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Draft Lower Aire Flood Risk Management Strategy: Environmental Report

Non-Technical Summary

January 2012

We are the Environment Agency. It's our job to look after your environment and make it a better place - for you, and for future generations.

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The Environment Agency. Out there, making your environment a better place.

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Castleford flooding, 2007

1. Introduction

We, the Environment Agency, are responsible for managing the risk of flooding from rivers and the sea in England and Wales. Flooding is a natural process that can have a major effect on lives, communities, the economy and the environment.

Our powers to undertake flood risk management activities are permissive and therefore not a legal duty. As a result, we follow Department of Environment, Food and Rural Affairs (Defra) guidelines in order to use our limited funds to maximise benefit to the nation as a whole.

In the Lower Aire Flood Risk Management Strategy (the Strategy), we set out the flood risk in the River Aire floodplain between Oulton and Goole and what will be done to manage it.

The Study Area

The Study Area covers 340km^2 of the floodplain of the River Aire, including Selby to the north and the M62 motorway to the south.

This area is mainly rural to the east of Ferrybridge; whilst to the west, the landscape is dominated by the towns of Knottingley and Castleford and the eastern outskirts of Leeds.

The rivers are maintained to help manage flood risk and the majority of the floodplain is protected by a combination of flood banks or walls which run alongside the river and by a series of washlands in the rural areas to the east.

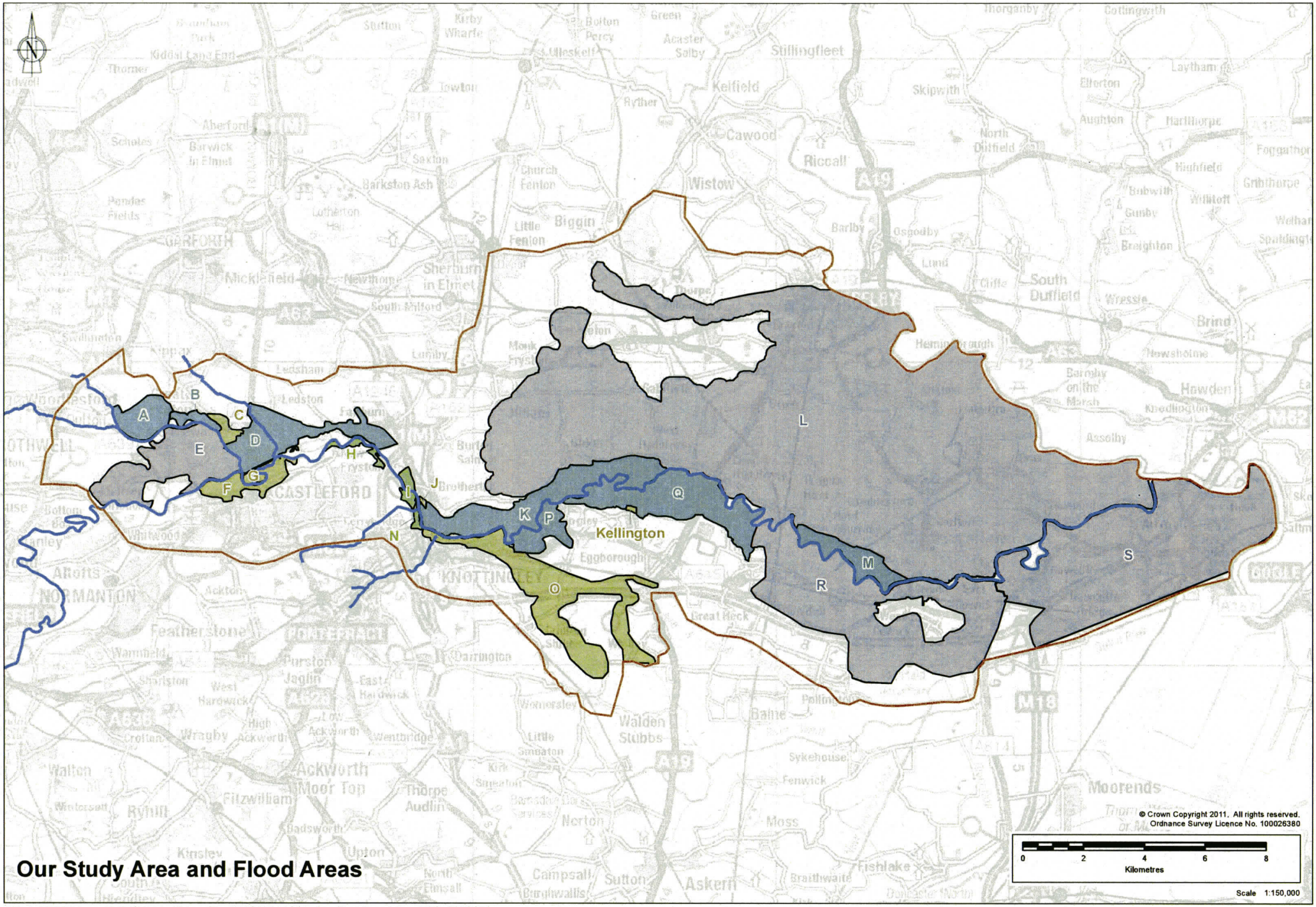
The washlands are generally areas of unpopulated floodplain which are surrounded by earth embankments and, or, higher ground. These washlands store water in the floodplain between front riverside banks (which overtop in high flows) and a combination of barrier banks, set back from the river, and higher ground to reduce the risk of water spreading to properties, businesses and infrastructure. The washlands flood when river levels rise to a certain level and store the floodwaters until river levels drop.

