North Lincolnshire Council

Local Flood Risk Management Strategy

August 2016

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Executive summary

Flooding is a natural phenomenon, the consequences of which can be exacerbated by poor management of the environment. The risk of flooding is expected to increase in future due to the effects of climate change, particularly if flooding is not sufficiently planned for when undertaking new developments. Whilst it is not possible to prevent all instances of flooding, it is possible to take actions to manage these risks and to reduce the impacts on communities, both now and in the future.

Purpose of this report

As the Lead Local Flood Authority, North Lincolnshire Council are responsible for managing flood risk from 'local' sources. This report is North Lincolnshire Council's Local Flood Risk Strategy (LFRMS) Summary for Public Consultation. It presents the summary of North Lincolnshire's preferred strategy for managing 'local' flood risks in the district, i.e. flooding arising from:

- surface run-off;
- groundwater; and
- Ordinary Watercourses (generally small rivers and streams).

How this Strategy fits into the wider management of flood risk from non-local sources?

Much of North Lincolnshire is flat and low lying and is therefore susceptible to flooding from a range of sources. Therefore, whilst this document focuses on local flood risks, it also sets out how all of the Risk Management Authorities covering North Lincolnshire have agreed to work together to consider risks from all potential sources of flooding. The Environment Agency are currently developing a Flood Risk Management Plan for the Humber catchment, within which North Lincolnshire is located, which will consider flooding from non-local sources, such as rivers and the sea. Together, the Humber Flood Risk Management Plan and this LFRMS will ensure that flooding from local sources is appropriately quantified alongside flood risk from these non-local sources, under the responsibility of the risk management authorities.

Who is this 'local' Strategy for?

This LFRMS has been developed in conjunction with the Risk Management Authorities present in North Lincolnshire, including the Environment Agency, Internal Drainage Boards and Water Companies. It sets out the roles and responsibilities of all of the Risk Management Partners and provides the necessary framework for fostering partnerships between these Flood Risk Management Partners, particularly in delivering flood risk management schemes. Ultimately, however, this strategy is for the residents and businesses of North Lincolnshire, set out how the Council intends to manage local flood risks, as well as contribute to management from non-local sources, and to engage and inform our residents on their own responsibilities, and enable them to contribute to the management of flood risk.

How do we propose to manage local flood risk

In developing a business case for new flood protection works, cost and benefits to property and infrastructure can only be considered once. It is important, therefore, that all risks are adequately identified in planning and delivering flood defence schemes. By working together with our flood risk management partners, we can achieve this. This strategy documents how we will work with our partners to deliver this objective in line with other plans and strategies, for example the Environment Agency's strategy for the Isle of Axholme and the Humber Flood Risk Management Plan.

Since 2007, North Lincolnshire Council has collected much information on historic local sources flood events, and we have mapped and recorded areas of drainage infrastructure in many settlement areas. We will continue to build upon the information gathered to date, with the intention of completing a comprehensive asset database for the whole council area. By combining our local knowledge of areas that have flooded in the past and existing flood risk management infrastructure, with new information regarding areas predicted to

be at risk in the future, we have identified those areas of North Lincolnshire which we consider to be at greatest risk from local sources. We intend to focus our attention on managing local flood risks in these areas, to enable efficient and effective solutions to be identified that provide the greatest benefit to our communities. The areas we intend to focus on are set out in this Strategy. The strategy explains the various funding avenues for flood risk management activities and emphasises the need for local partnership and contributions in delivering local flood schemes.

Working with our partners, we have already carried out extensive improvement works in many areas. We have contributed jointly to schemes where there have been benefits to all drainage authorities in delivering improvements, and we will continue to do this. For example works to improve a surface water sewer in Ulceby are planned, and include a contribution from Anglian Water, where it has been recognised that benefits to their infrastructure can be jointly derived.

Maintaining these new systems, alongside the very important work of maintaining existing drainage networks, is ongoing, and forms part of our annual investment into drainage infrastructure maintenance, which we will continue to undertake across North Lincolnshire. It is also important that private or riparian owners also carry out the routine maintenance they are required to undertake to ensure that watercourses are functioning as intended.

When will this occur?

This Local Flood Risk Management Strategy is a “live” document, which will continue to be updated as investigation works and analyses continue, improvements are undertaken and future flood events occur. This document then, sets out our strategy for the next six year period, but will remain live throughout that time as further understanding and review influences our priorities within that period.

The preparation of this LFRMS is a statutory requirement of the Flood and Water Management Act 2010, where Lead Local Food Authorities must prepare and publish a summary document which considers these risks. This strategy concurs with the Environment Agency’s National Flood and Coastal Erosion Risk Management Strategy.

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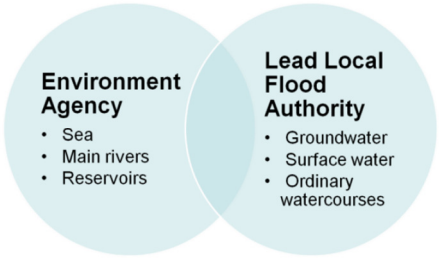
1. Introduction

1.1 Purpose of this report

This report is North Lincolnshire Council's Local Flood Risk Strategy (LFRMS) Summary for Public Consultation. It presents the summary of North Lincolnshire's preferred strategy for managing 'local' flood risks in the district.

'Local' flood risk is defined as a risk of flood arising from surface run-off, groundwater, or an ordinary watercourse, which includes a lake or pond which flows into an ordinary watercourse. The Environment Agency is responsible for managing the risk of flooding from the sea and main rivers, and also for regulating the safety of reservoirs. Where there is an interface between the sea and main rivers with local flood risk sources (for example, tide locking) it is the responsibility of the Lead Local Flood Authority (LLFA, discussed further in Section 1.2 below) to consider the impacts and consequences.[1]

Figure 1.1 Division of flood risk management responsibilities between the Environment Agency and Lead Local Flood Authorities, such as North Lincolnshire Council.



Source: Local Government Association, 2011. Framework to assist the development of the Local Strategy for Flood Risk Management, 2nd edition.

1.2 Background

Flooding can have significant impacts, as evidenced by the 2007 event. As well as the impact to residential properties, flooding can also cause major disruption to energy, water, communications and transport infrastructure. It can interfere with public services such as schools and hospitals and have significant indirect effects through disruption to travel or loss of income.

Flooding is a natural phenomenon, the consequences of which can be exacerbated by poor management of the environment. The risk of flooding is expected to increase in future due to the effects of climate change, particularly if flooding is not sufficiently planned for when undertaking new developments. Whilst it is not possible to prevent all instances of flooding, it is possible to take actions to manage these risks and to reduce the impacts on communities, both now and in the future.

In the summer of 2007, numerous communities across the country, including many in North Lincolnshire, suffered from flooding. Following this flood event the Government commissioned Sir Michael Pitt to undertake a comprehensive review of the lessons to be learned. In 2010, the Flood and Water Management Act 2010 (FWMA) enacted a number of the recommendations made by Sir Michael Pitt, including that Councils should 'take the lead on local flood risk management'. The Act named County Councils and

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Unitary Authorities as 'Lead Local Flood Authorities' (LLFAs). North Lincolnshire Council is a Lead Local Flood Authority, and as such is responsible for managing flood risk from **'local'** sources, which include:

- surface run-off;
- groundwater; and
- Ordinary Watercourses[2] (generally small rivers and streams).

The responsibilities of LLFAs include the development, maintenance and application of a Local Flood Risk Management Strategy (LFRMS), which sets out how the Council intends to manage flood risks arising from local sources. This document will be reviewed on a six yearly basis, to fit into the anticipated Local Plan period to 2026, or earlier if a significant flood event occurs that changes our understanding of local flood risk in the borough.

The purpose of this summary document is to allow the public and other relevant authorities to comment on the approach to managing 'local' flood risks currently preferred by the Council, such that they are able to influence the approach. The intention is to provide clarity and transparency to partners and the public by explaining the how our preferred approach was developed and agreed. The LFRMS also clarifies the roles and responsibilities within the Council area, which will help to facilitate the formation of effective partnerships between the Council and the other relevant authorities. We seek to identify, through the LFRMS, a range of effective flood risk management measures that we can then implement in a co-ordinated way that balances the needs of communities, the economy and the environment. This strategy also ensures that all risk management Authorities are brought together in order to deliver a coordinated approach to Flood Risk Management from all sources.

A holistic approach to flood risk management

Whilst the management of flood risk from 'local' sources lies with the Council, significant portions of the North Lincolnshire area are at risk of flooding from the sea and 'main rivers'. The Environment Agency remains responsible for the management of flooding from these non-local sources. We will continue to work together with the Environment Agency to ensure that funding and decisions on flood mitigation are taken for the best interest of the Council residents as a whole, irrespective of the type or source of flood risk. We believe that this holistic approach to flood risk management, that facilitates effective collaboration between Risk Management Authorities, will lead to the best outcomes for our residents overall.

1.3 Legislative context

The responsibilities of North Lincolnshire Council, as the LLFA in our area, are set out in section 9 of the Flood and Water Management Act. This states that we must develop, maintain, apply and monitor a strategy for local[3] flood risk management (a "local flood risk management strategy"), and publish a summary of the strategy (including guidance on the availability of relevant information). The strategy must be consistent with the National Flood and Coastal Erosion Risk Management Strategy for England, which was prepared by the Environment Agency and Defra. We are required to consult with both the general public and the risk management authorities in our area on our emerging strategy. This document is the draft summary of the strategy and forms part of that consultation process.

The strategy is required to specify:

a. the risk management authorities in the authority's area,

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[2] Ordinary waterS urses inS ude Sakes Sr pSnds whiSh fS w intS an Srdinary waterS urse. S

[3] "S aSfS d risk" means fS d risk frSm surfaSe runSff, grSundwater, and Srdinary waterS urses. S

b. the flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area,

c. the objectives for managing local flood risk (including any objectives included in the authority's flood risk management plan prepared in accordance with the Flood Risk Regulations 2009),

d. the measures proposed to achieve those objectives,

e. how and when the measures are expected to be implemented,

f. the costs and benefits of those measures, and how they are to be paid for,

g. the assessment of local flood risk for the purpose of the strategy,

h. how and when the strategy is to be reviewed, and

i. how the strategy contributes to the achievement of wider environmental objectives.

1.4 Aims and Objectives

Overall aims of North Lincolnshire Council

The objectives of this strategy need to align with our overall priorities, as set out in our North Lincolnshire Strategy document, which is available on our website[4]. These are:

- **Priority One - Excellence in customer service**

  This Strategy will seek to identify an approach that provides the best possible flood risk management service across the Council area.

- **Priority Two - Provide value for taxpayers' money**

  This strategy identifies areas considered to be at greatest 'local' flood risk and direct spending to these areas to provide the greatest benefit.

- **Priority Three - Make our communities safer and stronger**

  This strategy sets out how we intend to manage both flood risk from local sources, as well as our approach to working with the Environment Agency and Internal Drainage Boards to reduce the risk of flooding from non-local sources, such as larger rivers and the sea. The resulting reduction in flood risk will make our communities safer and stronger.

- **Priority Four - Regenerate our area and increase prosperity**

  The disruption caused by flooding can have a negative impact on the national and local economy. Managing and reducing the risk will help reduce this impact. Flooding of property and business can be extremely stressful for those involved for a prolonged period of time as well as being damaging to local environments. Managing the risk of flooding can reduce the likelihood of this.

Objectives of this strategy

The objectives of this strategy are:

- Objective 1 – to improve the understanding (of both our communities and our flood risk management partners) of the roles and responsibilities for flood risk management in North Lincolnshire;

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[4] http://www.nSrthSnSs.gSv.uk/ySur-S_unSi$/infSrmatiSn-and-perfSrmanSe/strategies-and-pS iSies/S_unSiSstrategy/ S

- Objective 2 – to improve our understanding of local flood risk;
- Objective 3 – to reduce the risk of flooding from local sources in our communities;
- Objective 4 – seek to implement flood risk management actions that contribute to wider social, economic and environmental outcomes and sustainable development;
- Objective 5 – create a strong collaborative approach across stakeholders to address risks from all sources of flooding;
- Objective 6 – raise public awareness and engage with local people about local flood risks, and help our communities to manage their own risks;
- Objective 7 – contribute to planning and development decisions to ensure new development is appropriate; and
- Objective 8 – contribute to effective emergency flood response.

These objectives for the LFMRS are discussed in greater detail below.

Objective 1 – to improve the understanding (of both our communities and our flood risk management partners) of the roles and responsibilities for flood risk management in North Lincolnshire

It is important that all the stakeholders, including residents and businesses, know what their roles and responsibilities in relation to flood risk management are. This was a national problem highlighted by the 2007 flood event.

To address this, the roles and responsibilities of all stakeholders are set out in Section 2 of this strategy. This should help all stakeholders to identify the relevant people to contact with respect any particular flooding issue. If there is any doubt, North Lincolnshire Council as the LLFA can be contacted to establish who is responsible. Contact details for the relevant risk management authorities will be provided on the Council website[5].

Objective 2 – to improve our understanding of local flood risk

In order to determine appropriate management measures, it is first important to understanding the causes and factors that influence local flood risk. The Council's flood risk and drainage team have been developing this understanding for a number of years now and are experienced in a range of flood risk issues ranging from rainfall, groundwater and drainage issues, to wider tidal and river (fluvial) issues generally dealt with by the Environment Agency. As set out in Section 3.9 of this strategy, the Council are currently establishing a register of flood risk assets and flood risk management works completed to date. Further information will be available on the Council's website in due course.

A current understanding of the local flood issues in North Lincolnshire are set out in Section 3 of this strategy. Investigations and analysis will continue, with the intention being the compilation of an accurate understanding of local flood risk issues in the borough. As part of this understanding exercise, North Lincolnshire Council will carry out investigations into flood events as required under Section 19 of the FWMA 2010. The triggers for a Section 19 investigation are internal property flooding, with domestic property being the highest priority, followed by disruption to critical infrastructure and the public highway network. Our understanding of flood risk will also be informed by investigations undertaken outside of the Section 19 process, information supplied by our risk management partners, such as modelling provided by the Environment Agency, and modelling undertaken by the Council where necessary. This approach will ensure that the most up to date information on flood risk in the borough is used to inform decisions and enable any catchment scale issues to be identified or when development comes forward. The Council jointly with North

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[5] http://www.nSrthSnSs.gSv.uk/S_mmunity-adviSe-and-suppSrt/emergenSies/fS__ding/ S

East Lincolnshire Council have also produced a Strategic Flood Risk Assessment (SFRA) that was adopted August 2012. This document is used to inform planning decision within the authority area. This SFRA is undergoing 'a light touch' review to update the current SFRA and is programmed to be available sometime in 2016.

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Objective 3 – to reduce the risk in our communities from local sources of flooding

This strategy aims to reduce the risk in our communities from local sources flooding. This can be achieved in a number of ways, including increasing the awareness of flood risks in our communities to enable those at risk of flooding to protect themselves, as discussed further under Objective 6 below. The Council aim to contribute to reducing local flood risk by enacting the strategy set out in Section 4 of this document, which seeks to identify and manage local flood risks in the most vulnerable areas.

The strategy, set out in Section 4 will help to reduce the risks in the most vulnerable areas. This will include further investigation to better understand the flood mechanisms, maintenance and intervention works as necessary. Works will be prioritised for where they are needed most. Reducing the risk should help to make insurance more widely available.

A wide range of funding sources will be considered to contribute to flood mitigation schemes, including flood defence 'Grant in Aid' funding from the Environment Agency, which takes into account how many households will be better protected from flood risk or coastal erosion, how many of those households are in deprived areas (which carry a heavier weighting than households in non-deprived areas) and any benefits to wildlife, e.g. habitat created or improved. Further information on funding and the decision making process is provided in Section 6.

It may not always be possible for a mitigation scheme promoted by one of the risk management authorities to reduce the risk of flooding to every property. In this instance people will be encouraged to implement their own property level protection measures with support and guidance from the council.

People who are vulnerable to flooding are able to help themselves prepare for the onset of a flood by registering on the Floodline Warnings Direct service provided by the Environment Agency[6]. This provides warnings for flooding from rivers and the sea. Whilst surface water and groundwater flooding are not covered by this service in the North Lincolnshire area, people can keep informed by keeping up to date with weather reports, including severe weather warnings from the Met Office, and the local media.

