pumping station facility at Black Sluice was presented and involved replacement of the pumps. It also included ongoing maintenance costs for the pumping station for the 50 year period assessed. Since the publication of the consultation document last summer the initial capital costs have been further refined, and have reduced slightly. It is currently estimated that each pump will cost £660,000 to replace, with additional costs to provide an upgraded power supply to the new electric pumps and undertake decommissioning of the old pumps. However the bulk of the costs, relate to the ongoing maintenance and running of the pumping station totalling around £15million, and these costs have not changed.

Also since the consultation was undertaken, BSIDB have arranged for an assessment and estimate for repair of the existing pumps to be provided. They have provided the estimate to us and this has given us the least cost option for the pumping station. This estimates an initial expenditure of £36,000 per pump, but ongoing maintenance costs would remain the same estimated to be £15million over 50 years.

BSPS Replacement Option assessed over 50 years	Initial capital spend	£5 million
	Maintenance	£15 million (based on £300,000 per year ongoing maintenance costs)
	Total	£20million
Least Cost BSPS repair of existing pumps assessed over 50 years	Initial capital spend (based on IDB estimates of £36,000 per pump)	Up to 5 x £36,000 = £180,000
	Maintenance	£15 million (based on £300,000 per year ongoing maintenance costs)
	Total	£15.18 million

Table 5: Summary of estimated costs for replacement or repair of the pumps in the BSPS

Theme 23: Boston Barrier and future water level management for navigation

You told us:	
"Installing the Boston Flood Barrier is a waste of time and money unless freshwater and salt water embankments are kept in good order and even raised when needed." (BSCW_06)	"...there are proposals for a Boston Flood Barrier which may inhibit the gravity capacity of the channel adjacent to the station. Removing the pumps could increase costs on the Barrier project and/or make that project less effective." (BSCW_25)
"I fail to see what protection the Barrier, if it were to be located as currently planned, will provide to the streets of Boston. I opine that the only prevention of sea water flooding into the Town will be the maintenance of the sea defences." (BSCW_63)	
"May be a necessity for potential future WLM in tidal haven." (BSCW_32)	"The installation of the barrier in Boston will be a factor in ensuring the gravity sluices at Black Sluice Pumping Station are not compromised within the overall flood management plan." (BSCW_33)
"It is important to construct a lock at the same time with Sector Gates at each end. The importance for a lock is for Safety reasons as well as navigation. In a situation of heavy rainfall which can happen at any time of year. The lock would provide another outlet at the side of the Barrier to increase the flow of the fresh water from the South Forty Foot Drain and River Witham to prevent flooding inland." (BSCW_20)	

Our response:

The Boston Barrier and longer term proposals for water level management (WLM) are being delivered through the Boston Combined Strategy (2008) which aims to determine a 100 year strategy approach to managing tidal flood risk and navigation improvements in Boston.

The Boston Barrier partnership will seek permission to build and operate a tidal flood defence barrier in the Haven. We will not seek permission to operate WLM. Separate permissions will be sought in the future to operate WLM.

While the Black Sluice Catchment Works and Boston Barrier project teams are liaising closely, they remain distinct because any decision about the pumping station would not impact on the construction of the Boston Tidal Flood Alleviation Barrier.

The proposed Boston Tidal Flood Alleviation Barrier would not impact on gravity discharge from the SFFD. The barrier would only be raised to reduce the risk of tidal flooding from a tidal surge. At all other times it would be flat on the riverbed (except when key maintenance requirements are needed) allowing fluvial flows and navigation to pass. Our modelling work has confirmed that there would be no increase in flood risk to communities living upstream or downstream as a result of the barrier.

A navigation lock would not be required as part of the immediate tidal flood defence scheme as we would not be impeding navigation along the Haven through the construction of a tidal flood alleviation barrier.

Although it is not currently intended to implement WLM as part of the Boston Barrier proposals, the EA remains committed to providing WLM in the future as part of the Fens Waterways Link - to provide a safe non-tidal navigable link between the Witham and SFFD. The Barrier project has considered the longer term proposals for WLM as part of the design works to ensure that the design of the Barrier does not unduly constrain future options for WLM.