Strategic Environmental Assessment

This document provides a summary of the Strategic Environmental Assessment (SEA) of the draft Lower Aire Flood Risk Management Strategy.

Under the SEA Directive, it is not mandatory to undertake SEA for flood risk management strategies. However, it is our policy to apply SEA to such strategies as part of our commitment to sustainable development.

SEA assesses the potential environmental consequences of plans and strategies before they are approved. The process allows us to consider different ways of managing flood risk, and identify, minimise or avoid significant environmental impacts at the earliest opportunity. We have sub-divided the Study Area into 'Flood Areas' (A to S) to help our analysis.



Our Study Area and Flood Areas

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2. Key Issues, Constraints and Opportunities

We have collected a wide range of baseline data from a variety of sources and reviewed a range of plans which are relevant to the future planning of the Study Area. We have been consulting with external organisations, local experts and the public throughout the development of the Strategy to ensure we fully understand the existing environment. This will continue until the Strategy has been finalised.

The table below outlines the key environmental issues we have identified.

Receptor	Key environmental issues
Human Beings	• Flood risk to urban and rural communities. • Critical transport and power infrastructure associated with coal fired power stations and national road and rail networks. • Public access and green space opportunities.
Flora and Fauna	• Special interest features of the freshwater Sites of Special Scientific Interest (SSSIs). • Opportunities for Biodiversity Habitat Action Plan habitat creation on river floodplains, river restoration and enhancement, and improving fish passage.
Climate	• Planning for climate change impacts.
Water	• Compliance of the Strategy with the environmental objectives of the Water Framework Directive (WFD) and implementation of the Humber River Basin Management Plan (RBMP). • Point source and diffuse pollution. • Water resource availability.
Landscape	• Areas of high landscape quality in diverse urban and rural landscapes • Opportunities to develop multi-functional urban and rural open spaces which contribute to the green infrastructure of the Study Area.
Cultural Heritage	• Buried and upstanding assets, including buildings, of national archaeological importance found within the rural floodplain. • Listed buildings including those associated with historic centres of Snaith, Selby, Knottingley and Goole.
Soil, Geology and Hydrology	• Flood risk to high quality and versatile agricultural land. • Contaminated land upstream of Ferrybridge associated with historic industrial land use.
Land Use and Natural Resources	• Future exploitation of coal measures and extraction of aggregates.
The following environmental issues have been scoped out:	
Air Quality	Emissions associated with construction activities can lead to localised and temporary effects on air quality; however, as details such as construction methods are unknown at this stage these effects are better assessed and managed at project level.
Noise and Vibration	Noise will only be an issue during construction in localised areas for a temporary period. As a result these effects are better assessed and managed at a project level.

Change Without a Plan

The table of key issues presents a snapshot of the existing environmental baseline; however, we are also required to consider the future evolution of the Study Area if a plan were not in place.

Ending our current flood risk management activities would result in extensive flooding, impacting thousands of homes, large areas of agricultural land, motorways and other critical infrastructure.