Objective 4 – seek to implement flood risk management actions that contribute to wider social, economic and environmental outcomes and sustainable development

The Council will seek to implement flood risk management actions that contribute to wider social, economic and environmental outcomes and sustainable development. As set out in Section 5 of this document, the wider environmental context of any flood risk management works have been considered in developing this strategy. Where possible, works that are undertaken will be done in a way that enhances the environment, and the wider strategy will aim to contribute to achieving sustainable development, including the anticipated impacts of climate change.

Objective 5 – establish a collaborative approach across stakeholders to address risks from all sources of flooding

Working collaboratively with other risk management authorities enables a holistic picture of flood risk issues from all sources to be considered, to enable the greatest benefit to be identified for our communities. Working together provides opportunities for sharing information and expertise to gain a greater understanding of flood risks and how these can be resolved. The Council will work with other flood risk

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[6] http://apps.environment-agency.gov.uk/wiyby/37835.aspx. TeSephSne: 0345 988 1188. S

management authorities to coordinate works across the borough so that resources can be shared and overall costs can be reduced. The approach taken is adaptive and evolves in response to actual events and new information as it becomes available. This allows a greater amount of work to be undertaken.

As set out in Section 2.2 the Council is a member of a number of regional flood groups, which enable the council to take a strategic lead over local flood risk management, as well as contribute to the management of flooding from other sources.

Objective 6 – raise public awareness and engage with local people about local flood risks, and help our communities to manage their own risks

The Council aim to empower communities to manage their own flood risk, in line with the objectives of this LFRMS, by working with them to understand what the risk are, and supporting them to reduce those risks. Key to this is raising public awareness of flood risk issues and providing support and advice on what can be done. The publication of this Strategy is central to meeting this objective. And the aim of this consultation is to engage with you, the Council's residents so that your views can help us understand the issues and concerns in each local area and plan our strategy accordingly. We are also engaging with local communities through the establishment of local flood action groups within individual parishes, as discussed in Section 2.3 below. Another part of this awareness is the education of landowners so that they appreciate the value and role of the watercourses in their land, and their responsibilities for maintenance, also discussed in Section 2.3 below.

Objective 7 – contribute to planning and development decisions to ensure new development is appropriate

The purpose of the planning system is to contribute to the achievement of sustainable development, which means delivering development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The guiding principles of sustainable development involve living within the planet's environmental limits; a strong, healthy and just society; a sustainable economy; good governance; and using sound science responsibly.

Key to this is that new development is planned to manage the risk of flooding. This should be taken into account in local plans alongside the North Lincolnshire and North East Lincolnshire Strategic Flood Risk Assessment, by directing new development to areas with the lowest probability of flooding, and by ensuring planning applications comply with planning policy. The overall responsibility for these planning system related items lies with the Council, under its role as the local planning authority. If development is to be undertaken in areas of flood risk, the Council should ensure it is informed by an appropriate flood risk assessment and that development is appropriately flood resistant and resilient. Development also needs to be monitored to ensure that it is built according to the agreed permissions and, if necessary, enforcement action may need to be undertaken to deal with unauthorised development.

North Lincolnshire Council now also provide statutory consultee input on major planning applications with implications for drainage. We have a responsibility to prioritise to the use of sustainable drainage systems (SuDS). To address the possibility that numerous non-major applications could result in a cumulative effect on drainage, we are also providing advice on non-major applications, which may be required of LLFA's as standard in the near future. Internal Drainage Boards also advise on planning applications for development within their catchments or those on the outside of the catchments that are considered to have an impact on the drainage catchment..

North Lincolnshire Council are currently developing SuDS guidance, to assist new developers. This will be available on our website in due course. We are also now considering our approach and policies on the future adoption of new SuDS systems.

In addition to these planning duties, North Lincolnshire Council are the consenting drainage authority for issuing and enforcing formal Land Drainage Consents for activities on ordinary watercourses outside Internal Drainage Board areas, and also for consenting third party activities on designated structures. This consenting process is separate to the planning process. In the absence of such regulation, activities might be undertaken that could block or restrict watercourses, or the effective operation of the floodplain, leading to

flooding of other property that might not have happened otherwise, or flood defence structures might be damaged with the same effect.

Objective 8 – contribute to effective emergency flood response

It is not possible to prevent all flooding. We can't reduce the risk of heavy rainfall events from occurring (such events are driven by natural atmospheric processes) and it is not feasible to design our natural or built environments to be able to cope with all possible rainfall events, no matter how heavy. We can however take actions to reduce the impact flooding on our communities. We can do this by being prepared for when it does occur. This includes all relevant risk management authorities, members of the public and businesses. The Civil Contingencies Act 2004 designated the council as a Category 1 Responder which means that we have a duty to prepare emergency plans for major incidents, including flooding. The North Lincolnshire Council Emergency Planning Team are part of the Humber Emergency Planning Service which provides the Emergency Planning provision for the four Humber bank local authorities. Responsibilities of the Humber Emergency Planning Service include preparedness for flooding, as set out in Section 2 of this document.

The response is outlined in the Multi Agency Flood Plan which contains actions to be taken for different trigger levels for the authorities involved in flood response. The Local Resilience Forum develops and maintains the Multi-Agency Flood Plan. The council also has plans to deal with more localised flood events which do not require a multi-agency response. The Council will communicate flood risk information to the Emergency Planners' to inform their future planning decisions as it arises. We will also engage with local communities to ensure that they are familiar with both plans and the role that they can play in responding to flooding. This will include promoting the use of Flood Wardens in communities at risk of flooding.

1.5 Related documents

National Flood and Coastal Erosion Risk Management Strategy

This Local Flood Risk Management Strategy is required to be, and is, consistent with the National Flood and Coastal Erosion Risk Management Strategy (NFCERMS) for England, which was approved by Parliament in July 2011[7].

The NFCERMS provides the overarching national framework for future action by all risk management authorities to tackle flooding and coastal erosion in England. It was prepared by the Environment Agency, with input from Defra, to ensure it reflects Government policy. The National Strategy sets the context for, and helped to inform, this Local Strategy, which will provides the framework to deliver local improvements needed to help our communities manage local flood risk.

The Local Government Association guidance for Local Flood Risk Management Strategies sets out six guiding principles for flood and coastal erosion risk management, consideration of which in the Local Strategy will ensure consistency with the National Strategy. These are:

- **Community focus and partnership working**

  Community focus and partnership working is covered by a number of the LFRMS Objectives (1, 3, 4, 5 and 6), and discussed further in Sections 2, 3 and 4 of this report.

- **A catchment and coastal "cell" based approach**

  A catchment and coastal "cell" based approach has been taken in considering the potential sources of flooding considered in Section 3 of this Strategy, and the preferred Strategy set

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[7] Environment Agency, 2011. The National Flood and Coastal Erosion Risk Management Strategy for England. Understanding the risks, empowering communities, building resilience. https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england

out in Section 4. Statutory assessments and future funding decisions will also be undertaken with due consideration for the wider catchment.

- **Sustainability**

  Sustainability is directly addressed in Objective 4 of this LFRMS, and indirectly in several of the other Objectives, and specifically in Objectives 5 and 7, by seeking a collaborative approach to flood risk management considering all sources, and by ensuring that new development is appropriate. Sustainability is discussed in Section 5 of this Strategy.

- **Proportionate, risk-based approaches**

  The approach that has been taken with respect to both the identification of 'local' flood risks in Section 3, and the preferred strategies in Section 4 is proportionate and risk based, as is the approach taken to sustainable development and the environment in Section 5.

- **Multiple benefits**

  The aim of achieving multiple benefits is covered by Objective 4 of this LFMRS, and will be actioned through the approach to sustainable development and the environment set out in Section 5.

- **Beneficiaries should be allowed and encouraged to invest in local risk management**

  The encouragement of beneficiaries to invest in local flood risk management will be achieved through a number of the Objectives, including Objectives 1 and 6 which aim to improve understanding, awareness and engagement throughout our communities, and Objectives 4 and 5, which seek wider benefits and collaborative approaches. Funding is dealt with specifically in Section 6 of this LFRMS.

Preliminary Flood Risk Assessment

In accordance with the Flood Risk Regulations, in 2011 North Lincolnshire Council undertook a Preliminary Flood Risk Assessment (PFRA) on local flood risks. The PFRA is a high level screening exercise, required by all LLFA's, the primary purpose of which is to identify the parts of the Country in which the greatest focus on investigating and addressing local flood risk should be placed. Thresholds for defining these nationally significant 'Flood Risk Areas' were provided by Defra to ensure that a suitable standard was applied across the Country. The PFRA confirmed that there are no nationally significant Flood Risk Areas in North Lincolnshire – in fact only 10 areas were identified across all of England[8], the nearest being Kingston-upon-Hull.

The process of identifying nationally significant Flood Risk Areas on the basis of information on local flood risk was also used by North Lincolnshire Council to identify 'local flood risk areas', i.e. areas considered to be at risk of flooding from 'local' sources, based upon local significance thresholds as determined by North Lincolnshire Council. The data on local flood risk areas was then used to inform an initial LFRMS (which preceded this version for public consultation), as discussed further below. The PFRA is a rolling 6 year cycle of assessment, with a review due in 2017. Data collection of flood events as they occur will form a key part of the next cycle.

Initial Local Flood Risk Management Strategy - 2011

Following the submission of the PFRA, North Lincolnshire Council used the information on local flood risk collated for the PFRA to inform an initial LFRMS. We consulted Risk Management Authorities and stakeholders such as the Environment Agency, Water Companies and Internal Drainage Boards on this initial strategy, which was prepared in 2011. The initial LFRMS was used by the Council to determine where

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[8] https://www.gSv.uk/gSvernment/upS ads/system/upS ads/attaShment_data/fiSe/298749/FRAs_EngSand_RBD.pdf S

to focus our activities with respect to flood risk mitigation, and was primarily informed by the lessons learnt from the 2007 event. As a result North Lincolnshire Council have already undertaken numerous alleviation works throughout North Lincolnshire to reduce the impact of a similar magnitude rainfall event on our communities in the future. . Works include major schemes such as the Midby Drain improvements at Barrow-upon-Humber, attenuation area at Low Burnham and replacement of a surface water drainage system at Belton, and numerous smaller scale works such as up-sizing of highway drainage systems, investigation and correction of misconnections, as will be detailed in later sections of this report.

The initial LFRMS was based on the best information available at the time, i.e. a combination of historical and modelled flood risk information. On the basis that numerous works have been undertaken, combined with the availability of new modelled information, it was decided that the strategy moving forward would benefit from a fresh start in terms of identifying the local flood risks posed to each community, hence the use of the latest available information in this Draft LFRMS Summary for Public Consultation.

Other relevant Plans and Strategies

Humber Flood Risk Management Plan

Under the Flood Risk Regulations, the Environment Agency is required to prepare a Flood Risk Management Plan (FRMP) for the Humber River Basin District. This covers all sources of flooding, but primarily focuses on flooding from main rivers, the sea and reservoirs. North Lincolnshire is located within four sub-catchments within the Humber basin. The eastern section and majority of North Lincolnshire is located in the Grimsby, Ancholme and Louth Catchment. The western section of North Lincolnshire is mainly located in the Lower Trent and Erewash Catchment, with far western sections of North Lincolnshire within the Idle and Torne, and the Don and Rother catchments. The management plans for these catchments includes a number of actions intended to prevent, prepare and protecting from risk from rivers and the sea, as set out in the Humber Flood Risk Management Plan itself, a draft version of which is available on the Environment Agency's website. With respect to local sources, the Environment Agency have committed to working with and supporting North Lincolnshire Council in developing this LFRMS.

Humber Flood Risk Management Strategy

Humber Flood Risk Management Strategy (2008) sets out the plan for managing flood risk in the Humber Estuary looking at the different ways that this can be achieved. The strategy is currently in the process of being reviewed by the Environment Agency

Strategic flood risk assessment

The Strategic Flood Risk Assessment (SFRA) for North Lincolnshire Council and North East Lincolnshire was adopted in August 2012. An SFRA is required as part of the evidence base to inform strategic planning and development decisions by the local planning authority. The current SFRA generally focuses on flooding from non-local sources, i.e. from Main Rivers and the Sea. The SFRA is available online[9] and can also be viewed at the Civic Centre in Scunthorpe.

Water Cycle Strategy

An Outline Water Cycle Strategy (WCS) for North Lincolnshire Council was undertaken in 2010. Water Cycle Strategies are used to inform local authority planners of what infrastructure improvements are needed to ensure that future development can take place without exposing communities and the environment to unnecessary and unacceptable risks. The outline WCS investigated the feasibility of the proposed level of growth for North Lincolnshire within the LDF plan period (2010 to 2026) with regard to the water cycle, and

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[9] http://www.northlincs.gov.uk/planning-and-environment/planning-policy/evidence-monitoring-info/strategic-flood-risk-assessment/ S

commented on the requirement for further studies or a full detailed Water Cycle Strategy. The key areas of water resources and supply, wastewater collection and treatment, water quality, and flood risk were investigated. With respect to flood risk, the main conclusions related to the location of the main development areas (including the West Scunthorpe Urban Extension) within zones of high flood risk, for which any planning applications would need to be accompanied by FRAs that demonstrated that the Exception Test would be passed. The study also recommended that strategic mitigation measures to be investigated prior to new development taking place in areas at high risk from fluvial, tidal or surface water flooding.

Surface water management plan

A Surface Water Management Plan is under preparation for the largest development in North Lincolnshire, Scunthorpe, as discussed further in Section 4.

Isle of Axholme Strategy

The Isle of Axholme Strategy, determined by the Environment Agency, sets out a framework for the delivery of projects for the management of fluvial and surface water flood risk within the Isle of Axholme. The delivery programme spans 100 years, and is intended to be funded from public funds by the Environment Agency, Internal Drainage Boards and Local Authorities. The eastern part of the Isle of Axholme is located with the North Lincolnshire Council area. The preferred strategy is currently available online, and the final strategy is anticipated to be available in 2016.

Catchment Flood Management Plans (CFMPs)

CFMPs are non-statutory plans produced by the Environment Agency that consider all types of inland flooding, but not flooding directly from the sea. They provide an overview of flood risk across each river catchment and recommendations of ways to manage those risk for the next 50 to 100 years. CFMPs may be a useful source of information on historic flooding and may provide some information on local sources of flood risk. They can also be used to identify interactions with flooding from rivers. North Lincolnshire is covered by the Grimsby & Ancholme, and the Trent CFMPs. The Grimsby & Ancholme CFMP notes that further investigation of groundwater flood risk is required in both Barrow and Barton upon Humber.

Shoreline Management Plans (SMPs)

SMPs are non-statutory plans led either by Local Authorities or the Environment Agency. They provide a large scale assessment of the risks associated with coastal processes and help reduce these risks to people and the developed, historic and natural environments. They include an assessment of flooding from the sea and therefore can be used to identify interactions with local flood risks. No SMPs cover the North Lincolnshire area, the nearest being the Flamborough Head to Gibraltar Pont SMP, which only extends into the Humber Estuary as far as Immingham.

Multi-agency Flood Plans (MAFPs)

MAFPs are developed by Local Resilience Forums to help organisations involved in responding to a flood work together better. They may provide information on particularly vulnerable receptors not identified by national datasets. The Humber Local Resilience Forum Multi-Agency Flood Plan, prepared by the Humber Emergency Planning Service on behalf of the Humber Local Resilience Forum, covers the North Lincolnshire Council area. The MAFP sets out the command and control structures and groups required to assist in the management of tidal, river (fluvial), surface water (pluvial) and groundwater flooding incidents within the Humber area.

Greater Lincolnshire Local Economic Partnership Water Management Plan

The Water Management Plan aim is for Greater Lincolnshire to be seen as a national exemplar for water management, both flood reduction and water supply, so that it acts as an incentive for investors in the GLLEP's priority growth sectors. This will enable effective water management to be a positive contributor to economic growth by identifying a number of projects to be delivered between 2015 and 2040

Lincolnshire Lakes Flood Risk and Drainage Strategy

This strategy provides an appraisal of flood risks to the Lincolnshire Lakes Area Action Plan development site. It identifies potential measures to mitigate flood risk and make recommendation for drainage requirement.

2. Roles and Responsibilities

2.1 Risk Management Authorities

There are many organisations that are involved in, and make a contribution to, flood risk management in North Lincolnshire. The risk management authorities[10] in North Lincolnshire Council are:

- the Lead Local Flood Authority, i.e. North Lincolnshire Council;
- the Environment Agency;
- the Internal Drainage Boards (IDBs) i.e. the Shire Group of IDBs, Isle of Axholme and North Nottingham WLMB, and the North East Lindsey IDB;
- the water and sewerage companies, i.e. Severn Trent Water and Anglian Water; and
- the highway authority, i.e. North Lincolnshire Council.