Theme 24: Transfer of assets to BSIDB

You told us:	
"Transfer to BSIBD -- Maintains status quo and defers any final decision to a later time when more data may be available." (BSCW_15)	"There is much to be gained in having the whole catchment managed by one organisation." (BSCW_33)
"The EA funding formulae do not allow significant sums of money to be expended on the pumping station since properties are not at risk. The IDB is not so constrained so if methods can be found for the IDB to be funded to manage the pumping station and catchment it would be to the long term benefit of the catchment." (BSCW_33)	
"If the EA economic model does not work then maybe the IDB can make it do so" (BSCW_01)	"I do believe an IDB would be more competent in managing a pumping station than any government department. However, the BSIDB should not have to pay for the past disastrous management by EA." (BSCW_06)
"They also need to be clear that the options they are consulting on meet the obligations of the Black Sluice Drainage and Navigation Act of 1765, geo.iii c86." (BSCW_47)	
"...the Black Sluice Drainage Board could be in charge of both the Black Sluice Pumping Station and the 'main river' of the South Forty Foot Drain currently managed by the Environment Agency." (BSCW_61)	"The Black Sluice IDB have a history of being proactive and thorough in their maintenance of waterways and would be well qualified to take over this task." (BSCW_54)

Our response:

Both the EA and BSIDB recognise that the BSPS as a land drainage pumping station, is best managed and funded by a land drainage organisation. The SFFD however is designated as a main river because there are a large number of properties that could be affected by flooding from over topping and possible breaching of the banks. This makes a full transfer more complex, as there are a number of responsibilities associated with it that may not all be transferable to the BSIDB. These responsibilities include flow gauging and flood warning, water resource security and navigation. However it does follow that if the BSIDB are operating the BSPS, then they will in effect be part managing the discharge of SFFD water. We cannot end up with a situation where both organisations are trying to operate the discharge in a different way.

We will therefore work closely together to establish the operating rules for the catchment, which will meet not only land drainage aspirations, but those obligations outlined above. It may be the case, that for legal reasons, the SFFD may not be able to be drained as fully as would be desired for land drainage purposes. The EA may not be legally able to transfer the main rivers in full to the IDB, and a compromise solution would need to be found.

In the upper catchment, traditional lowland drainage techniques may not be appropriate, but there is no reason why working collaboratively we cannot move to a regime of working with natural processes to manage flood risk both in the upper catchment and to reduce the pressure of highland water on the lower catchment, that is ultimately implemented by the BSIDB. The EA will work with partners to establish the most effective way of managing flood risk across all the organisations involved. It is envisioned that the EA role in undertaking works on the ground will need to change in the future. By working closely together we hope to allow both organisations to play to their strengths and redistribute tasks accordingly.

Next steps

Work on this project has produced the following key points:

- The Black Sluice Catchment currently benefits from a historical legacy of drainage works and infrastructure that reduce flood risk in the catchment.
- Current owners and operators of some of these watercourses and infrastructure are either not set up, or funded, to allow them to continue to operate these into the future. Others may be able to manage them to better effect.
- The EA is not able to deliver all the aspirations that partners and the community have for flood risk management and linked growth ideas, such as water resource security and navigational development, alone.
- There are many other projects that both BSIDB and the EA need to link with as the Black Sluice Catchment Works project is progressed. (for example the Fens Waterway Link and a potential water transfer scheme).

The EA and the BSIDB have agreed to seek to move forward jointly in the following way:

Creation of the South Forty Foot Catchment Steering Group

Robert Caudwell has been appointed as an independent chairman to ensure a continued dialogue between all risk management authorities (RMAs) and other organisations and individuals who have offered to assist in shaping the future flood risk management and sustainable development of the Black Sluice Catchment. This will allow the EA to act as an equal partner, instead of a lead, which better reflects the EA's funding position. The chairman will set up a strategic catchment partnership steering group. This group will include representation from the BSIDB, the EA, Lincolnshire County Council and the Greater Lincolnshire Local Enterprise Partnership.

The Steering Group will focus on four areas for development:

1. Catchment wide asset management for land drainage and flood risk management
2. Water Resource
3. Water Level Management for Navigation
4. Water Framework Directive

Organisations will be able to bid for funding from sources other than FCRMGIA and coordinate development and risk management activities within the catchment.

1. Catchment wide asset management for land drainage and flood risk management

A transitional arrangement for BSPS

The EA and BSIDB will investigate how they can fund and facilitate a smooth transition of the BSPS to BSIDB. Provisionally, a two year transitional arrangement is proposed, where the EA continue to operate the BSPS, but with increasing involvement of the BSIDB, until their familiarity and competence in running the station is at a point where full hand over can be achieved. This time will allow other funding sources to be investigated and legal processes to be progressed, but is dependent on the necessary funding being in place.