3. Strategic Options

We identified potential flood risk management options for the Lower Aire Catchment as a whole. We initially considered a wide range of options and used a computer model to gain a thorough understanding of the river processes and flooding regime. We then carried out an initial assessment of options which also looked at environmental and health and safety issues. We identified options for each Flood Area which are technically viable, economically feasible and consistent with national and regional flood management policy.

We have developed these options further through a detailed appraisal of environmental, economic and technical factors, and consideration of the funding that would be available in the future to be able to continue to manage defences. This process led to the identification of two preferred strategic options for the Study Area:

- **Option 1** assumes that we will only be able to rely on central government funding to implement the Strategy.
- **Option 2** assumes that we are able to find third party (external) contributions to supplement central government funding to implement the Strategy.

<table>
<tr><th>Option 1: Use available Government Funding to manage flood risk</th><th>Option 2: Use available Government and Partnership Funding to manage flood risk</th></tr>
<tr><td rowspan="2">Limited Maintenance - Under Option 1, we would continue to maintain a number of defences until they need major works (such as rebuilding or replacing), after which time Government funding alone would be insufficient to replace or maintain them.

This limited maintenance approach would apply to: Allerton Bywater (C), Whitwood Mere and Castleford (F), Castleford Loop (G), North Bank Area (L), Hirst Courtney (M), Beal (Q).</td><td>Maintain Flood Risk Management (FRM) Asset - Under Option 2, we would seek the partnership funding needed to supplement Government funding to meet the cost of replacing and or maintaining existing flood defences.

This partnership approach would apply to: Allerton Bywater (C), South Castleford (F), Castleford Loop (G), North Bank Area (L), Hirst Courtney (M), Beal (Q)</td></tr>
<tr><td>Improve FRM Asset - Our studies have shown that there would be a significant benefit in improving the level of flood protection at Whitwood Mere (F). However, we would only able to do this with the partnership funding.</td></tr>
<tr><th colspan="2">The following components are the same for Option 1 and Option 2</th></tr>
<tr><td colspan="2">Maintain FRM Asset - Many existing defences within the Study Area provide significant flood protection to property. Where the economic case is strong, we will be able to use available central Government funding to continue to maintain these defences.

Both options include the continued maintenance of the following defences: Low Street, Brotherton (J), Ferrybridge & Knottingley (O), Kellingley (P), Kellington Bank, Gowdall & Snaith (R), East Cowick (R), and Rawcliffe, Airmyn and Goole (S).</td></tr>
<tr><td colspan="2">Withdrawal of Maintenance - There are a number of defences in the Study Area which provide limited or no protection to property. Where the costs of maintaining defences are greater than the benefits of maintaining them, we cannot justify continued investment in those defences. We have powers to manage flood defences but it is Government policy to withdraw from defences where the cost of maintaining them is greater than the benefits.

Both options include withdrawal of maintenance at: Lowther Washland (B), Fairburn Ings (D), Mickletown Ings (E), Brotherton Ings Settling Ponds (I), Brotherton Marsh, West Holme and Birkin Holme (K), Kemp Ings (except Kellingley) (P), South Bank Washlands (except Beal, Kellington Bank, Gowdall, Snaith and East Cowick) (Q,R).

Where we intend to stop maintaining a defence we will work closely with the affected landowners and communities before we withdraw maintenance.

We do not presently maintain any flood defences in New Fryston to Water Fryston (H) or Ferrybridge Power Station (N). We will continue to assist land and property owners in these areas to be prepared for flooding.</td></tr>
</table>

4. Options Assessment

Using what we know about the key environmental receptors and issues in the environment, we developed a range of environmental assessment criteria which were used to test and compare each of our options.

Our environmental appraisal methodology evaluated the significance of potential effects by considering the sensitivity of the receptor and the scale of the impact resulting from a strategic option.

We have used an environmental appraisal period of 100 years and have considered how any negative impact from the work that we would do, or by any resultant changes in flood risk of an option, may be limited through mitigation.