Contact details for each of these Risk Management Authorities are provided in Appendix A. Plans showing the boundaries of each of these Risk Management Authorities are provided in Appendix B.

North Lincolnshire Council

North Lincolnshire Council is the Lead Local Flood Authority for North Lincolnshire. We have a responsibility to manage flood risk associated with surface water run-off, groundwater and flooding from ordinary watercourses (small rivers and streams). Where there is an interface between local sources of flood risk and the sea and main rivers (for example a tide locking scenario) it is our responsibility to consider the impacts and consequences.

LLFAs are required to:

- prepare and maintain a strategy for local flood risk management in their areas, coordinating views and activity with other local bodies and communities through public consultation and scrutiny, and delivery planning;
- maintain a register of assets – these are physical features that have a significant effect on flooding in their area;
- investigate significant local flooding incidents and publish the results of such investigations;
- contribute to the Council's planning regime, under the Town and Country Planning Act, with respect to Sustainable Drainage Systems (SuDS) proposed in new planning applications (with due consideration of the Ministerial Statement on SuDS April 2015;
- issuing consents and undertaking enforcement activities on ordinary watercourses for works such as altering, removing or replacing certain structures (except where there is an internal drainage board); see below
- play a lead role in emergency planning and recovery after a flood event.

We will need to work closely with the Environment Agency to ensure that local and national plans link up. An essential part of managing local flood risk will be taking account of new development in any plans or strategies.

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[0] As set Sut in the FWMA 20S0, Part S, 6.S3. S

North Lincolnshire Council were made a statutory consultee in April 2015 for drainage matters in new major planning applications and are developing procedures in delivering this role. We are also applying similar principles to smaller developments.

If a flood happens, all local authorities are 'category one responders' under the Civil Contingencies Act. This means they must have plans in place to respond to emergencies, and control or reduce the impact of an emergency. Being a LLFA, North Lincolnshire Council also have a new duty to investigate flood incidents to help understand how they happened and to determine which risk management authorities have relevant powers , and whether those authorities have or intend to exercise their powers. The results of such investigations must be published and the relevant risk management authorities notified.

The Environment Agency

The Environment Agency has a strategic overview of all flood risk in England, and is responsible for managing the risk of flooding from the sea and larger watercourses (known as main rivers), and also for regulating the safety of reservoirs. The Environment Agency's role also covers the provision of advice and support to other risk management authorities, including the review of local flood risk management strategies undertaken by lead local flood authorities, such as this one. They also work in partnership with the Met Office to provide flood forecasts and warnings and seeks opportunities to maintain and improve the environment for people and wildlife.

The North Lincolnshire administrative area straddles two Environment Agency regions (Regional Flood and Coastal Committee Areas), reflecting the two main drainage basins of the council area. The western part of North Lincolnshire (being located in the Catchment of the River Trent), is covered by the Trent (Midlands) Team, and the eastern part is covered by the Anglian Northern Region team. These two regions are indicated in Appendix B1.

Internal Drainage Boards

An Internal Drainage Board (IDB) is an independent public body who is responsible for managing water levels in specified low-lying areas. They are an integral part of managing flood risk and land drainage within areas of special drainage need in England and Wales. Each IDB has permissive powers to undertake work to provide water level management within their Internal Drainage District (IDD), undertaking works to reduce flood risk to people and property and manage water levels for local needs. Much of their work involves the maintenance of rivers, drainage channels, outfalls and pumping stations, facilitating drainage of new developments and advising on planning applications. They also have statutory duties with regard to the environment and recreation when exercising their permissive powers.

Approximately 50% of the North Lincolnshire Council area is located within an Internal Drainage Board (IDB) district, as shown in Figure B2 in Appendix B. The Internal Drainage Boards within the North Lincolnshire Council area are:

- The Shire Group of IDBs[11]:
  - Ancholme IDB[12]
  - Doncaster East IDB[13]
  - Scunthorpe & Gainsborough WMB[14]

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http://www.shiregrSup-idbs.gSv.uk/ S

[2] http://www.shiregrSup-idbs.gSv.uk/summary.aspx S

[3] http://www.shiregrSup-idbs.gSv.uk/summary.aspx S

[4] http://www.shiregrSup-idbs.gSv.uk/summary.aspx S

- Isle of Axholme and North Nottinghamshire Water Level Management Board[15]; and
- North East Lindsey IDB[16].

IDBs are the land drainage authority within their districts and have an important role to play in flood risk management:

- They manage water levels in their areas, both in watercourses and underground (groundwater), by undertaking various activities, including:
  - supervising land drainage;
  - maintaining ordinary watercourses, drainage channels and pumping stations; and
  - flood defence works on ordinary watercourses (or other flood sources as requested by the local authority and/or the Environment Agency).
- They undertake ordinary watercourse regulation.
- They are the land drainage authority within their districts and as such their powers include:
  - the creation of byelaws affecting their areas;
  - the regulation of works in ordinary watercourses and associated structures; and
  - they are statutory consultees on activities that could impact land drainage, such as run-off arising from new developments that drain to their land (even if the development itself is located outside of their district).

Their activities are primarily funded by those who benefit by their works, through drainage rates and levies from land occupiers and local authorities. They are made up of elected members who represent land occupiers, and others nominated by local authorities who represent the public and other interest groups. North Lincolnshire Council have full representation on all of the drainage boards in our area at officer and elected member level.

Water and sewerage companies

Three water and sewerage companies operate within North Lincolnshire, as set out in Table 2-1 below.

Table 2-1 Water and sewerage companies and their responsibilities

	Location within North Lincolnshire Council	Removing foul water	Maintaining existing surface water drainage systems[1]	Supplying fresh water
Anglian Water	Eastern	✓	✓	✓
Severn Trent Water	Western	✓	✓	✓
Yorkshire Water	Northern	×	×	✓

[1] The water companies are not responsible for maintaining all surface water drainage systems within their areas. North Lincolnshire are responsible for some highway drainage systems, and others will be privately owned.

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[5] http://www.wmS-idbs.Srg.uk/ISAaNN/ S

[6] http://www.nSrtheastSndsey-idb.Srg.uk/ S

The general duty of sewerage undertakers, as set out in the Water Industry Act 1991, are:

a. "to provide, improve and extend such a system of public sewers (whether inside its area or elsewhere) and so to cleanse and maintain those sewers, and any lateral drains which belong to or vest in the undertaker] as to ensure that that area is and continues to be effectually drained; and

b. to make provision for the emptying of those sewers and such further provision (whether inside its area or elsewhere) as is necessary from time to time for effectually dealing, by means of sewage disposal works or otherwise, with the contents of those sewers."

In addition, the roles and responsibilities of the water and sewerage companies include:

- to make sure their systems have the appropriate level of resilience to flooding, and maintain essential services during emergencies;
- to manage the impact of (and reduce the risk of) flooding and pollution to the environment by maintaining and managing their water supply and sewerage systems appropriately;
- to provide advice to LLFAs on how water and sewerage company assets impact on local flood risk
- to work with developers, landowners and LLFAs to understand and manage local flood risks – for example, by working to manage the amount of rainfall that enters sewerage systems; and
- to coordinate the management of water supply and sewerage systems with other flood risk management work, by working with the Environment Agency and North Lincolnshire Council.

Where there is frequent and severe sewer flooding, (sites included on the DG5 Register: Flooding from Sewers[17]) sewerage undertakers are required to address this through their capital investment plans, which are regulated by Ofwat.

Highway Authorities

Highways authorities have the lead responsibility for providing and managing highway drainage and roadside ditches (not including those under riparian ownership) under the Highways Act 1980. The owners of land adjoining a highway also have a common-law duty to maintain ditches to prevent them causing a nuisance to road users. There are two highways authorities in North Lincolnshire Council:

- Highways England (who replaced the Highways Agency in April 2015); and
- North Lincolnshire Council, who are the Local Highways Authority, responsible for all other public roads in our area.

Highways England operate, maintain and improve the strategic road network. In North Lincolnshire this includes the M180, M181, A160 and A180, as shown in their Network Management Map, available on their website[18]. North Lincolnshire is located within Highways England's Area 12, Yorkshire and Humberside Ports Motorways.

North Lincolnshire Council, who are the Local Highways Authority, are responsible for all other public roads in our area. Private roads are the responsibility of the landowner(s).

Highways authorities need to work effectively with the Environment Agency, LLFAs and district councils to ensure their flood management activities are well coordinated.

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[7] http://www.Sfwat.gSv.uk/reguSating/abSutS_nsumers/SeveSSfserviSe S

[8] https://www.gSv.uk/gSvernment/pubSSatiSns/rSads-managed-by-the-highways-agenSy S

Summary of Risk Management Authorities in North Lincolnshire

The Risk Management Authorities in North Lincolnshire and their responsibilities are summarised in Table 2-2 below.

Table 2-2 Summary of Risk Management Authorities and their responsibilities

Risk Management Authority	Location within North Lincolnshire Council[1]	Summary of flood risk responsibilities

		• Responsibility to manage flood risk from:
		  ○ surface water run-off;
		  ○ groundwater; and
		  ○ ordinary watercourses.
		• Investigation of local flooding incidents.
		• Local Flood Risk Management Strategy.
		• Maintain a register of assets.
		• Comment on SuDS proposed in new planning applications.
		• Consenting and enforcement activities on ordinary watercourses.
		• Emergency planning and recovery after a flood event.
		• Highway drainage and roadside ditches (not including those under riparian ownership)

	Midlands (western) and Northern Anglian (eastern) Teams	• Responsible for managing the risk of flooding from the sea and larger watercourses (known as main rivers). • Regulating the safety of reservoirs. • Strategic overview of all flood risk in England, and provision of advice and support to other risk management authorities. • Flood forecasts and warnings.

Ancholme IDB (Shire Group)	Central	• Water level management within their Internal Drainage District (IDD), both in watercourses and underground (groundwater). Activities include:
		  ○ supervising land drainage;
		  ○ maintaining ordinary watercourses, drainage channels and pumping stations; and
		  ○ flood defence works on ordinary watercourses.
		• Regulation of works in ordinary watercourses and associated structures.
		• Advising on drainage matters in new planning applications.

Doncaster East IDB (Shire Group)	Western	
Scunthorpe & Gainsborough WMB (Shire Group)	West central	
Isle of Axholme and North Nottinghamshire Water Level Management Board	Western	
North East Lindsey IDB	Eastern	
Severn Trent Water	Western	• Removal of foul water. • Maintain existing AW surface water drainage systems. • Supply fresh water. • Ensure their system is appropriately resilient to flooding. • Maintain essential services during emergencies. • Manage the impact of their system on the environment. • Address frequent and severe sewer flooding through their capital investment plans.
		• Supplying fresh water. • Ensure their system is appropriately resilient to flooding. • Maintain essential services during emergencies.

Table Notes:
[1] Regions are indicated in Figure B1 in Appendix B

Whilst individual authorities have direct responsibility for the different potential sources of flooding, this strategy is set to ensure that all of the RMA's are brought together to ensure that overall Flood risk management is considered, and appropriate strategies and projects are complementary.

2.2 Regional Flood Groups

As set out in Section 13 of the FWMA, the Risk Management Authorities set out above must co-operate in exercising their functions. To facilitate this several regional flood groups have been set up that cover the North Lincolnshire Area:

- The North Lincolnshire Council Flood Risk Management Board (the Flood Forum);
- Flood Risk and Drainage Technical Groups; and
- The Flood Risk Planning Group (to be implemented in 2016).

In addition, there are other groups.

- Regional Flood and Coastal Committees

North Lincolnshire Council Flood Risk Management Board (the Flood Forum)

The primary purpose of the 'Flood Forum', chaired jointly by North Lincolnshire Council and the Environment Agency, is to ensure that North Lincolnshire Council's responsibilities as the LLFA, in terms of planning, the FWMA, the Flood Risk Regulations, and Land Drainage Act, are being complied with, and to ensure that the Risk Management Authorities in North Lincolnshire (or South Humber) comply with the National Flood and Coastal Erosion Management Strategy. Through this board, we receive support to help us deliver our responsibilities as the LLFA.

The board includes representatives from numerous North Lincolnshire departments (including flood risk, highways, planning, spatial planning, environmental health, emergency planning), representatives from IDBs (Lindsey Marsh, Shire Group and North East Lindsey), Severn Trent Water, Anglian Water, and the Environment Agency (representatives from the EA's Anglian and Midland teams as appropriate). Representatives from neighbouring Lead Local Flood Authorities are also invited. Meetings are held on a six monthly basis.

Flood Risk and Drainage Technical Groups

The 'Technical Groups' will be used to discuss site specific issues identified by the flood risk partners who sit on the Strategic Flood Risk Board and/or the Flood Forum, and to determine responsibilities and solutions for addressing them. The Technical Groups include representatives, as required for the topic at hand, from North Lincolnshire, the IDBs (Lindsey Marsh, Shire Group and North East Lindsey), Severn Trent Water, Anglian Water, and the Environment Agency. The groups will be chaired by North Lincolnshire Council, as the LLFA, and are to be held at least every quarter.

Flood Risk Planning Group

North Lincolnshire Council intend to establish as Flood Risk Planning Group in 2016. The primary purpose of the 'Planning Group' is to ensure that flood risk and drainage are taken into account as required in the local planning process, both in informing strategic planning and on specific planning decisions. It will also provide a single point of contact for developers to consult with local planning authorities on SuDS and other drainage solutions. Similarly, it will enable organisations that are not statutory consultees in the planning process to have a voice concerning assets they may have to adopt in the future.

The Planning Group will include representatives from North Lincolnshire (planning, spatial planning and highways), and additional bodies as appropriate/necessary depending upon the planning matters to be discussed, which may include the IDBs, Severn Trent Water, Anglian Water, the Environment Agency and adjacent local planning authorities. The group will be chaired by North Lincolnshire Council, and will occur on a timeframe linked to the planning cycle.

Regional Flood and Coastal Committees

Regional Flood and Coastal Committees (RFCC'S) are committees established by the Environment Agency under the Flood and Water Management Act 2010 that brings together members appointed by Lead Local Flood Authorities (LLFAs) and independent members with relevant experience for 3 purposes:

- to ensure there are coherent plans for identifying, communicating and managing flood and coastal erosion risks across catchments and shorelines;
- to encourage efficient, targeted and risk-based investment in flood and coastal erosion risk management that represents value for money and benefits local communities; and
- to provide a link between the Environment Agency, LLFAs, other risk management authorities, and other relevant bodies to build understanding of flood and coastal erosion risks in its area.

Humber Local Resilience Forum

Emergency planning in the North Lincolnshire Council area is undertaken/delivered by the Humber Emergency Planning Service (HEPS), a joint service between the four unitary authorities surrounding the Humber. The Service prepares the Council's corporate emergency plans and arranges suitable training and exercising. It also encourages Town and Parish Councils to prepare their own emergency plans and works with partners to encourage residents in North Lincolnshire to be prepared for an emergency'.

The Humber Emergency Planning Service provides the secretariat service to the Humber Local Resilience Forum. North Lincolnshire Council sit on the Humber Local Resilience Forum, which is attended by risk management authorities, local government, the Environment Agency, emergency services, health services and utility and transport organisations. The plans for a range of emergency situations, of which flooding is one, by developing, maintaining and monitoring the Multi-Agency Flood Plan.

Humber Local Economic Partnership (Humber LEP)

The Humber LEP has formed a Flood Group to report to the Humber LEP Board to identify and consider flood and drainage improvement schemes to assist (in terms of funding) in removing constraints where the Humber LEP identify where local economic growth should take place in the next 25 years. This process allows for flood and drainage projects to be presented and discussed under a peer review process, which is closely linked with the Humber Flood Risk Management Strategy (2008) – currently under Review. Projects are currently identified within North Lincolnshire in this process. The Humber LEP is one of two LEPs which include the North Lincolnshire area.

Greater Lincolnshire Local Enterprise Partnership (GLLEP)

The GLLEP has formed a Water Management Board and Officers Working Group to produce a Water Management Plan (2015 to 2040) for its area and to report to the GLLEP Board. The Water Management Plan aim is for Greater Lincolnshire to be seen as a national exemplar for water management, both flood reduction and water supply, so that it acts as an incentive for investors in the GLLEP's priority growth sectors. There are currently a number of projects identified of which 6 projects are within North Lincolnshire.