Arrangements have already been made for staff from BSIDB to commence training on the operation and maintenance of the BSPS shortly.

Interim capital works undertaken by EA and BSIDB

Both RMAs will continue to progress capital works that sustain and improve the flood risk management of the existing system - where these comply with treasury funding rules and meet the strategic approach that is being formulated by the catchment partnership. For example BSIDB land drainage pump station refurbishments, culvert replacements, protecting the low points along raised main river embankments, one off capital dredging works and the Swaton Flood Alleviation Scheme.

A joint operation and maintenance plan

A detailed plan for operating and maintaining the flood risk infrastructure in the catchment will be jointly written by all RMAs involved in managing flood risk. It will outline each partner's roles and responsibilities and identify funding sources and arrangements, to ensure that the work is affordable and fully funded. Use would be made of the Public Sector Cooperation Agreement to allow the RMAs to undertake work on each other's behalf where they are better equipped or have resources to do so. This will allow the possible future transfer of watercourses between organisations to take place more smoothly if desired. The EA has a statutory duty to provide flood warnings to the public. The operational plan will describe how the EA and IDB will work together to put in place suitable communications that will allow the EA to continue with this responsibility.

2. Water Resource

Opportunities will be sought to optimise the use of water within the catchment to generate economic growth.

3. Water Level Management for Navigation

Existing and new aspirations will be considered when developing works arising from the above to ensure Water Level Management for Navigation is incorporated or as a minimum, not precluded for the future.

4. Water Framework Directive

Opportunities will be sought across all works arising from the above to collectively deliver in accordance with the Water Framework Directive and enhance the environment where possible.

Detail to be agreed by Steering group for 2, 3 and 4.

Annexes

1.1. List of respondents

BSCW_1	Business
BSCW_2	National Grid Plc
BSCW_4	South Kesteven District Council Councillor
BSCW_5	Member of the public
BSCW_6	Member of the public
BSCW_7	Member of the public
BSCW_8	Member of the public
BSCW_9	National Farmers' Union
BSCW_10	Farming landowner
BSCW_11	Members of the public
BSCW_12	Members of the public
BSCW_13	Natural England
BSCW_14	Member of the public
BSCW_15	Member of the public
BSCW_16	Lincolnshire County Council Councillor
BSCW_17	Member of the public
BSCW_18	Member of the public
BSCW_19	Member of the public
BSCW_20	Member of the public
BSCW_21	South Kesteven District Council Councillor
BSCW_22	Boston Borough Council
BSCW_23	Member of the public
BSCW_24	Member of the public
BSCW_25	Member of the public
BSCW_26	Member of the public
BSCW_27	Member of the public
BSCW_28	Anglian Water
BSCW_29	Member of the public
BSCW_30	Member of the public
BSCW_31	Lincolnshire Wildlife Trust
BSCW_32	Member of the public
BSCW_33	Farmer
BSCW_34	Member of the public
BSCW_35	Member of the public
BSCW_36	Members of the public

BSCW_37 Members of the public
BSCW_38 Members of the public
BSCW_39 Landowners
BSCW_40 Member of the public
BSCW_41 Newton Haceby and Walcot Parish Meeting
BSCW_42 Member of the public
BSCW_43 Farmers
BSCW_44 Members of the public
BSCW_45 Member of the public
BSCW_46 Swaton Parish Council
BSCW_47 Inland Waterways Association
BSCW_48 Royal Yachting Association
BSCW_49 Essex and Suffolk Water
BSCW_50 Witham Fourth District Internal Drainage Board
BSCW_51 Black Sluice Internal Drainage Board
BSCW_52 Member of the public
BSCW_53 Member of the public
BSCW_54 Member of the public
BSCW_55 Historic England
BSCW_56 Member of the public
BSCW_57 Association of Drainage Authorities
BSCW_58 Member of the public
BSCW_59 Horbling Parish Council
BSCW_60 Lincolnshire Waterway Association
BSCW_61 Member of the public
BSCW_62 Billingborough Parish Council
BSCW_63 South Kesteven District Council Councillor
BSCW_64 Member of the public
BSCW_65 Pointon and Sempringham Parish Council
BSCW_66 Member of the public
BSCW_67 Member of the public
BSCW_68 Member of the public
BSCW_69 Lincolnshire County Council
BSCW_70 Business
BSCW_71 Farming business
BSCW_72 Lincolnshire County Council Councillor

– * Please note there is no BSCW_3.