How we Define Flood Risk	
Flood Event	**Flood Risk**
Very Frequent - events that have more than a 50% chance of happening in any year	Extremely Significant
Frequent - events that have between a 50% and 4% chance of happening in any year	Very Significant
Infrequent - events that have between a 4% and 1.33% chance of happening in any year	Significant
Moderate - events that have between a 1.33% and 0.5% chance of happening in any year	Moderate
Low - events that have less than 0.5% chance of happening in any year	Low

Option 2 is the preferred environmental option due to:

- **Reduced flood risk** to Whitwood Mere and adjacent areas of Castleford from Very Significant or Significant to Moderate or Low.
- **Greater number of residential and commercial properties protected** from Significant or greater flood risk; fewer properties exposed to increased flood risk than Option 1.
- **Continued protection to critical infrastructure -** Option 1 would increase flood risk to more sections of the road network and also to some sewage / wastewater treatment plants and waste management facilities.
- **Continued protection from sources of contamination -** Option 1 would increase flood risk to six historical landfill sites that contain non-inert waste and a number of other potential sources of contamination.
- **Continued protection to cultural heritage features and buildings -** a greater number of Scheduled Monuments and listed buildings will be protected from Significant or greater flood risk, and fewer historic environment assets exposed to increased flood risk, when compared with Option 1.
- **Continued protection to thousands of hectares of agricultural land -** Option 2 provides protection to 3,870ha more agricultural land than Option 1.

5. Description of the Draft Strategy

Our preferred strategy is set out in more detail below. When the Strategy is adopted, we will carry out the required design work and project level Environmental Impact Assessment (EIA) for those elements of the preferred option that require construction work.

Draft Lower Aire Flood Risk Management Strategy
Upstream of Ferrybridge (Flood Areas B to J)
We intend to continue maintaining the defences that provide protection to the key population centres of Allerton Bywater (C), Castleford (G), and Brotherton (J). We propose to reduce flood risk in the Whitwood Mere and adjacent areas of Castleford (F), possibly by increasing the height of the existing riverside embankment. We will withdraw maintenance from all other flood banks (B, D, E, I). We will continue to assist land and property owners in New Fryston to Water Fryston (H) to be prepared for floods. The proposal to reduce flood risk in the Whitwood Mere and adjacent areas of Castleford (F) will be dependent on the availability of the external funds required to supplement central government funding.
Downstream of Ferrybridge, South Bank (Flood Areas N to S)
We will maintain linear defences along the river banks which protect Knottingley (O) and Beal (in Q); the linear defences and cross bank (Pickhill Bank) which protect Snaith (in R); and, the linear defences and cross bank (Hazel Bank) which protect Airmyn, Rawcliffe and Goole (S). We will look to improve the defences for Flood Areas O and S as required in line with climate change. After appropriate consultation and notice, we will withdraw maintenance from the other linear defences along the river banks in Flood Areas P, Q and R, but intend to maintain the barrier banks and cross banks that are set back from the river to protect the population centres of Kellingley (Area P, bank along the A645), Kellington (next to Area Q, Kellington Barrier Bank), Hensall and Gowdall (Area R, Sea Bank), and East Cowick (Area R, East Cowick bank). We will continue to assist Ferrybridge Power Station (Flood Area N) to be prepared for floods. The continued maintenance of the linear defences at Beal (in Q) will be dependent on the availability of the external funds required to supplement central government funding.
Downstream of Ferrybridge, North Bank (Flood Areas K to M)
We will maintain the banks of the washlands and the barrier banks which protect Selby and the villages and hamlets to the north of the River Aire (L and M). After appropriate consultation and notice, we will withdraw maintenance from the other washland banks (K). The continued maintenance of flood defences on the north bank in Flood Areas L and M will be dependent on the availability of the external funds required to supplement central government funding.
Being prepared for Floods
We will help prepare communities for flooding by: • Continuing our flood awareness programme and encouraging those at risk to prepare emergency plans and sign up to the Environment Agency flood warning systems. • Carrying out consultation with landowners and property owners to discuss potential further solutions. • Working with the local councils to ensure a coordinated local approach to flood risk management that people understand. • Working with other organisations to ensure information about what to do in a flood reaches the most vulnerable people in the community.
Adapting to Floods
The Strategy sets out recommendations for managing flood risk in the long term in ways that wherever possible work with nature. In areas where engineered defences may not be appropriate, resilience measures to adapt to floods, such as refuge areas, flood proofing, personal flood plans and temporary defences will be required to ensure that all consequences of flooding can be managed safely. It is a popular view that we should stop building on floodplains. Whilst the Strategy does not have the authority to change planning controls, the Environment Agency will continue to object to planning permissions for inappropriate development on the floodplain.