2.3 Local Communities

North Lincolnshire Council is seeking to encourage local communities to participate in local flood risk management. This consultation on the LFRMS is the ideal opportunity to get involved. Together we can raise awareness of flood and coastal erosion risks, develop and share good practice in risk management, train community volunteers so that they can raise awareness of flood risk in their community, and help the community to prepare for any flooding that does occur, such as preparing a flood action plan. Local flood action groups (and other organisations that represent those living and working in areas at risk of flooding)

can be useful and trusted channels for sharing up-to-date information, guidance and support directly with the community. The Council and the Humber Emergency Planning Service have been working with parish councils to develop Community Emergency Plans (CEPs), including the establishment of flood wardens, discussed further below.

Flood wardens

Flood Wardens are members of the local community who volunteer to help their community be prepared for flooding. They can be individuals, representatives of the Parish Councils or existing volunteers. The role and area covered by any particular Warden can depend upon their particular circumstances and the size of the community.

Flood Wardens are often called 'flood watchers'. They keep an eye out for blocked drains and culverts, tree branches in rivers, and anything else that may cause a flood risk and report them to the appropriate land or property owners. They can also help local communities to understand the flood risks in their area, and attend local meetings as necessary. A good example of the benefits Flood Wardens can provide is Doncaster's Community Flood Warden Scheme[19]. The Doncaster Wardens have helped in planning for an effective flood response and providing early warning to local residents, the Council and the Environment Agency. North Lincolnshire Council established the need for flood wardens within the communities some time ago, and some local community plans include named flood wardens.

If you or a member of your community is interested in volunteering to become a Flood Warden in North Lincolnshire, please contact either your local parish council, or North Lincolnshire Council directly using the contact information included in Appendix A. North Lincolnshire Council, in partnership with the Environment Agency, will provide support to Flood Wardens in their role and provide the necessary training.

Local Working Groups

Local working groups such as the Bottesford Beck working group have already been established and other groups are developing. The purpose of these groups is to develop local interest in flood risk management, enhance environmental development of watercourses, and develop recreational elements of beck-side areas and walkways. The Bottesford Beck Group are well established. They have attracted local funding for projects, and our working with Risk Management Authorities to deliver improvements to the watercourse and the local environment.

Riparian landowners

If you own land or property next to a river, stream or ditch you are a 'riparian landowner'. As a riparian owner you have a responsibility to manage your own flood risk. You also have a number of rights and responsibilities which you should be aware of.

Riparian landowner's rights have been established in common law for many years, but they may be affected by other laws. For example, for some activities permission (usually Flood Defence Consent) is required from a third party, which may be the Council, Internal Drainage Board or the Environment Agency.

Much of the impacts of flooding experienced in the borough in summer 2007 could be attributed to a lack of maintenance. Many riparian owners were unaware of their own responsibilities and the impacts that can arise as a result of a lack of maintenance. To work effectively, a watercourse needs to be clear and well maintained. Such maintenance works are one of the responsibilities of the riparian owners, including keeping the banks clear of anything that could cause an obstruction. Responsibilities also include maintaining the bed and banks, including trees and shrubs growing on the banks; keeping any structures, such as culverts, trash screens, weirs and mill gates, clear of debris; and clearing any litter and animal

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[9] https://www.gSv.uk/gSvernment/upS ads/system/upS ads/attaShment_data/fiSe/609S6/Case-Study-CSmmunity-SFS_d-Warden-S_heme.pdf S

carcasses from the channel and banks, even if they did not come from your land. As discussed above, you may need consent for these works.

Responsibilities also include letting water flow through your land without any obstruction, pollution or diversion (which affects the rights of others), and accepting flood flows through your land. You have a legal obligation to notify the Environment Agency and the relevant risk management authority if you would like to build or alter a structure that acts as an obstruction to a watercourse. This includes culverting a section of watercourse[20], which should not be undertaken without prior consent. The risk management authority can reclaim from you the cost of whatever action they decide is necessary to remove or alter any work undertaken without the necessary consent. If you fail to comply with a notice to rectify problems you may face criminal charges.

A full breakdown of riparian land owner's rights and responsibilities are set out in a guide published by the Environment Agency, which is available on their website[21].

Under the Land Drainage Act 1991 and the FWMA 2010, the Council and IDB have powers to manage local flood risks, including in riparian owned watercourses. Powers include carrying out works that will contribute to this LFMRS, generally maintaining the efficiency of an existing watercourse or drainage work, and serving notice on riparian owners who have not maintained a watercourse that is in turn affecting the proper flow of water and thus increasing flood risk.

2.4 Internal and External Partners

It is essential to recognise the key contribution of other internal and external authorities and stakeholders that have a key responsibility for flood risk management in their own areas of discipline. This includes the following internal partners:

- Emergency Planning;
- Planning;
- Spatial Planning;
- Property Services and Car Parks;
- Bridges;
- Highway Development Control;
- Environment Team and Public Rights of Way;
- Highways Maintenance and Design;
- Leisure Services; and
- Neighbourhood Services.
- Environmental Health

The following external partners are also recognised:

- Highways England;

[20] A SuSvert is a waterS urse that has been enS sed in a struSture suSh as a pipe. S

[21] Environment Agency, 2014. Living On the Edge. A guide to your rights and responsibilities of riverside ownership. Fifth edition, 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/454562/LIT_7114.pdf

- Network Rail;
- Emergency Services;
- Parish and Town Councils;
- Housing Associations;
- Local Resilience Forum;
- Canal and River Trust (formerly British Waterways);
- Natural England;
- English Heritage;
- Meteorological Office;
- Local partnerships, forums and community groups;
- Association of British Insurers;
- Wildlife Trusts;
- Royal Society for the Protection of Birds;
- Association of Drainage Authorities;
- National Flood Forum;
- Country Land and Business Association;
- National Farmers Union;
- Professional Institutions; and
- Land owners and land/estate managers.

2.5 Flood and Weather Warning Services

A number of bodies provide flood and weather warning services that can assist in preparing for flood events.

Flood Warnings

The Environment Agency provide a free flood warning service for many areas at risk of flooding from rivers and the sea. These are generally the areas of the Country considered to be at the greatest risk. You can check whether you are located within a flood warning area by checking the Flood Warning map, available on their website[22]. If you live within a shaded area on the map, then flood warnings are available to you. When warnings are in place, these are issued on their website[23] and in the media.

If you would like to receive flood warnings for your area, you can register with the Environment Agency's Floodline Warnings Direct[24], which is a free service that provides flood warnings by phone, text or email.

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[22] http://apps.environment-agency.gov.uk/wiyby/37835.aspx

[23] http://apps.environment-agency.gov.uk/flood/31618.aspx

[24] https://fwd.environment-agency.gov.uk/app/olr/home

National Severe Weather Warning Service

The Met Office warn the public and emergency responders of severe or hazardous weather which has the potential to cause danger to life or widespread disruption through their National Severe Weather Warning Service. Warnings are provided through national and local media, and the Met Office website[25], and include warnings for rain, snow, wind, fog and ice. This information is provided directly to Risk Management Authorities and Emergency Planning partners.

Flood Forecasting Centre

The Flood Forecasting Centre (FFC) is a partnership between the Environment Agency and the Met Office, combining their meteorology and hydrology expertise into a specialised hydrometeorology service. The centre forecasts for all natural forms of flooding - river, surface water, tidal/coastal and groundwater. The intention is to deliver longer lead time flood forecasts and more accurate, targeted information to the Category 1 and 2 responders who have roles and responsibilities in handling emergency situations. This earlier and better communication of flood risk enables national and local responders to support the public and local communities at risk of flooding. This provides people more time to take action to protect themselves and their homes and businesses from flooding. This information is provided the Risk management authorities to better prepare for potential flooding incidents.

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[25] http://www.metoffice.gov.uk/public/weather/warnings/#?tab=map&map=Warnings&zoom=8&lon=-1.78&lat=53.36&fcTime=1448409600

3. Flood Risk in North Lincolnshire

The LFRMS is intended to be pro-active and risk-based, using the best available information on future flood risk, i.e. a combination of historical and modelled information. An overview of flood risk issues affecting North Lincolnshire and the information used to inform this Strategy are set out below.

3.1 Historic flood risk

Following the 2007 event, we engaged extensively with parishes to understand and record the extent of flooding. This information on previous flooding has contributed to our understanding to enable us to prioritise the areas at greatest risk in which we should take action to reduce the risk occurring again in future. As discussed later, we have been using this information, together with additional information, to inform flood alleviation works over the intervening period. The historic flood extents are presented in the Figures that accompany this report, and can be associated with any of the types of 'local' sources discussed further below.

3.2 Types of Flood Risk

Large scale flooding

Flooding from Rivers and the Sea

Significant parts of North Lincolnshire are at risk of flooding from the sea/coast, via the Humber Estuary, and from 'Main Rivers', such as the River Ancholme and River Trent. A network of assets and systems are in place to manage these risks, in particular from river and coastal flooding, but protection is not comprehensive and a risk remains that the assets and systems could fail, or a particularly large event could occur.

Main rivers[26] and the sea are considered to be 'non-local' sources of flood risk because of the size and scale of the waterbody involved. The responsibility for flood risk management of flooding from such sources requires an overview approach to flood risk management that extends beyond political boundaries and therefore is a responsibility of the Environment Agency, who are able to take a wider view of management decisions than is possible at an individual Council level. As discussed in Section 1.5 of this Strategy, the Environment Agency are currently preparing the FRMP for the Humber River Basin District, within which North Lincolnshire is located, which will cover the management of flooding from main rivers, the sea and reservoirs.

According to the draft Humber FRMP, the numbers of people at risk in North Lincolnshire from these non-local sources for flooding are several orders of magnitude greater than the number of people identified in this LFRMS at risk from local sources. For example, in the Louth, Grimsby and Ancholme catchment, a significant proportion of which is located within North Lincolnshire, 32% of the population (over 20,000 people) are at risk of flooding from rivers or the sea. This total does include the significant population centres of Grimsby and Cleethorpes, located on the Humber Coast but outside of North Lincolnshire, but it does give an indication of the difference in scale of risk associated with these larger non-local sources.

It is important that local communities engage with flood risk management associated with these non-local sources, as well as from local sources. However, the management of flood risk associated with these sources is not the focus of this 'local' flood risk management strategy. The main focus of this strategy will be

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[26] Main Rivers are S assified as suSh by the EnvirSnment AgenSy, and San be identified Sn their main river map. Other S rivers/waterS urses are knSwn as 'Srdinary waterS urses'. S

on the management of flooding from smaller scale 'local' flood sources, which fall under the responsibility of the Council. This will feed into the Humber FRMP process and understanding of flood risk from all sources.

'Local' flood risk

'Local' sources of flooding include from surface water, groundwater and ordinary watercourses.

Surface water (and sewer) flooding

Surface water flooding occurs when water, usually rainfall, is unable to drain away quick enough either during or immediately after heavy rainfall. The water 'runs-off' the ground surface and collects in topographic low points. It may occur very quickly, in locations remote from watercourses, and where flooding has not happened before. In urban areas, surface water flooding will occur when the intensity of a storm exceeds the capacity of the underground drainage system to drain the water away. Maintenance of the drainage system is required in order to ensure that its capability to drain is not reduced over time. The amount of water running off the ground surface will be greater in developed areas, where there is more hardstanding. The paving-over of gardens, to provide driveways for example, can increase the risk of surface water flooding by increasing the amount of run-off to be drained.

Surface water flooding is also related to sewer flooding, which occurs when the drainage system is provides the pathway for the water to reach place that gets flooded. Water emerges out of the sewers or drainage gullies, which may occur downhill of a drainage system serving a large area. Related to this, sewer flooding can occur when surface water drains have been mis-connected to the foul system, which can result in floodwaters that contain sewage, which has additional health and environmental implications. In some places, such as Scunthorpe, separate drainage systems for surface water and foul do not exist, and instead a combined system serves both purposes. Combined systems are usually larger to accommodate such dual use, so whilst sewer flooding of this type may be less likely than a mis-connection to the foul system, there is still a risk that the system could be exceeded, resulting in sewer flooding that is contaminated with sewage.

Groundwater flooding

Groundwater flooding occurs when the water level in the rock or soil exceeds the elevation of the ground, resulting in groundwater emergence. Groundwater flooding is usually less immediate and may occur sometime, days or even weeks after a heavy or prolonged rainfall event. It may be long lasting, ranging from several weeks, to months or even years. It usually causes the greatest impact in locations where it cannot flow away, a topographic low point for example, but it can also occur in locations you may not expect, such as on hillsides in the form of a spring.

At present, understanding of this risk is limited, restricted to a broad indication of areas that may be susceptible to groundwater floods. The Environment Agency is continuing to develop understanding on groundwater flood risk and in the future should be able to provide additional information. But for this first version of the strategy, we have relied upon our experience of previous groundwater flood events to identify areas at potential risk. Areas in which groundwater flooding has previously been an issue include Barrow-upon Humber and Kirton Lindsey.

In low-lying areas, the management of groundwater through land drainage can be important in managing wider flood risk, and as such is undertaken by Internal Drainage Boards, such as the Ancholme IDB.

Ordinary watercourse flooding

Ordinary watercourse flooding occurs when the flow of a stream/ditch/river exceeds the channel capacity, resulting in water overtopping the banks. This is a natural process, known as fluvial flooding, but the risk of this occurring can be increased if the rate and volume of water running off to a watercourse is increased (as a result of an upstream development for example), or from the channel being blocked. This type of flooding is the same as flooding from main rivers, but on a smaller scale, being associated with 'local' watercourses such as streams, ditches and small rivers.

Other sources of flooding

Reservoirs

Flooding could occur if the banks of an artificial water body, such as a raised reservoir, failed. The Reservoirs Act (1975) was introduced to ensure that large raised reservoirs are suitably monitored and maintained, and amendments to the requirements to cover smaller reservoirs were made through the FWMA 2010. The flood risk from reservoirs is covered in the Humber Flood Risk Management Plan, discussed under section 1.5 of this document.

Although responsibility for their flood risk management does not specific fall within the responsibility of North Lincolnshire Council, the reservoirs at Barton-upon Humber and Kirton Lindsey, which have been identified as presenting a potential flood risk to identified receptors, have been considered in this strategy. Healey's Drain, located approximately 600m to the south of Burringham, (between Carr Dyke road in the east the River Trent in the west), is officially designated as a reservoir under the Acts on the basis of its maximum possible raised capacity, although the water levels in reality are almost always negligibly above the surrounding ground level.

Artificial water bearing infrastructure

Storage tanks and canals are covered by the Flood Risk Regulations. However, the Regulations do not apply to floods from water supply systems, e.g. burst water mains, and/or floods of raw sewage caused solely, for example, by a sewer blockage. Main water and sewerage do not fall under the Flood Risk Regulations are the responsibility of the water and/or sewerage company.

3.3 Factors increasing the risk of flooding

The risk associated with any event is a function of its probability of occurrence, multiplied by it's the consequences. Therefore, factors that could affect the likelihood and or consequence of flooding could result in an increase in risk.

A number of factors could result in an increased risk of flooding in North Lincolnshire in the future, including:

- Climate change resulting in more extreme weather and more intense rainfall events;
- Sea level rise;
- Inappropriate development in areas at risk of flooding;
- Inappropriate drainage from new developments, resulting in increased run-off rates and volumes increasing flood risk downstream;
- Lack of maintenance of existing watercourses and drainage systems; and
- Unauthorised/unconsented works to watercourses and drainage systems, including infilling, culverting and misconnections in piped systems.

The effect of climate change on local flood risk is considered in Section 5.4 below. Sea level rise is considered in the Humber Flood Risk Management Strategy. Inappropriate development and drainage is dealt with by North Lincolnshire's planning process. Ongoing community engagement with riparian owners aims to reduce issues relating to lack of maintenance of existing riparian owned watercourses and drainage systems, as well as reduce unauthorised works to watercourses. Increased North Lincolnshire Council involvement in drainage matters through the planning process should contribute to this, and reduce the likelihood of misconnections from new developments. Increased levels of joint working with other risk management authorities, facilitated through the Regional Flood Groups discussed in Section 2.2 of this document should deliver more efficient maintenance and management of drainage systems throughout North Lincolnshire.