1.2. List of meetings held

Date	Event
24 July	Meeting with SKDC councillors and local MP
17 August	Consultation event, BSIDB offices
25 August	Consultation event, Billingborough village hall
1 September	Consultation event, BSIDB offices
10 September	Consultation event, Rippingale village hall
14 September	Consultation event, BSIDB offices
15 September	NFU Bourne Branch meeting
18 September	Presence in Members' Foyer during Lincolnshire County Council Full Council Meeting
22 September	Consultation event, Bicker village hall

1.3. Copy of the Joint Position Statement submitted to the Lincolnshire Flood and Drainage Management Scrutiny Committee

Lincolnshire COUNTY COUNCIL
Working for a better future

Policy and Scrutiny

Open Report on behalf of	
Report to:	**Flood and Drainage Management Scrutiny Committee**
Date:	**30.11.2015**
Subject:	**Black Sluice Catchment**

Summary: Black Sluice Internal Drainage Board Joint Position Statement for the Black Sluice Catchment

Actions Required: To note

1. Background

The EA carried out a six week formal consultation to look at how flood risk could be managed in the future, between 17th August and 27th September 2015. A series of consultation events were jointly hosted by the EA and BSIDB in recognition of the critical roles that both organisations have in the catchment.

The Environment Agency (EA) and the Black Sluice Internal Drainage Board (BSIDB) have provided a joint position statement on the future development of the Black Sluice Catchment flood risk management proposals.

Current arrangements for managing flood risk

The Black Sluice Catchment is drained and protected from flooding by a complex system of artificially embanked main rivers, lowland drainage ditches, gravity outfalls and pumping stations. In the higher areas of the catchment rivers have often been straightened and deepened to allow water to run away more quickly. The whole system flows out to sea via the Black Sluice – comprised of two gravity sluices (one of which is also a navigation lock) and the BSPS which currently needs a large investment to secure its operation into the future. This facility is currently owned and operated by the EA, who also own and operate the c120km of main river embanked channels in the catchment. The BSIDB manage the large and complex network of c755km of drainage ditches, and the 34 pumping stations and gravity outfalls from these drainage catchments into the main rivers. They also manage some ordinary watercourses in the highland area of the catchment, on behalf of the local authorities. BSIDB are dependent on the main river system to evacuate the majority of drainage water from the catchment. BSIDB offer additional protection to the SFFD main river from overtopping and possible breaching events by implementing an emergency strategy of reduced or no pumping into the SFFD during extreme events (holding the flood water within the catchments). There are no restrictions from the eight EA controlled main river highland carriers gravitating into the SFFD.

Work undertaken over a number of years, examining the effectiveness of the Black Sluice system has shown how important the structures and channels within the lowland area of the catchment are in reducing flood risk by providing land drainage for the purpose of growing food and other crops as well as for habitation within this area. The operation of the BSPS itself does not reduce the risk of flooding to homes in the area. It does reduce the number of hectares of land that flood from 992 to 814 if the pumps operate using a scenario of a flood with a 10% chance of happening in any given year. The EA alone cannot attract funding to refurbish the pumping station, because the economic benefit falls far short of the treasury requirements for investment. However, there is a small economic benefit that other organisations may wish to realise through local investment in the pumping station.

Organisational remit and funding

Whilst both organisations have a role to play in flood risk management in the catchment, the remit, focus and funding arrangements for each are different. The EA has one main source of funding for flood risk management, known as Flood and Coastal Risk Management Grant in Aid (FCRMGIA). The application of these funds is weighted towards reducing flood risk to people and homes. The EA receive c£278k per annum additional funding from the BSIDB, known as the IDB precept, which is used to contribute to the up keep and maintenance of the SFFD main river to allow drainage water to flow out to sea. The BSIDB is 51% funded through drainage rate payers (land owners and tenant farmers) and 49% funded collectively from Boston Borough Council, North Kesteven District Council, South Kesteven District Council and South Holland District Council, who pay to ensure the ongoing land drainage of the catchment. BSIDB are also able to claim FCRMGIA for work that reduces flood risk, and they are able to make bids to other funding sources, for example Local Enterprise Partnership funding. As a government body, the EA cannot apply for these other funds.