6. Environmental Effects, Mitigation and Monitoring

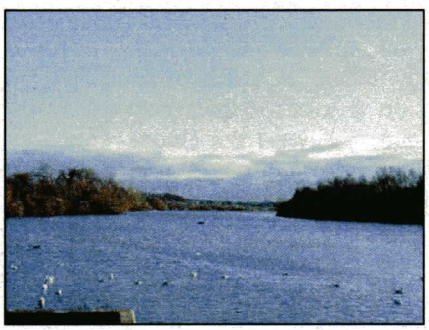
The draft Strategy has a number of impacts on the environment, both positive and negative. These, and any potential mitigation or further work required, are summarised below.

Positive Impacts	Negative impacts	Further Work and Mitigation
Human Beings: Reduced flood risk to ~340 residential and ~170 commercial properties in Whitwood Mere and Castleford. Continued protection ~11,960 residential properties and ~970 commercial properties which would otherwise be at Significant or greater flood risk. Continued protection to healthcare facilities and the majority of key infrastructure.	**Human Beings:** Increased flood risk to ~42 residential and ~6 commercial properties in rural and washland areas (Flood Areas D, E). Increased flood risk to two sections of A-road. Failure of riverside banks will disrupt footpaths and recreational access along several sections of the River Aire.	**Further work:** Liaison with relevant organisations around flood risk to the A-roads and the PRoW. **Mitigation:** Work with environmental partners, landowners, communities and individual properties in the short term (0-5 years) to decide how best to manage the assets prior to withdrawing maintenance from front banks.
Flora and Fauna: Continued protection to 30 local nature conservations sites from significant flood risk. Increased connectivity between the river and its floodplain provides significant opportunities for improved extent and quality of wetland habitats and the species that they support.	**Flora and Fauna:** Changes in flooding and drainage regime for Mickletown Ings SSSI (Flood Area E) and Fairburn and Newton Ings SSSI (Flood Area D) could have negative effects on the cited features.	**Further work:** Liaison with Natural England, RSPB and other interested parties to enable review and adaption of sustainable water level management planning at Mickletown Ings SSSI and Fairburn and Newton Ings SSSI.
Climate: No significant impacts.	**Climate:** No significant impacts.	**Further work/Mitigation:** Not necessary.
Water: Withdrawal of Maintenance from the front banks along substantial lengths of the River Aire provides opportunities to contribute to the implementation of the Humber RBMP and meet the environmental objectives of the WFD.	**Water:** No significant impacts, pending confirmation of restoration details and future aggregate extraction at Methley Quarry (Flood Area E).	**Mitigation:** Confirm details of restoration works for extraction Phases 1 to 4 at Methley Quarry and confirm risk to Lafarge borehole and aggregate extraction operations. Liaise with the site operator to develop local solutions if required.
Landscape: Continued protection of large areas of the Lower Aire floodplain will prevent the extent of negative impacts of Extremely Significant flood risk to landscape features such as arable land, hedgerow, woodland, feature trees and settlements.	**Landscape:** Sections of four Local Landscape Character Areas will be subject to Extremely Significant flood risk; landscape features such as arable land, hedgerows, woodland, feature trees and settlements are likely to deteriorate and experience negative impacts. Improvements to and construction of new flood defences may have negative impacts on visual amenity and landscape character.	**Mitigation:** Where construction works are planned carry out project-level Landscape and Visual Impact Assessment, and consider screen and replacement planting for affected areas.

Positive Impacts	Negative impacts	Further Work and Mitigation
Cultural Heritage: Continued protection to five Scheduled Monuments, 36 Listed Buildings and one conservation area from significant flood risk	**Cultural Heritage:** Increase in flood risk to two Scheduled Monuments. The two Scheduled Monuments comprise buried remains and earthworks with one already partially submerged; increased flood risk is not predicted to have any significant negative effects.	**Further work:** Liaise with cultural heritage partners and owners of individual properties to confirm level of risk to Scheduled Monuments, and discuss methods of improving resilience and adapting to floods if necessary.
Soils, Geology, Land Quality and Land Use: Continued flood protection to 6,100ha of Provisional ALC Grade 2 and 3 land from extremely significant flood risk. Reduced flood risk to seven historical landfill sites in the Whitwood Mere and adjacent areas of Castleford, and continued protection of 18 other historic landfill sites, reducing the potential for release of contaminants onto land.	**Soils, Geology, Land Quality and Land Use:** Increase of 1,110ha in the area of Grade 2 and Grade 3 agricultural land at extremely significant flood risk. Expected change in land use of these areas from arable farming to grassland, e.g. grazing, silage.	**Further work:** Work with environmental partners, landowners and communities in the short term (0-5 years) to decide how best to manage the assets prior to withdrawing maintenance from front banks.
Natural Resources: Continued flood protection to large areas of the Study Area, potentially reducing barriers to future exploitation of coal and other resources.	**Natural Resources:** Increased flood risk to areas surrounding Methley (Flood Area E) and north of Kellingley Colliery (Flood Area P). Potential to affect any future expansion of sand and gravel exploitation area and Kellingley Colliery outside of its current permitted development area.	**Further work:** Liaise with Site Operators over present and future operations (see Section 7.4)