3.4 Predicting future flood extents

Flood events are inherently difficult to predict in terms of: timing, location and severity. However, whilst these uncertainties represent a challenge to flood risk management, this challenge can be made less onerous if potential risks are appropriately assessed in advance and measures taken in advance to reduce the risks. Being better prepared leads to better response and recovery mechanisms. To assist in this, we need to understand the mechanisms of flooding, and to understand the likely extent of future local flood events.

Overview of flood risk in North Lincolnshire

North Lincolnshire is split between:

- the coastal floodplain of the River Humber to the north;
- the floodplains of the rivers Trent and Torne to the west (including the raised Isle of Axholme); and
- the elevated hilly areas of limestone and Chalk hills to the east, which is bisected by the River Ancholme and it's floodplain.

Flood risk is primarily concentrated in the low-lying areas of North Lincolnshire, which are defended by flood defence embankments and artificial drainage systems. These artificial systems become tide-locked at high tide and/or are assisted by artificial pumping. At risk are low-lying parts of settlements and the high-value agricultural land located in this area. The M180/A180 roads and key railway lines pass through the area to and from Immingham docks. However, flood risk is not just confined to low-lying areas. Groundwater flooding associated with the re-emergence of ephemeral winterbourne watercourses has been recorded in the higher Chalkland parts of the area, e.g. Barrow-upon-Humber.

Non-'local' sources of flooding

The Environment Agency will continue to lead on managing flood risk from non-local sources of flooding, such as from larger rivers (Main Rivers) and the sea. They also co-ordinate the management of risks associated with larger reservoirs. The prioritisation of flood risk management works for such potential sources of flooding is undertaken at the national scale, which ensures a consistent and co-ordinated approach across the country, which intends to achieve the maximum possible benefits for the funds available. The prioritisation and plan for managing flood risk from all sources is set out in the Humber Flood Risk Management Plan, discussed in Section 1.5.

Local Flood Risk Extents (LFREs)

It is North Lincolnshire Council's responsibility to manage risks from local sources of flooding. To inform this strategy, we have created a 'Local Flood Risk Extent' (LFRE) for the whole of North Lincolnshire based upon the local sources of flood risk discussed above. A similar approach to that used for the PFRA was taken, whereby the best available information from a number of sources was combined to create the Council's current best prediction of the flood extent that could occur in future as a result of flooding from 'local' sources of flooding, i.e. surface water, groundwater and ordinary watercourses. The LFRE for North Lincolnshire is based upon a combination of datasets/information, including:

- North Lincolnshire's historic flood layer (largely based upon the 2007 event);
- Modelled surface water flood extents (the Environment Agency's updated Flood Map for Surface Water, 2013);
- Modelled fluvial flood extents associated with Ordinary Watercourses (obtained from the Environment Agency's flood map for planning); and
- A standard buffer of 20m (10m on either side) from those Ordinary Watercourses for which no modelled extent is held by the Environment Agency.

These individual datasets were combined into a single extent to create a LFRE spanning the entire North Lincolnshire area. Where modelled information was available, the 1 in 100 annual exceedance probability (AEP) event flood extent was used. Expert judgement informed by our extensive local knowledge was then used to amend the LFRE as necessary to reflect the works that had been undertaken in specific locations since 2007 and/or to reflect any under or overestimation of risks. For example, the extensive works undertaken in Barrow-upon-Humber to increase the capacity of the Midby Drain running through the centre of the village has reduced the flood risk in this area – a greater proportion of the floodwater will be conveyed within the new system than was possible when flooding of this area was experienced in 2007.

In such instances, the flood extent indicated in the Environment Agency's surface water flooding model was amended to reflect the fact that the assumptions upon which that modelling was based would not have accounted for the increased capacity provided in the new drain system. The Midby Drain was designed to convey the 1 in 75 AEP event[27], and therefore during a 1 in 100 AEP event some flooding may still be expected to occur. The 1 in 30 AEP extent was considered to provide a suitable estimate for the flood extent that might be expected in the centre of Barrow-upon-Humber if a 1 in 100 AEP event occurred. This approach ensured that a standard approach was taken across North Lincolnshire, whilst also accounting for works undertaken to reduce flood risk at specific locations and expert local knowledge.

The LRFE is indicated in light blue in Figures 1 to 36 that accompany this report. The historic flood extent is hatched in black. Therefore, for the most part, the light blue LFRE can be seen underneath the hatching, reflecting the fact that the historic flood extent has been used to inform the LFRE. Where amendments have been made to the LFRE, such as discussed for Barrow-upon-Humber above, the hatching associated with the historic extent has been left in the Figure so as to demonstrate the extent of the actual historic flooding that previously occurred, even though a smaller LFRE is shown underneath.

No suitable modelled groundwater flooding information was available to inform this study; the modelled datasets that are available were not considered to be suitable to inform the LFRE. This doesn't mean that groundwater has not been adequately considered in this strategy. In many areas, groundwater flood extents would likely coincide with the extents indicated at risk of surface water flooding (albeit with the events themselves arising through a different mechanism and occurring over different timeframes), and the historic flood extent dataset also includes events associated with groundwater flooding. An action of this LFRMS will be to improve our understanding of groundwater flood risks across the Council area.

The Figures also include the extent of Flood Zone 3 associated with flooding from Main Rivers and the Sea during a 1% AEP event (rivers) and a 0.5% AEP event (the sea). This is shown in a semi-transparent dark blue colour so as to communicate the risks posed to our communities from these 'non-local' sources of flooding.

3.5 Prioritisation of risk areas

LLFAs have limited resources, and can only do so much, even with funding and other support from partnership organisations. Available resources to manage flood risk therefore have to be allocated fairly and proportionally – i.e. cost-effectively via risk-based assessment.

In order to identify those areas in which alleviation works to manage the risk of flooding from local sources should be focussed, it is necessary to undertake a prioritisation process. The method by which this has been undertaken for the LFRMS is summarised below.

Consequences of future floods – potential receptors

The risk associated with any event is a function of the probability of an event occurring, and the consequence. As discussed in section 3.5, a 'standard' probability has been taken across the North

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[27] The EnvirSnment AgenSy have requested that the mSdeSing undertaken tS determine the standard Sf prSteStiSn S prSvided by Midby Drain be prSvided fSr their reS rds. S

Lincolnshire area associated with the 1 in 100 AEP event. With respect to the consequence of flooding, an approach has been taken that ranks areas based upon measurable variables, such as the number of people at risk, or the number of critical services. For example, by counting the number of people at risk of potential future flooding, i.e. the number of people located with the LFRE, it will be possible to identify those areas at greatest risk. The following potential receptors have been considered:

- human health;
- economic activity; and
- the environment.

For the LFRMS, a similar but simplified approach to that used for the PFRA was taken, which focused on the receptors considered to be of greatest importance.

Human Health

Two indicators have been used to identify the consequences of flooding on human health:

- number of people at risk; and
- number of critical services at risk.

Data on people and critical services were obtained from the Environment Agency's National Receptor Dataset (NRD), which is a collection of risk receptors primarily intended for use in flood and coastal erosion risk management. As well as residential dwellings, it also includes important infrastructure such as schools, electricity sub-stations and hospitals.

With respect to people, in order to focus the searches the inset boundaries for North Lincolnshire Council's 85 settlements, as defined by our local planning regime[28]. The number of people at risk of flooding was calculated by multiplying the number of properties located within the LFRE by 2.34. Geographic Information System (GIS) tools were utilised to undertake this analysis. This approach necessarily focuses attention on towns and villages – it is not viable to consider funding flood risk management works to protect disparate individual properties; such properties will continue to be served by reactive flood risk management actions in response to actual events. That said, the rural nature of North Lincolnshire dictates that relatively small communities that are included in the 85 settlement areas identified by the planning system have still been considered in the GIS analysis.

With respect to critical services, the same services as those considered in the PFRA have been considered for the LFRMS. Critical services include:

- schools;
- hospitals;
- nursing/care/retirement homes;
- police stations;
- fire and ambulance stations;
- prisons;
- sewage treatment works; and
- electricity installations.

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[28] This compares to the use of Ordnance Survey (OS) grid squares to identify areas at risk, as was required for the delineation of nationally significant Flood Risk Areas for the PFRA, an approach which had its limitations when applied to small scale settlements, such as splitting small communities that straddle grid lines on the basis of the OS grid. For the LFRMS, this alternative approach was considered to be more appropriate.

Whilst the critical services are identified in the NRD, the scale of the impact of flooding of individual sites is not identified, for example, it does not identify whether the infrastructure serves no properties, a few, or thousands. Local knowledge of the council area has been used to identify those locations in which the critical services are likely to most affect human health. As with the risk to people in residential properties, the GIS analysis for critical services was undertaken on a settlement basis in the first instance, but then also undertaken across North Lincolnshire as a whole to ensure that all critical services at potential 'local' flood risk are identified. This approach was considered appropriate on the basis that a distant critical service, such as an electricity sub-station, could serve numerous people and result in a significant consequence if flooding resulted in the loss of the critical service.

Economic activity

In terms of economic activity, it was decided that the infrastructure network was likely to cause the greatest impact to businesses and residents in the North Lincolnshire area, and will therefore been focused on for the LFRMS. In order to measure the impact, the following were measured.

- Length of road; and
- Length of rail.

The length of road and rail (km) affected by flooding can be calculated. However, it is important to consider significant consequences by looking at the importance of the route (national, regional, local) and whether there are alternative routes. For example, if a settlement is cut off due to flooding of all roads around it, then this could be a significant consequence. If a main line rail route is flooded, this is likely to be significant. The length of diversion, if substantial, could also be considered. We are still undertaking the assessment into local flood risks to road and rail infrastructure, and will be including this in the final LFRMS.

Environment

LLFAs should consider the potential for flooding to cause harmful consequences due to pollution. For this first version of the LFRMS, we have focussed on the Control of Major Accident Hazard (COMAH) sites within North Lincolnshire, and undertaken a qualitative assessment of the risk. COMAH sites include the Humber oil refineries and steelworks. The intention is to use this information to work together with the site operators to help them understand and reduce the risk of pollution events occurring in the future. We are still undertaking the assessment into local flood risks to the environment as a result of flooding of COMAH sites, and will be including information on this in the final LFRMS.

Priority categories

Having undertaken the analysis discussed above to determine the number of people, critical services, access routes and COMAH sites at risk, it will then be necessary to undertake a rationalisation process to prioritise flood risk management efforts and funding. It is acknowledged that not all receptor types are considered equally in this process, but the categorisation process is broadly in line with the flood risk vulnerability classifications utilised by the planning system, as set out in the National Planning Policy Framework[29] (NPPF). The priority categories are set out in Table 3.1 below.

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[29] Department fSr CSmmunities and S aSGSvernment, 20XX. NatiSnaSPSanning PS iSy FramewSrk. S

Table 3-1 Prioritisation categories to be applied in North Lincolnshire for this LFRMS

Priority Category	Receptor type	Potential future impact
	Residential Property[2] Critical Services: • Schools[2] • Hospitals and nursing/care/retirement homes[2] • Emergency services[3] (police, fire and rescue, ambulance Stations • Electricity[4] • Sewage treatment, water treatment and pumping stations[4]. Transport: • Category 1 highway or major rail link[4] • North Lincolnshire Council winter network (priority routes)[4]	Residential • Fifty or more people at risk within properties flooded internally above ground floor level in one location. • One or more residential facilities rendered inaccessible. Critical services • One or more flooded critical installations resulting in loss or potential loss of service or causing or potentially causing flooding to other property. Transport • Any Category 1 section impassable due to flooding for 2 or more hours. • Any of the North Lincolnshire Council winter network (priority routes) impassable due to flooding for 4 or more hours.
3	Residential Property[2] Critical Services: • Schools[2] • Hospitals and nursing/care/retirement homes[2] • Emergency services[3] (police, fire and rescue, ambulance Stations • Electricity[4] • Sewage treatment, water treatment and pumping stations[4]. Transport: • Category 2 or 3a highway or minor rail link[4]	Residential • Ten or more people in residential properties flooded internally above ground floor level. Critical services • One or more critical asset buildings flooded above ground level, but not resulting in loss or potential loss of service, or risk of pollution. Transport • Any Category 2 section impassable due to flooding for 4 or more hours. • Any Category 3a section impassable due to flooding for 10 or more hours.
	Residential property[2] Transport:- • Transport routes (all categories of network)[4] Commercial property, e.g. shops and offices[5] Agriculture[5] Environment[6] and Heritage Sites[5]	Less than ten people at risk within properties flooded internally above ground floor level. Sections of transport routes impassable due to flooding for an unspecified time period (beyond that considered under priorities 2 and 3. Productive agricultural land flooded for more than 24 hours.

[1] No risk to loss of life identified at this stage. Receptors may be recategorised into the risk to loss of life category if such potential is identified through further studies undertaken as a result of this Strategy.
[2] Land uses that are assigned a flood risk vulnerability classification of *'More Vulnerable'* by the NPPF include: buildings used for dwelling houses and/or residential institutions (such as care homes); hospitals and buildings used for health services; and nurseries and educational establishments (such as schools).
[3] Police and ambulance stations; fire stations and command centres; and telecommunications installations required to be operational during flooding are all assigned a flood risk vulnerability classification of *'Highly Vulnerable'* by the NPPF. Police, ambulance and fire stations which are not required to be operational during flooding are assigned a flood risk vulnerability classification of *'Less Vulnerable'*.
[4] Land uses that are assigned a flood risk vulnerability classification of *'Essential Infrastructure'* by the NPPF include: essential transport infrastructure which has to cross the area at risk; essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; water treatment works that need to remain operational in times of flood; and wind turbines. Non-essential transport infrastructure is not classified in the NPPF, but is generally considered to be *'Less Vulnerable'* development. Water treatment works that do not need to remain operational and sewage treatment works that have adequate measures to control pollution and manage sewage during flood events can be classified as *'Less Vulnerable'*. Water transmission infrastructure and pumping stations and sewage transmission infrastructure and pumping stations can all be classified as *'Water Compatible Development'*.
[5] Land uses that are assigned a flood risk vulnerability classification of *'Less Vulnerable'* by the NPPF include: buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; assembly and leisure; Land and buildings used for agriculture and forestry. Heritage sites are not classified in the NPPF, but a flood risk vulnerability classification of *'Less Vulnerable'* is considered appropriate.
[6] Land uses such as amenity open space, nature conservation and biodiversity, outdoor sports and recreation are classified as *'Water Compatible Development'* in the NPPF.

3.6 Ranking of settlement areas

Those settlements identified through the process described above to be at the highest risk of flooding from local sources are listed in Table 3.2 below. Figures showing the LFREs for each settlement are included at the end of this report.

Table 3-2 Settlements identified to be at highest risk of flooding from local sources

Settlement inset number[1]	Settlement	Estimated number of people[2] at local flood risk	Estimated number of critical assets at local flood risk	Map /Figure number[3]	Priority category
36	Scunthorpe & Bottesford Urban Area				
10	Brigg, Scawby Brook & Castlethorpe	138	3	3	2
7	Barton upon Humber				
33	Redbourne	101	0	5	2
39	Ulceby	68	0	7	2
6	Barrow upon Humber				
5	Barnetby le Wold	47	1	9	2
9	Bonby	40	0	11	3
30	New Holland				
27	Kirton in Lindsey	30	2	13	2
29					
42	Westwoodside	28	1	15	2
57	South Humber Bank			16	2
75	Graizelound	26	1	17	2
40	West Butterwick and East Butterwick	23	1	18	2
13	Crowle	21	1	19	2
35	Scawby	21	1	20	2
28	Luddington	19	1	21	2
17	Elsham	16	0	22	3
32	Owston Ferry	16	0	23	3
14	Ealand	14	1	24	2
41	West Halton	14	1	25	2
11	Broughton	12	1	26	2

Settlement inset number[1]	Settlement	Estimated number of people[2] at local flood risk	Estimated number of critical assets at local flood risk	Map /Figure number[3]	Priority category
23	Haxey	12	0	27	3
46	Worlaby	12	0	28	3
47	Wrawby	12	0	29	3
94	Whitton	12	1	30	2

[1] Settlement inset numbers relate to the numbers assigned in the Local Plan.
[2] Number of people at risk calculated by multiplying the number of properties by 2.34.
[3] Maps (called Figures), are provided at the end of this report.

As indicated in Table 3.1, no priority category 1 areas have been identified (risk to life). Twenty five priority category 2 areas have been identified, and eight priority category 3 areas. The remaining settlements are priority category 4, for which no specific local flood risk management works will be prioritised during this LFRMS period, beyond reactive works identified as a result of actual flood incidents. The cut-off for inclusion of settlements in Table 3.2 is priority category 4, i.e. less than 10 people at risk.