There are a number of options for sustaining and improving the flood risk management in the catchment, proposed by the consultation document. The consultation responses have shown a strong appetite for the BSPS to continue as a facility for the catchment. There are still ways in which this can move forward as an option; however the EA is unlikely to be able to continue to be the operator, due to the funding constraints described above. The consultation also revealed new options and partners that may be able to contribute to future flood risk management. There are significant benefits available within the catchment, which would justify EA and BSIDB expenditure of FCRMGIA on sustaining and improving the current infrastructure (not including the BSPS). The consultation responses strongly supported further investment in both lower and upper catchments to improve flood risk management.

2. Conclusion

The way forward

Work on this project has produced the following key points:

- The Black Sluice Catchment currently benefits from a historical legacy of drainage works and infrastructure that reduce flood risk in the catchment.

- Current owners and operators of some of these watercourses and infrastructure are either not set up, or funded, to allow them to continue to operate these into the future. Others may be able to manage them to better effect.
- The EA is not able to deliver all the aspirations that partners and the community have for flood risk management and linked growth ideas, such as water resource security and navigational development, alone.
- There are many other projects that both BSIDB and the EA need to link with as the Black Sluice Catchment Works project is progressed. (for example the Fens Waterway Link and Anglian Water Services water transfer scheme).

The EA and the BSIDB have agreed to seek to move forward jointly in the following way:

Creation of the South Forty Foot Catchment Steering Group

Robert Caudwell has been appointed as an independent chairman to ensure a continued dialogue between all risk management authorities (RMAs) and other organisations and individuals who have offered to assist in shaping the future flood risk management and sustainable development of the Black Sluice Catchment. This will allow the EA to act as an equal partner, instead of a lead, which better reflects the EA's funding position. The chairman will set up a strategic catchment partnership steering group. This group will include representation from the Black Sluice IDB, the Environment Agency, Lincolnshire County Council and the Greater Lincolnshire Local Enterprise Partnership. The Steering Group will focus on four areas for development:

- Catchment wide asset management for land drainage and flood risk management
- Water Resource
- Water Level Management for Navigation
- Water Framework Directive

Organisations will be able to bid for funding from sources other than FCRMGIA and coordinate development and risk management activities within the catchment.

- **Catchment wide asset management for land drainage and flood risk management including:**

A transitional arrangement for BSPS

The EA and BSIDB will investigate how they can fund and facilitate a smooth transition of the BSPS to BSIDB. Provisionally, a two year transitional arrangement is proposed, where the EA continue to operate the BSPS, but with increasing involvement of the BSIDB, until their familiarity and competence in running the station is at a point where full hand over can be achieved. This time will allow other funding sources to be investigated and legal processes to be progressed, but is dependent on the necessary funding being in place.

Interim capital works undertaken by EA and BSIDB

Both RMAs will continue to progress capital works that sustain and improve the flood risk management of the existing system - where these comply with treasury funding rules and meet the strategic approach that is being formulated by the catchment partnership. For example BSIDB land drainage pump station refurbishments, culvert replacements, protecting the low points along raised main river embankments, one off capital dredging works and the Swaton Flood Alleviation Scheme.

A joint operation and maintenance plan
A detailed plan for operating and maintaining the flood risk infrastructure in the catchment will be jointly written by all RMAs involved in managing flood risk. It will outline each partner's roles and responsibilities and identify funding sources and arrangements, to ensure that the work is affordable and fully funded. Use would be made of the Public Sector Cooperation Agreement to allow the RMAs to undertake work on each other's behalf where they are better equipped or have resources to do so. This will allow the future transfer of watercourses between organisations to take place more smoothly if desired. The EA has a statutory duty to provide flood warnings to the public. The operational plan will describe how the EA and IDB will work together to put in place suitable communications that will allow the EA to continue with this responsibility.

- **Water Resource**
  Opportunities will be sought to optimise the use of water within the catchment to generate economic growth.

- **Water Level Management for Navigation**
  Existing and new aspirations will be considered when developing works arising from the above to ensure Water Level Management for Navigation is incorporated or as a minimum, not precluded for the future.

- **Water Framework Directive**
  Opportunities will be sought across all works arising from the above to collectively deliver in accordance with the Water Framework Directive and enhance the environment where possible.
  Detail to be agreed by Steering group for 2, 3 and 4.