Monitoring Plan

A monitoring plan has been developed to monitor the significant impacts and mitigation measures identified in the assessment. The findings of the monitoring plan will be reviewed and incorporated into the periodic review of the Strategy.

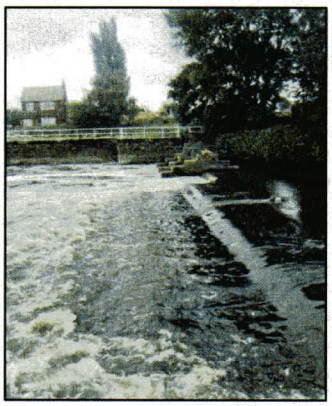




7. Environmental Benefits

We have a statutory duty to protect and enhance the local environment wherever possible. In addition to the objectives of the Strategy, the consultation and option development processes have helped identify a number of benefits that the Strategy can deliver.

Environmental benefits are measures that improve the existing environment. These measures are in addition to any mitigation measures and may provide multiple benefits for recreation, improved water quality and could potentially attract agri-environmental funding as well as funding from other external sources.

Water Framework Directive



The Strategy provides opportunities to help implement a number of the mitigation measures in the Humber River Basin Management Plan that are required for water bodies to reach good ecological status.

Works to maintain or improve defences on the River Aire may allow us to plan for and design a more natural river habitat by changing the line of the defence and using techniques to work with natural river processes.

The withdrawal of maintenance from some of the washland banks downstream of Ferrybridge may also present opportunities where landowners and other stakeholder groups wish to work with us to take an active role in the restoration of floodplain areas to create and improve water dependant habitats.

Working with others in the future

We will continue to engage with Selby District Council, East Riding of Yorkshire Council, Leeds City Council and Wakefield Council about the spatial distribution of future development in relation to flood risk and sustainable development.

As part of review of development and mineral planning we have identified that the Strategy may provide opportunities to tie in flood risk management, water quality and nature conservation objectives with ongoing and potential future sand and gravel exploitation around Methley. We will liaise with Leeds City Council and the current and future site operators to identify how future development in this area might be planned to provide multiple benefits locally.

Setting out guidelines for Green Infrastructure

The implementation of the Strategy offers a substantial opportunity to enhance landscape on a local to regional level. As part of the Strategy we have reviewed the Local Landscape Character Assessments (LLCAs) that are relevant to the Study Area and identified a number of common guidelines which will:

- Shape the way our flood risk management schemes will be implemented in the future.
- Help to guide partner organisations, landowners and stakeholders by identifying ways of managing and enhancing more natural floodplains in the future.

8. Conclusion

Overall, the draft Strategy has a positive environmental impact as it continues to protect the majority of the Study Area from flooding and provides opportunities to implement environmental benefits.

The mitigation measures we recommend in the Strategy will ensure that any potentially significant negative impacts are minimised.

Abbreviations and Glossary

Abbreviation / Term	Definition
EIA	Environmental Impact Assessment
FRM	Flood Risk Management
Flood Risk	The combination of the likelihood of a flood happening and the impact it would have
Flood Risk Management	Activities that are undertaken to reduce the impact of flooding
LLCA	Local Landscape Character Assessment
Mitigation	The measures, including any process, activity or design to avoid, reduce, remedy or compensate for negative impacts.
RBMP	River Basin Management Plan
River Basin Management Plan	A plan prepared under the Water Framework Directive that sets out the mitigation measures and actions that are needed for water bodies to reach good ecological status
SEA	Strategic Environmental Assessment
SSSI	Site of Special Scientific Interest
WFD	Water Framework Directive

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