A number of settlements that were previously identified as being at high risk of flooding from local sources, primarily as a result of flooding during the 2007 event, have since benefitted from improvements works, which have resulted in a reduction in the local flood risk. It was felt that these settlements also needed to be documented in this LFRMS in order to demonstrate that the flood risk in these communities has been taken into account. The settlements previously identified to be at a higher risk of flooding from local sources for which works have been undertaken since 2007 to reduce the risk are listed in Table 3.3 below.

Table 3-3 Settlements previously identified at a higher risk of flooding from local sources for which works have been undertaken since 2007 to reduce the risk

Settlement inset number*	Settlement	Estimated number of people at local flood risk	Estimated number of critical assets at local flood risk	Map/Figure number	Priority category
8	Belton Westgate and Carrhouse	5	0	31	4
15	East Halton	5	0	32	4
83	Low Burnham	0	0	33	4

3.7 Settlement area pro-formas

For each of the settlement areas identified in Tables 3.2 and 3.3, further information on flood risk is provided in the relevant settlement area pro-forma included in Appendix C. It is envisaged that, for each settlement area, the pro forma and associated Figure will provide all of the key flood risk information relating to this LFRMS, as well as providing the reader with details of any other relevant flood risk management plans/strategies that focus on non-local sources of flooding, such as the relevant sections of the Humber Flood Risk Management Plan.

The pro-formas include information on the following:

- location/settlement area name, figure number, ranking, and priority category;
- number of people potentially at risk;

- number of critical assets potentially at risk;
- Risk Management Authorities and stakeholders;
- other relevant flood risk management strategies;
- history of flooding and flood risk mechanisms;
- future flood risk overview;
- critical assets located within the LFRE;
- North Lincolnshire assets located within the LFRE;
- works carried out by North Lincolnshire Council (and other stakeholders) since the 2007 flood event;
- North Lincolnshire Council's existing maintenance regime;
- council-wide strategy options; and
- area-specific flood risk management strategy options to address the local flood risk identified (including potential partners, estimated cost and/or funding source and potential timescales for delivery).

This pro-forma approach ensures that information on flood risk in each settlement is presented in a coherent and comparable way, and can be updated as changes occur over time. The inclusion of a pro-forma for each of the settlements listed in both Table 3.1 and 3.2 ensures that, not only are those settlements considered to be at highest risk of flooding from local sources captured, but also those settlements for which a significant reduction in flood risk has been achieved since 2007 (associated with the alleviation works already undertaken as a result of the initial LFMRS), for which increased levels of inspection and maintenance may be appropriate.

3.8 Critical assets located outside of settlement areas

In order to ensure that critical assets located outside of settlement areas were not omitted from the flood risk identification process, GIS queries were also undertaken across the entire North Lincolnshire area to identify critical assets located outside of settlements that could also be at risk. The primary purpose of this was to identify those assets that would result in a significant impact should flooding occur, such as electricity power stations, substations, water and sewage treatment works and pumping stations.

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Table 3-4 Potentially critical assets located outside of settlement areas which are potentially at flood risk from local sources

Critical asset ID number (Map/Figure 34)	Name and details of asset	Ownership
1	Greenholme Pumping Station - IDB drainage pumping station	Isle of Axholme & North Nottinghamshire IDB
2	Hibaldstow Sewage Treatment works	Anglian Water
3	Cadney Pumping Station - IDB drainage pumping station	Ancholme IDB
4	Broughton pumping station - IDB drainage pumping station	Ancholme IDB
5	Ulceby Chase Farm Pumping Station - water treatment compound, with substation.	Anglian Water
6	Suspected water supply, not drainage	Anglian Water
7	Suspected water supply, not drainage	Anglian Water
8	Lysaght Drain Neap House Customer Transformer – electricity substation (and IDB pump station next to it)	Northern Power Grid
9	Electricity substation	Northern Power Grid

The preferred strategy for dealing with these assets at potential local flood risk is set out in Section 4 below.

3.9 Flood Risk Asset Register

Lead Local Flood Authorities, such as North Lincolnshire Council, are required to establish and maintain a register of structures or features which, in the opinion of the authority, are likely to have a significant effect on a flood risk in its area, and keep records about each of those structures or features, including information about ownership and state of repair.

The Council are currently in the process of establishing such a register, which will be known as the North Lincolnshire Flood Risk Asset Register. The first version of the register will only include 'significant' assets, but we will continue to develop the register with an aim to capture increasing detail across the council area moving forward. Details captured in the register will include:

- Information on the asset itself;
- Ownership;
- Associated maintenance regimes;
- Flooding incidents at the asset; and
- Any subsequent mitigation works.

The asset register will be periodically reviewed by the Council, both internally and with our flood risk management partners. An appropriate timescale for this is thought to be on 6 monthly basis, but this will be reviewed once the register has been established based upon experience. Summary details of the asset register will be available via the mapping service on the Council's website in due course.

3.10 Works Completed to Date

The Council have undertaken numerous actions and works to manage flood risk to date, as summarised below. Further details are provided in the pro-formas in Appendix C.

Council-wide works

Works have been undertaken across the entire Council area. Such works include:

- Inspection and maintenance regime;
- Investigation of reported incidents;
- Intervention works;
- Pre-emptive works;
- Flood resilience/resistance works;
- Engagement with communities;
- Partnerships with local Risk Management Authorities; and
- Contributing to the planning system.

The Council intend to continue to undertake these activities across the Council area, as set out in greater detail in Section 4.

Standard maintenance and incident response works carried out throughout the North Lincolnshire Council area include:

- Gulley cleansing (all gullies are cleaned at least annually and prioritised for additional cleaning as required);
- Reactive maintenance works to specific issues reported via our 'confirm customer services' system;
- Flood incident response, with teams, tankering and pumping as required;
- Prepare and respond to the receipt of weather warnings provided by our partners, including the UK Met Office and the Environment Agency;
- Inspection of flood risk management assets following major flood events, prioritising those that are considered to be 'significant'.

Settlement area specific works

Settlement area specific works undertaken since the flood of 2007 are detailed in the Settlement Area Pro-formas included in Appendix C. Works already undertaken include:

- Development of a surface water management plan for Scunthorpe;
- Groundwater flooding alleviation scheme in Barrow-upon-Humber;
- Improvements to piped drainage systems in numerous locations;
- Improvements to open watercourses systems in numerous locations;
- Creation of a flood storage area upstream of Low Burnham;
- Flood protection works, such as the creation of defence bunds at numerous locations; and
- Studies into existing flooding issues to inform the development of this strategy and future alleviation works at numerous locations.

Details of specific works undertaken in other key settlement areas are provided in the pro-formas provided in Appendix C.

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4. Preferred Strategy for Flood Risk Management

4.1 Introduction

The preferred strategy for managing 'local' flood risks in North Lincolnshire are set out below, with the proposed strategies for each of the settlement areas identified in Table 3.3 set out in detail in the relevant pro-formas in Appendix C.

Reducing the risk of flooding to our communities will need to focus on reducing the likelihood, severity and consequences, and dependent upon cost and benefits. Management of flood risk can take a number of forms, including providing new defences or drainage systems, property resilience measures, warning systems, and evacuation procedures. Flooding may still occur, but the intention is that the severity and consequences of such events will be reduced.

4.2 Council-wide strategy options

The council already undertake a number of flood risk management activities as standard across the Council area, as set out in Section 3.9 of this LFRMS. The Council propose to continue to undertake activities across the Council area as part of this Strategy, irrespective of whether or not a location is within the prioritised settlement areas identified in Table 3.3. This will ensure that all areas are provided with a minimum standard of local flood risk management irrespective of location with the council area. The Council-wide strategy options are set out in Table 4.1 below.

Table 4-1 Council-wide strategy options for managing local flood risks

Council-wide Strategy Options	Details
Inspection and maintenance regime	
Investigation of reported incidents	Continue reactive investigation of incidents reported by the public Continue to develop the asset map and register, with a view to implementing an asset management plan.
Intervention Works	Substantial work already undertaken in certain locations, as summarised on pro-formas where these have been provided. Minor civil works as and when required, as informed by the investigation of incidents reported by the public, including localised capacity improvements/flood flow conveyance/storage improvements.
	Undertake appropriate preparations and precautions when forecasts of adverse weather (e.g. National Severe Weather Warning reports) and/or EA flood warnings are received.
Flood Resilience/Resistance	Where requested, provide advice on property specific measures that may be taken by householders.
	Encouraging wards to develop community emergency flood plans and establishment of flood wardens, whose responsibilities may be to report on whether key watercourses/drainage infrastructure remains clear to convey flows, etc. Humber Emergency Planning Service (HEPS) to provide guidance.
Engagement with riparian owners	We intend to engage with riparian owners to inform them of their responsibilities and encourage them to undertake these responsibly.
Partnerships with local Risk Management Authorities	Continue to meet regularly with flood risk partners to discuss problems, areas for investigation and/or joint working for future schemes and joint benefits.

Council-wide Strategy Options	Details
Planning System	Provide SuDS/drainage input to all relevant planning applications under our role as statutory consultee with respect to SuDS, to ensure that appropriate surface water runoff management is incorporated in new builds/refurbishments. Provide information to the North Lincolnshire Council spatial planning department and developers, such as advice to avoid development of locations that convey/store surface water to ensure that such flow routes are not interrupted. Assist in preparing a calculation to secure SuDS developer contributions through the Section 106 process to provided management and maintenance of any new SuDS infrastructure adopted as part of a new development.

4.3 Location-specific strategy options

As set out in Section 3 of this LFRMS, certain locations have been identified as being at greater 'local' flood risk, in which our local flood risk management efforts and activities should be focussed. In these areas, location-specific strategies are proposed, as set out in the Settlement Area Pro-formas in Appendix C. The proposed strategies set out in each pro-forma are assessed as being proportionate to the level and complexity of flood risk at each location.

Timeframes

For each of the location-specific strategies, an estimate of the likely timeframe over which delivery could be achieved has been provided. These are intended to provide clarity of our intentions and to focus our attention, but should not be taken as confirmation that the individual strategies will be completed by the dates provided, there are too many influencing factors, including availability of funding, for such certainty to be provided with any confidence.

Timeframes for the location-specific strategies are as follows:

- Short term: within 1 year;
- Medium term: 1 – 6 years; or
- Long term: more than 6 years, i.e. to be delivered during a subsequent review period of this LFRMS.

These timeframes have been selected on the basis of the timeframe associated with this LFRMS, which itself will have a review timeframe of six years, as set out in Section 7 of this document, and those activities that would be incorporated into the first annual action plan.

Settlement area-specific preferred strategy options

The location-specific strategies are set out in the individual Settlement Area Pro-formas in Appendix C. These are summarised in Table 4.2 below, which provides an overview of the proposed strategy, together with potential funding sources, indicative costs and indicative timeframes for delivery.

Table 4-2 Settlement area-specific preferred strategy options for managing local flood risk

Preferred strategy options for managing future local flood risk	Settlements	Potential funding source	Indicative cost (cumulative for each row) (£)	
			Short and medium term (<6 years)	Long term (>6 years)
Continue to develop the Scunthorpe SWMP	Scunthorpe	North Lincolnshire Council	Ongoing	

Preferred strategy options for managing future local flood risk	Settlements	Potential funding source	Indicative cost (cumulative for each row) (£)	
			Short and medium term (<6 years)	Long term (>6 years)
	• Goxhill • Messingham • West Halton	North Lincolnshire Council/Local Levy		
Planned capital scheme	• Goxhill • Ulceby • Barnetby • West Butterwick • Crowle • Scawby	Defra/EA/North Lincolnshire Council	**£1,300,000**	
Investigation of potential capital scheme options	• Brigg, Scawby Brook and Castlethorpe • Barton • Crowle	North Lincolnshire Council/Local Levy	**£30,000**	
Study to increase understanding of drainage/groundwater/watercourse issues at a specific locations	• Brigg, Scawby Brook and Castlethorpe • Keadby • Ulceby • Barnetby • Winterton • Bonby • New Holland • Kirton Lindsey • Scawby • Luddington • Elsham • Ealand • Broughton • Haxey • Wrawby • East Halton	North Lincolnshire Council/Local Levy	**£180,000**	
Partnership working with Risk Management Partners	• Brigg, Scawby Brook and Castlethorpe • Barton • Ulceby • Barrow Upon Humber • Barnetby • Winterton • Westwoodside • West Butterwick • Crowle • Luddington • Owston Ferry • Ealand • Haxey • BeltonWestgate/Carrhouses	North Lincolnshire Council/RMA Partners	Existing revenue funding + some additional investigation costs **£50,000**	And Long Term **£50,000**
Telemetry monitoring of specific watercourses	• Redbourne • West Halton	North Lincolnshire Council/Local Levy	**£30,000**	
Monitor the effectiveness of completed improvements	• Barrow Upon Humber • New Holland • Westwoodside • Graizelound • Owston Ferry • Whitton • Low Burnham	North Lincolnshire Council	Existing revenue funding	

Preferred strategy options for managing future local flood risk	Settlements	Potential funding source	Indicative cost (cumulative for each row) (£)	
			Short and medium term (<6 years)	Long term (>6 years)
Raised water bodies – monitor with owners	• Barton Upon Humber • Kirton Lindsey	North Lincolnshire Council/RMA Partners	Existing revenue funding	
Further Investigation and Cleansing	• Worlaby	North Lincolnshire Council		
Liaison with major industry and Emergency planning in relation to COMAH sites	South Humber Bank	North Lincolnshire Council	Existing revenue funding	And Long Term
Liaison with owners of critical assets	Throughout North Lincolnshire	North Lincolnshire Council	Existing revenue funding	
Total			**£1,730,000**	

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4.4 Specific strategy options

Surface Water Management Plan

A Surface Water Management Plan (SWMP) is a plan which outlines the preferred surface water management strategy in a given location[30]. In this context surface water flooding describes flooding from sewers, drains, groundwater, and runoff from land, small water courses and ditches that occurs as a result of heavy rainfall. The purpose is to establish a long-term action plan to manage surface water in an area and should influence future capital investment, drainage maintenance, public engagement and understanding, land-use planning, emergency planning and future developments. The benefits provided by a SWMP include

- increased understanding of the causes, probability and consequences of surface water flooding, and where this will occur;
- to inform spatial and emergency planning functions; and
- the development of a co-ordinated action plan, agreed by all partners and supported by an understanding of the costs and benefits, which partners will use to work together to identify measures to mitigate surface water flooding.

Scunthorpe SWMP

The strategy for Scunthorpe is to continue to develop the Scunthorpe SWMP. Following the PFRA and the initial LFRMS, it was identified that the management of surface water was an issue in Scunthorpe. North Lincolnshire is currently co-ordinating the production of a Surface Water Management Plan for Scunthorpe which considers flood risk from surface runoff, groundwater and ordinary watercourses and the interaction with flooding from main rivers, the sea and sewers. The aim of the SWMP is to provide a greater understanding of local flood risk and to develop action plans to manage the risks. In terms of this LFRMS,

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[30] https://www.gSv.uk/gSvernment/upS ads/system/upS ads/attaShment_data/fiSe/69342/pbS3546-swmp-guidanSe-S_003S9.pdf S

the strategy for Scunthorpe is to complete the SWMP and subsequently to identify what actions can be taken to address the risks identified.

Community areas SWMP

The strategy for Goxhill, Messingham and West Halton is to undertake further investigation/study into surface water management. These studies are likely to comprise mini SWMP to increase understanding of the causes of flooding in areas already known to have experienced surface water flooding in the past.

Planned capital scheme

Capital schemes are already proposed for Goxhill, Ulceby, Barnetby, West Butterwick, Crowle and Scawby. These have been developed informed by the initial LFRMS undertaken in 2011. These capital schemes will be subject to the necessary statutory assessments as set out in Section 5 of this LFRMS to ensure their sustainability and environmental impacts are acceptable. Planned capital schemes include replacement, and/or upgrading of existing infrastructure, e.g. at Ulceby a re-routed and larger capacity surface water sewer is to be provided linking to the outfall to the IDB system.

Investigation of potential capital scheme options

The proposed strategy for Brigg, Scawby Brook and Castlethorpe, Barton, and Crowle is the investigation of potential capital scheme options. It is envisaged that such investigation would be desk based, and may involve modelling of the existing system, and the effectiveness of the proposed schemes.