3. Consultation

Results from the formal consultation
The formal consultation was promoted widely through traditional and social media as well as directly to locally elected members at county, borough, district, town and parish level, along with local MPs. Six events took place, providing opportunities for people to come and talk to both organisations – three at village halls in Rippingale, Bicker and Billingborough, and three at the BSIDB offices at Swineshead. In addition we attended a bespoke meeting for the Bourne branch of the NFU and the EA attended the Lincolnshire County Council Flood and Drainage Management Scrutiny Committee in September. More than 150 people attended these events.

An analysis of the 71 responses received reveals that:

- Most people support transferring the Black Sluice Pumping Station (BSPS) to the BSIDB followed by replacing two pumps to keep the current pumping capacity. The options least supported are do nothing and do minimum i.e. removing the pumps.
- For the Lower Catchment, most people support protecting low points along the raised river embankments from erosion, followed by making flood products available to homes most at risk. The options least supported are do nothing and do minimum i.e. continue with current maintenance. In addition to the options consulted upon responders also favoured increased maintenance of the South Forty Foot Drain (SFFD) channel and for this work to be carried out by the BSIDB.
- For the Upper Catchment, most people support increased channel maintenance downstream of villages, followed closely by 'slowing the flow' upstream to hold water back, and make flood products available to homes most at risk. The options least supported are do nothing and do minimum i.e. continue with current maintenance.
- Eighteen responses indicated a willingness on the part of both individuals and organisations, to help deliver some of the proposed options.

It must be noted that a 'do nothing' and 'do minimum' option are required when putting together a business case for funding. It has to be shown and quantified that it is worth doing something, rather than nothing, and also what the implications are if what happens currently just continues.
A full 'response to the consultation document' will be published by the 27th January 2016.

4. Appendices

These are listed below and attached at the back of the report	
None	

5. Background Papers

The following background papers as defined in the Local Government Act 1972 were relied upon in the writing of this report.

Document Title	Where the document can be viewed
None	

This report was written by Deborah Campbell, who can be contacted on email Deborah.campbell@environment-agency.gov.uk and agreed and signed by Ian Warsap who can be contacted on email ian.warsap@blacksluiceidb.gov.uk

Acknowledgements

We would like to thank the Black Sluice IDB for their contributions and support for this document.

We would also like to thank all consultees who took the time to attend our engagement events and respond to the consultation. Your feedback has been extremely valuable and is already informing decisions that are being made about the future flood risk management of the Black Sluice Catchment.

Glossary

BSCW	Black Sluice Catchment Works
BSIDB	Black Sluice Internal Drainage Board
BSPS	Black Sluice Pumping Station
Catchment	The watershed of a surface water river system
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EU	European Union
Fluvial	Of or found in a river
FCRMGIA	Flood and Coastal Risk Management Grant In Aid - funding from central government for flood risk management projects
Government	The term government is used within this report to refer to Defra (the Department for Environment, Flood and Rural Affairs) and HM Treasury (Her Majesty's Treasury).
Ha	Hectares
IDB	Internal Drainage Board
Km	Kilometres
LEP	Local Enterprise Partnership
LLFA	Lead Local Flood Authority
Main river	A watercourse shown as such on the main river map, and for which the Environment Agency and Natural Resources Wales has responsibilities and powers
PLFP	Property Level Flood Protection
Reservoir	A natural or artificial lake where water is collected and stored until needed. Reservoirs can be used for irrigation, recreation, providing water supply for municipal needs, hydroelectric power or controlling water flow.
Risk Management Authorities (RMAs)	Organisations that have a key role in flood and coastal erosion risk management as defined by the Act. These are the Environment Agency, Natural Resources Wales, LLFAs, district councils where there is no unitary authority, internal drainage boards, water companies, and highways authorities.
River flooding	Occurs when water levels in a channel overwhelms the capacity of the channel.
Services	Services include schools, hospitals, nursing/care/retirement homes, police stations, fire and ambulance stations, prisons, sewerage treatment works and electricity installations. Only those in areas at risk of flooding are shown on these maps.
SFFD	South Forty Foot Drain
Standard of Protection	The annual probability of the design flood level being reach or exceeded

Surface water flooding	Flooding from rainwater (including snow and other precipitation) which has not entered a watercourse, drainage system or public sewer.
Tributaries	A river or stream flowing into a larger river or lake.
WFD	Water Framework Directive

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