Study to increase understanding of drainage/groundwater/watercourse issues at a specific locations

The proposed strategy for Brigg, Scawby Brook and Castlethorpe, Keadby, Ulceby, Barnetby, Winterton, Bonby, New Holland, Kirton Lindsey, Scawby, Luddington, Elsham, Ealand, Broughton, Haxey, Wrawby, and East Halton is to undertake additional studies to increase the understanding of drainage/groundwater/ watercourse issues at a specific locations. In order to identify potential suitable actions to address the risks identified it is necessary to fully understand the mechanisms of the potential flood risk first.

Where ‘new’ areas of local flood risk have been identified, in the first instance this will involve further interrogation of the data that sits behind the LFRE to identify the source of the flood risk, whether that be surface water, groundwater, or from ordinary watercourses, and whether further information can be gleaned from the existing information, such the anticipated depth of flooding, velocity of the flood water, and thus hazard rating.

Flood risk to people is defined by flood hazard and therefore this approach will allow further prioritisation to take place, whereby if any areas at high or moderate hazard are identified, these can be prioritised further, potentially moving some of the settlement areas into priority category 1 of Table 3.2. Such high to moderate areas of hazard are likely to be highly localised and may only form a small part of the LFRE in any given area, hence it’s consideration subsequent to the main LFRMS prioritisation process undertaken thus far; it is considered appropriate to consider detail such as hazard rating once further detailed study is undertaken in each settlement area.

Having interrogated the existing information further to understand the potential risk, expert representatives from the Council will visit each location to verify (or otherwise) the modelled information, including the hazard rating. It may be that, having visited the location itself, it is identified that the potential risk is less than indicated. This could arise as a result of the inherent simplification associated with modelling. For example, a pathway by which water can drain away from the potentially flooded area is identified, which does not appear to have been represented appropriately in the modelling. Or another structure is present that would prevent the modelled risk from occurring, such as a kerb line that directs overland flow away from the area potentially at risk, or an existing drainage system of sufficient capacity. This use of expert judgement is vital to ensure that attention and funding is directed appropriately towards those areas considered to be at greatest risk and to whom the greatest benefit can be achieved.

Where significant potential flood risks are verified, investigation would continue, which may involve modelling. For example, modelling of existing surface water drainage systems may be undertaken to identify those sections of the system in which improvements could be made – it may be that an improvement to a section distant from the area at risk would improve drainage both in the area identified to be at risk, and throughout the wider system, thus providing greater benefit than focussing efforts on the area identified to be risk only. For example, this could include improvement works to a downstream pump station, or to the drainage ditches into which the piped drainage system outfalls, which could be achieved through improved engagement with riparian owners.

Partnership working with Risk Management Partners

Partnership working with risk management partners is proposed in Brigg, Scawby Brook and Castlethorpe, Barton, Ulceby, Barrow Upon Humber, Barnetby, Winterton, Westwoodside, West Butterwick, Crowle, Luddington, Owston Ferry, Ealand, Haxey, and BeltonWestgate/Carrhouses. The solutions at these locations are likely to involve our risk management partners, and will therefore require working in partnership to consider appropriate solutions, which may take the form of one of the other strategy options discussed above and below.

North Lincolnshire Council intend to develop a common works plan, whereby information on works to be undertaken will be shared between Risk Management Partners.

Telemetry monitoring of specific watercourses

The proposed strategy includes for telemetry monitoring of specific watercourses, such as in Redbourne and West Halton. The intention of this is to provide flood warning information in these sensitive areas. The data will also serve to improve our understanding of flood mechanisms in these areas to validate and/or calibrate the results of existing flood models, upon which flood risk management decisions will be have been and will continue to be taken.

Monitor the effectiveness of completed improvements

Flood risk management works have already been completed in Barrow Upon Humber, New Holland, Westwoodside, Graizelound, Owston Ferry, Whitton, and Low Burnham. It is important to monitor the effectiveness of such completed improvements and ensure that any necessary maintenance is undertaken as required.

Raised water bodies – monitor with owners

Raised/impounded artificial waterbodies located in the vicinity of our communities have been identified at Barton Upon Humber and Kirton Lindsey. The strategy will be to engage with the owners/operators of these artificial water bodies to ensure that the necessary actions are taken to ensure that risk of failure and/or overtopping is kept to an acceptably low level. Partnership working with the Environment Agency on such matters is proposed (whom retain overall responsibility for management of flood risk from larger reservoirs) so as to ensure that our local knowledge can be combined with their expertise on how to deal with the management of such risks, for the benefit of our communities.

Further Investigation and Cleansing

Further investigation and cleaning is proposed at Worlaby. The works to be undertaken here will likely be maintenance works to remove roots and to investigate the ability of the wider surface water drainage system to serve its purpose.

Liaison with major industry and Emergency planning in relation to COMAH sites

The proposed strategy for the South Humber Bank area will be to liaise with the major industry operators located there (primarily COMAH sites in the first instance) and with the emergency planners to ensure that information regarding local flood risks is shared appropriately and to provide support as necessary to enable the individual operators to take the necessary actions to address the risks on their sites.

Liaison with owners of critical assets

The preferred strategy with respect to critical assets that have been identified to be at potential local flood risk (both those located within settlement areas (see Settlement Area Pro-formas) and those located outside of settlements (see Table 3-4), will be to liaise with our risk management partners and/or the asset owners to obtain further information. The intention will be to identify whether there is any history of flooding at the location, the vulnerability of the asset to flooding, and the impacts and consequences of such an event. Ultimately, the purpose will be to identify those assets that the asset owner(s) should prioritise for the purposes of flood risk management, if necessary. The role of North Lincolnshire Council in this regard will be to help the asset owner to understand the flood mechanisms and their prioritisation of any resultant works.

4.5 Other proposed flood risk management strategy activities being led by our risk management partners

It is important to acknowledge that whilst this LFRMS has necessarily focused on the strategy for managing flooding from local sources, as required by the Flood and Water Management Act 2010, the main flood risks posed to residents of North Lincolnshire will continue to be from non-local sources (larger rivers and the sea), which will continue to be managed by the Environment Agency. However, this does not mean that funding for management of such larger 'non-local' sources should come solely from central Government, and the Council will continue to contribute funds towards such larger schemes as necessary to help facilitate as necessary the delivery of flood risk management activities that provide the greatest benefit to our communities. Proposed flood risk management strategy options/activities being led by our risk management partners are set out in Table 4.3 below.

Table 4-3 Proposed flood risk management strategy options/activities being led by our risk management partners

Strategy	Settlements	Potential funding source	Indicative cost (cumulative for each row) (£)	
			Short and medium term (<6 years)	Long term (>6 years)
	• Settlements in the vicinity of the Humber Estuary	EA/North Lincolnshire Council/Private/ Others		
Isle of Axholme Strategy(see section 1.5)	• Settlements in the Isle of Axholme Area	EA/North Lincolnshire Council/Private/ Others		
Lincolnshire Lakes	• Lincolnshire Lakes development	Private developer & LEP funding	TBC	TBC
Total			TBC	TBC

Decisions will need to be taken so as to ensure that available Council funds are allocated accordingly, and this LFRMS should help with that decision making process.

5. Sustainable Development and the Environment

5.1 Background

“Flooding and coastal erosion can also have significant impacts on the environment and on cultural heritage, including causing pollution or damage to historic buildings and changes to habitats. However, for some habitats and heritage assets, managed flooding and/or deposits of material eroded from elsewhere are essential for their existence and health.”

In addition to reducing local flood risk to people and property, the Local Strategy will aim to deliver wider environmental, social and economic benefits and aim to avoid damaging the existing natural and historic environment.

In promoting projects, measures will be considered where environmental improvements could be made to help improve biodiversity and cultural assets, protect critical infrastructure, and support regeneration and economic growth.

5.2 Sustainability

Sustainable development is that which meets the needs of the present without compromising the ability of future generations to meet their own needs’. This means making decisions to stimulate economic growth, maximise wellbeing and protect the environment without negatively impacting on future generation’s ability to do the same. This supports the overall aims of the Council, as set out in Section 1.4 of this LFRMS.

Through the implementation of all of the objectives set out in Section 1.4 into the decision making process of this LFRMS and subsequent implementation, North Lincolnshire will undertake our flood risk management responsibilities in such a way so as to support the aim of sustainable development. An approach has been identified that does not compromise the ability of future generations to manage flood risks.

5.3 Statutory Assessments

Strategic Environmental Assessment

A Strategic Environmental Assessment (SEA) was carried out to accompany the LFRMS and can be found in a separate accompanying document. The aim of the SEA was to identify any potential adverse effects on the environment, minor or significant, from the LFRMS and if any are identified, to propose mitigation or enhancement measures to be incorporated into the strategy. The assessment evaluated the LFRMS objectives against eight SEA objectives which cover a variety of aspects of the environment including biodiversity, human health, soil and water quality, landscape characteristics, heritage features and economic assets. Additionally specific activities identified in the LFRMS have been assessed against these criteria. The outcome of this SEA showed that there was no significant adverse effect expected as a result of the implementation of the LFRMS. It is stated that as this LFRMS is a high level document, any specific activities which are not yet detailed in the LFRMS will require a more detailed environmental evaluation and possible mitigation measures when they are implemented.

Habitat Regulations Assessment

The Conservation of Habitats and Species Regulations (2010) aims to conserve natural habitats, flora and fauna. There are a number of European designated sites in and around North Lincolnshire, such as the intertidal areas of the Humber Estuary, and the Thorne, Crowle And Goole Moors, which cannot be negatively impacted upon. To make sure that this strategy does not impact upon the designated sites identified in the SEA, this strategy will be screened for compliance with the Habitats Regulations. This screening assessment will be undertaken during the course of the public consultation.

Water Framework Directive

The Water Framework Directive (WFD) (Directive 2000/60/EC) is a European Union directive which aims for 'good ecological status or potential' for all ground and surface waters (rivers lakes, transitional waters and coastal waters). The WFD came into force in 2000 and was transposed into UK law in 2003. The WFD is coordinated in England by the EA, through River Basin Management Plans (RBMP) which set out the measures to be taken to achieve the objectives of the WFD. North East Lincolnshire is part of the Humber river basin.

WFD compliance assessments are required where waterbodies could be impacted as a result of a specific proposal, strategy or works. Due to the high level of the strategy, there is insufficient detail available at this stage (on how any specific schemes identified in this LFRMS would be implemented) to undertake an assessment into the compliance of this LFRMS with the WFD. Specific flood risk schemes that arise as a result of this strategy will be screened on a case by case basis at the appropriate time to identify whether a full WFD assessment is required and for any work that can contribute to the measures outlined in the RBMP. The need for a WFD compliance assessment will be established with the EA at project inception stage.

The strategy has specifically been assessed against the SEA objective to maintain and enhance soil and water quality, for which no negative effects have been found. On this basis, the Strategy itself is not considered to be fundamentally counter to the aims of the WFD. The council will also contribute to the WFD though the ordinary watercourse consenting process where the effect of proposed works will be assessed for compliance with the WFD.

Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a process required by European law that brings together information about any likely significant environmental effects of a proposed development. It provides decision-makers and the public with the environmental information needed to make sustainable decisions when determining applications for certain developments. Environmental Impact Assessment (EIA) is required for certain forms of development, known as EIA Development. Some types of developments always require EIA. Others only require EIA if they are likely to have significant effects on the environment by virtue of their nature, size or location, as defined by the EIA Regulations. EIA will be undertaken on a scheme by scheme basis, where necessary, as specific capital schemes are brought forward.

5.4 Climate change

The risk of flooding and coastal erosion in England is predicted to increase in the future due to the effects of climate change. Therefore it is essential to consider the potential impacts of climate change when determining the approach to flood risk management to ensure that measures put into place now will be resilient to a changing climate. Although it is not possible to prevent all instances of flooding, either now or in the future, action can begin now, through this strategy, to manage the risks and reduce the impact.

Likely future flood risk has been considered in Section 3.5 of this Strategy. The purpose of considering likely future flood risk was to enable identification of areas at greatest local flood risk in which to direct efforts for flood risk management. The potential impacts of climate change will be considered when implementing the next phase of the strategy, whether that be further study and investigation to understand the risks, or the detailed design of specific schemes. Climate change is covered by SEA objective 8 and is also a specific requirement when bidding for Flood Defence Grant in Aid (FDGiA) funding, thus ensuring its consideration as specific schemes are brought forward.

6. Funding

6.1 Factors influencing funding considerations

Although the benefits of individual flood risk management measures are often many times greater than their cost, this is not always the case, and it is not technically, economically or environmentally possible to implement flood risk management measures to mitigate the risk of all flooding. The approach proposed in this LFRMS is to implement the most cost-effective measures that provide the greatest benefits in terms of reduce the risks and impacts felt by our communities.

When applying for external funding for flood risk management, the calculation of 'cost benefits' to property and infrastructure can only be considered once. It is important, therefore, that at any given location, all potential flood risks are adequately identified in planning and delivering flood defence schemes. By working together with our flood risk management partners, by engaging with the Environment Agency in the delivery of the Strategy for the Isle of Axholme and/or the Humber Flood Risk Management Plan for example, this can be achieved.

As set out in this LFRMS, North Lincolnshire Council have adopted a risk based prioritisation to the allocation of funding (from the Council or otherwise) for flood risk management. The Council will seek funding and contributions from all available sources and will review funding allocations from its capital and revenue resources where appropriate. North Lincolnshire Council will always seek to support area funding for schemes to reduce flood risk from all sources of flooding.

Investment will be consistent the national policy and take account of policies within wider strategies, such as the CFMPs.

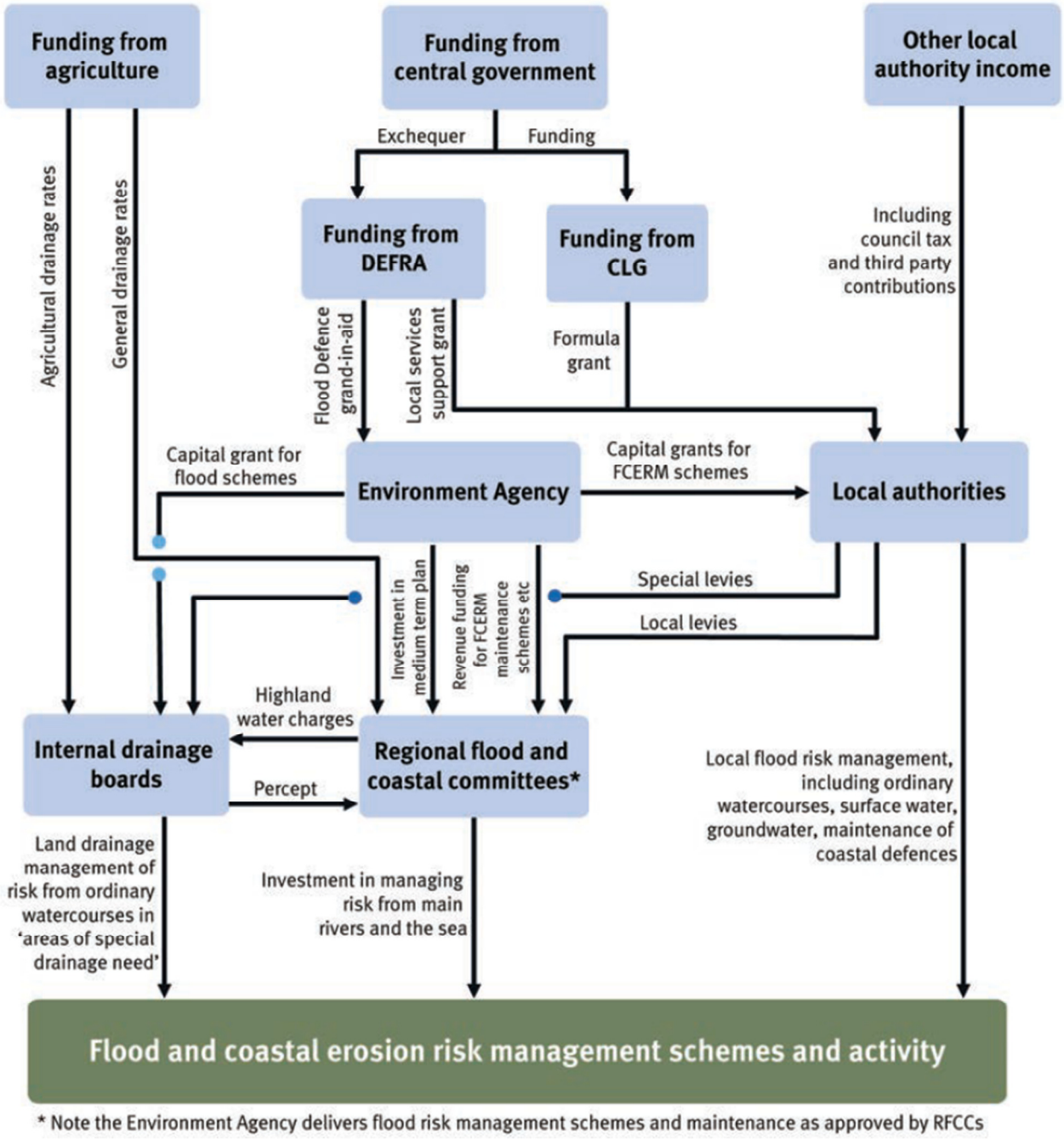
The Council will:

- Determine all the environmental, social and economic costs and benefits of each measure;
- identify measures which represent 'quick wins';
- Engage those partners who benefit from each measure and gain their support and involvement;
- Investigate all possible sources of funding;
- Engage with Local Enterprise Partnerships (LEPs) to secure funding;
- Identify whether the contributor's funding programmes need coordinating; and
- Establish links between the Local Strategy and high-level flood risk management priorities.

6.2 Potential funding sources/opportunities

Potential funding sources to deliver flood and coastal erosion risk management activity are presented in Figure 6.1 below. North Lincolnshire are located on the right-hand side of Figure 6.1, with the potential connections to central government and other risk management authorities shown by the arrows linking 'local authorities' to the other boxes. Local flood risk management, which is the responsibility of North Lincolnshire Council and the focus of this Strategy, is covered by the bottom right arrow. But in terms of North Lincolnshire as a whole, and all potential sources of flood risk, we can benefit from all of the funding sources shown in Figure 6.1.

Figure 6.1 Funding streams of risk management authorities



Source: Environment Agency 2011. Understanding the risks, empowering communities, building resilience: the national flood and coastal erosion risk management strategy for England.

The funding streams potentially available to help deliver local flood risk management schemes in North Lincolnshire are discussed further below.

Flood Defence Grant in Aid

Flood defence grant in aid funding (FDGiA) is available from Defra through a national application scheme managed and administered by the Environment Agency. Potential projects are scored and prioritised nationally based upon national assessment criteria. The calculation of cost benefits and outcome measures is dependent upon the overall project cost related to the measured benefits of property protection, and the reduction in risk to property flooding as a result of the scheme construction. Benefits to a specific location

can only be counted once, meaning that applications for funding need to be carefully considered so as to gain the greatest benefit for the communities involved.

Funding through FDGiA will be sought where bids have both a reasonable chance of success and achieve significant net funding benefit. The scheme is generally aimed at the larger projects that provide wide-ranging and significant benefits, such as schemes providing protection from flooding from larger rivers or the sea, which are administered by the Environment Agency. Due to the time and thus costs associated with applying for FDGiA funding, it does not lend itself well to smaller schemes against which lower value economic benefits would be achieved, which is usually the case for 'local' sources of flooding. In those instances where it is thought that funding is unlikely to be granted, or would not exceed the costs associated with preparing the application, funding via FDGiA will not be investigated. Opportunities for funding via FDGiA will be investigated wherever feasible for larger schemes, for which significant benefit, and thus a greater likelihood of success, is envisaged, such as was achieved for the Midby Drain alleviation scheme in Barrow-upon Humber.

Residents of North Lincolnshire also benefit from FDGiA funding assigned to manage flooding from non-local sources, such as the proposed defence works (upgrading defences and realignment) along the Humber Bank at Winteringham Ings and South Ferriby, as part of the current Humber Flood Risk Management Plan (discussed in Section 1.5 of this report).

Local Enterprise Partnerships

Funding may also be available through the Local Enterprise Partnerships (LEPs), which ultimately are funded from central government. North Lincolnshire is covered by two Local Enterprise Partnerships (LEPs), Greater Lincolnshire and the Humber. Projects may be considered for funding through the Local Development Fund, or European (ESiF) funding, managed by the LEPs. Flood risk management is one of the priorities for the LEPs, related to economic development.

Local Transport Plan

Department for Transport funding to support the Local Transport Plan (LTP) is provided to the Council to support highway capital works, which includes drainage works. Priorities and programmes of work are agreed annually with the Cabinet member for Neighbourhoods. There is also an opportunity to bid for "Challenge" funding for specific projects, where these may be too large to fund from the LTP allocation. The bids must include strong business cases, and decisions are made by Department for Transport (DfT) based upon established criteria.

Regional Flood and Coastal Committee Local Levy

Funding for smaller flood risk management schemes may be available through local levy funding. These are funds that are managed directly by the RFCC's. Bids made to the RFCC's for local levy funding are prioritised and agreed by the RFCC members.

North Lincolnshire Council Capital Funding

North Lincolnshire Council may decide to allocate capital funding to specific projects, to part fund partner projects, or to support agreed strategies. These decisions are made by elected members based upon bids and requests from Council Officers.

Community Infrastructure Levy

The Community Infrastructure Levy came into force in April 2010 and provides the Council with an alternative source of potential funding for community infrastructure, which could include flood defence schemes if necessary. It allows the Council to raise funds from new development to help fund infrastructure that could reduce the impact that a developments may have on flood risk. The infrastructure that can be covered by levy is defined in the Planning Act 2008, and includes transport, schools, hospitals, parks and flood defences.

The Council is currently working on a policy for the development and implementation of CIL. This includes a study into the future infrastructure requirements needed to support development proposals outlined within the North Lincolnshire Core Strategy and the Housing and Employment Land Allocations Development Plan. The study will need to consider the likely cost the additional infrastructure requirements, when they will be required and how they could be funded and delivered. Utility services, including the internal drainage board have been consulted to inform this process.

Developer contributions

The national strategy proposes that costs should not fall exclusively to the general taxpayer because benefits achieved can lead to personal and private gain and as such there are both public and private benefits. North Lincolnshire Council will seek to maximise funding where possible to reduce the flood risk and reflect local benefits including from developers so as to maximise risk management activity. The Pitt Review stated that developers should make a full contribution toward the costs of building and maintaining flood defences. The council will seek such funding through the planning process as appropriate. The flood risk management infrastructure necessary to protect the proposed Lincolnshire Lakes development will be secured through developer contributions, together with other funding from non-Council sources.

With respect to SuDS in particular, the Council are currently preparing a SuDs developer contribution policy, which will ensure that the appropriate financial developer contribution is secured for management and maintenance for the type of infrastructure to be developed.

Other external sources of funding

North Lincolnshire Council may also seek other external funding partners where appropriate. Existing local businesses or industries may be asked to, or offer to, contribute to local projects where benefits may be shared in the longer term. Similarly, other public bodies and water companies may contribute to schemes where there are direct benefits to their infrastructure or assets, or where there are clear benefits to delivering a joint scheme.

7. The Next Steps

7.1 Consultation on this strategy

As set out in Section 1 of this document, this LFRMS presents the summary of North Lincolnshire's preferred strategy for managing 'local' flood risks in the district. The purpose of this consultation is to allow the public and other relevant authorities to comment on the approach to managing 'local' flood risks currently preferred by the council, such that they are able to influence the approach. We now welcome feedback on the proposed LFRMS. Engagement with our local communities is key to the delivery of an effective strategy that seeks to provide the greatest possible benefits to our communities.

Comments on the proposed strategy should be sent to our Highways team on highway.maintenance@northlincs.gov.uk or, alternatively, by post to:

Highways
North Lincolnshire Council
8-9 Billet Lane
Normanby Enterprise Park
Scunthorpe
DN15 9YH
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Comments should be received by Tuesday 19 April 2016. Late submissions will not be reflected in the final LFRMS report, but may be considered in the ongoing development of the identified strategy options, which will continue beyond the publishing of the final report.

7.2 Key Performance Indicator

A key performance indicator (KPI) has been established to enable measurement of the Council's progress with respect to managing flood risk. Indicator PL10 covers the number of properties where flood risk has been reduced. The aim of the indicator is to monitor annual progress in reducing local flood risk to residential properties. Improvement schemes may also be carried out to reduce risk to other elements of infrastructure (e.g. highways), which would not be accounted for. This is acknowledged, but in terms of providing a suitable indication of the Council's performance with respect to flood risk, this measurable metric is considered to be proportionate and appropriate. If this KPI is found to be insufficient in measuring the Council's performance moving forward, then consideration will be given to its revision, and/or any additional KPIs to cover other elements of the Council's management activities.

7.3 Annual action plans

Annually, we will produce a report to the Flood Risk Management Board, summarising the progress of the strategy against that set out in this LFRMS. This will provide a process by which North Lincolnshire Council's Drainage Team is accountable to the Board.

7.4 Review and update of the LFRMS

This strategy reflects North Lincolnshire Council's current understanding of local flood risk across the district, and the preferred approach to managing these risks. However, upon publishing the LFRMS as final, it does not become fixed until the next review period; As the Council gains a more complete understanding of the condition of their flood protection assets and the associated flood risk, strategy implementation will be adjusted accordingly. To facilitate this adaptive approach, this Local Flood Risk Management Strategy will remain a live document, to be updated as new technical information associated with flood risk management evolves, and real events occur. This 'live' approach is reflected in the changes to this strategy since the initial version prepared in 2011, which has taken updated modelling and alleviation works completed by the council into account.

The North Lincolnshire LFRMS will be managed by the North Lincolnshire Flood Risk Management Board (joint-chaired by North Lincolnshire and the Environment Agency), with regular progress reports to the Cabinet Member with a responsibility for flood risk management. Progress and a works programme are to be reviewed annually. The Flood Risk Management Board will ensure that the strategy is kept up to date, taking account of objectives and remain focussed at a strategic level.

The LFRMS will be reviewed in its entirety on a six-yearly cycle. This will be consistent with the PFRA process, enabling both requirements of the LLFA to be dovetailed where possible. The update will take into account the flood risk management works undertaken since the previous iteration of the Strategy, as well as new data, such as the latest surface water modelling, groundwater modelling (if a suitable dataset is available) and/or fluvial modelling for ordinary watercourses.

Revised data sources

New data to inform the LFRMS may become available during the course of the six year timeframe of this LFRMS. This could include new or updated modelling undertaken by North Lincolnshire or our Risk Management partners, or new actual flood data to inform our historic flood dataset, which would be the case if we suffer another flood event associated with local sources such as occurred in 2007.

The inclusion of such additional data within the six year timeframe will be taken on a case by case basis, informed by advice from our partners, and the scale of any change compared to our currently understanding, and the implications on the proposed strategy and our communities. Minor changes to our current understanding are unlikely to be reflected in the overall aims and objectives of this strategy. Significant changes to our understanding of flood risk may necessitate a complete revisit of the LFRMS prior to the end of the six yearly timeframe.

8. Glossary

Annual exceedance probability (AEP)	The Annual Exceedance Probability is the chance or probability of an event with a defined magnitude occurring annually and is usually expressed as a percentage. Larger events occur (are exceeded) less often and will therefore have a lesser annual probability.
Catchment	A catchment is the total area that drains into a river or other drainage system.
Catchment Flood Management Plan (CFMP)	A strategic planning tool through which the Environment Agency works with other key decision-makers within a river catchment to identify and agree policies for sustainable flood risk management.
Chance of flooding	The chance of flooding is used to describe the frequency of a flood event occurring in any given year, e.g. there is a 1 in 100 chance of flooding in this location in any given year. This can also be described as an annual exceedance probability (AEP) and be given as a percentage, as defined above, e.g. a 1% AEP of flooding in any given year.
Climate change	The climate is the average weather experienced in a region over a long period (for example 30 years). Climate change refers to recent changes in this long term average weather. The climate of the earth does experience a 'natural variability' which is not due to climate change.
Critical assets/services/infrastructure	Assets/services/infrastructure which are considered 'critical', vital or indispensable to society, the economy, public health or the environment, and where the failure or destruction would have a large impact. This would include services such as hospitals, communications, electricity sub-stations, water and wastewater treatment works, transport infrastructure and reservoirs.
Department for Environment, Food and Rural Affairs (Defra)	The UK government department responsible for policy and regulations on the environment, food and rural affairs - including flood risk.
Department of Communities and Local Government (DCLG)	Government department which sets national policy for planning through the National Planning Policy Framework (NPPF).
DG5 Register	A register of properties and areas that have suffered or are likely to suffer flooding from foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant period.
Internal Drainage Boards (IDB)	Internal Drainage Boards are established in particularly low lying areas of England where land drainage and flood defence are necessary to protect both agricultural and developed land.
Environment Agency	The Environment Agency was established under the Environment Act 1995, and is a non-departmental public body of Defra. They are responsible for regulating major industry; flood and coastal risk management; water quality and resources; waste regulation; climate change; fisheries; contaminated land; conservation and ecology and navigation.
Flood and Water Management Act 2010 (FWMA)	The Act in which the Government enacted many of the recommendations made in the Pitt Review. Clarified the roles with regards to all forms of flood risk and designated the council as the Lead Local Flood Authority (LLFA).

Flood consequence	The consequences of flooding will depend upon the nature of the flood hazard and the vulnerability of an area.
Flood probability	The probability of a flood hazard can be described as the chance that it will happen in any one year (see AEP above).
Flood risk	"Flood risk" is a combination of the probability and the potential consequences of flooding from all sources – including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.
Flood Risk Maps	The Environment Agency has range of maps on the 'What's in Your Backyard' section of their website which shows different sources of flood risk.
Flood Risk Management Plan (FRMP)	Production is required by the Flood Risk Regulations 2009. FRMPs will provide a strategic overview of the management of all sources of flood and coastal erosion risk. The FRMP will include: • conclusions about all sources of flood and coastal erosion risk; • the objectives for managing the risk, and • the measures proposed to achieve the risk management objectives for 2015 to 2021.
Flood Risk Regulations 2009	Legislation that transposed the European Floods Directive into English law in 2009.
Fluvial Flooding	Flooding from watercourses, such as streams or rivers. Resulting from excess water leaving the channel of a river and flooding adjacent land.
Groundwater Flooding	Caused by water levels in the ground rising until it appears above the ground surface. Groundwater flooding often occurs in low lying areas where the water cannot drain away, or on the sides of valleys where a change in the ground conditions or geology occurs.
Habitats Regulations	The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species' and the adaptation of planning and other controls for the protection of European Sites.
Lead Local Flood Authority (LLFA)	The authority, either the unitary council, or county council, with responsibility for local flood risk management issues in its area, as defined in the Flood and Water Management Act 2010. North Lincolnshire Council are a Lead Local Flood Authority.
Local Resilience Forums (LRF)	Group of risk management authorities which plan for a range of emergency situations of which flood risk is one. Responsible for producing the Multi-Agency Flood Plan.
'Local' sources of flooding	Surface run-off, groundwater, and ordinary watercourses (generally small rivers and streams). The Council are responsible for management of flood risk from 'local' sources in North Lincolnshire.
Main River	Main Rivers are watercourses marked as such on a main river map. Generally main rivers are larger streams or rivers, but can be smaller watercourses in critical locations.
National Flood and Coastal Erosion Risk Management Strategy	A national framework produced by the Environment Agency regarding flood and coastal erosion risk management.

National Planning Policy Framework (NPPF)	Sets out the government's planning policies for England.
'Non-local' sources of flooding	Sources of flooding that are not considered to be 'local' sources. 'Non-local' sources of flood risk include the larger watercourses, known as 'Main Rivers', the sea and reservoirs. Management of flood risk from non-local sources is the responsibility of the Environment Agency.
Ordinary watercourse	Watercourses (rivers, streams, ditches, drains, cuts, dykes, sluices and passages through which water flows) that are not part of a main river. North Lincolnshire Council has powers under the Land Drainage Act 1991 for regulation of these watercourses. Internal Drainage Boards are responsible for the management of these watercourses within their Districts.
Pitt Review	A review carried out into the floods of summer 2007 by Sir Michael Pitt. The review led to 92 recommendations for improving flood risk management in England.
Resilience measures	Constructing a building to reduce the impact of floodwater entering the building so that no permanent damage is caused and the building can be cleaned and dried without much difficulty.
Resistance measures	Constructing a building to prevent floodwater entering and damaging its fabric.
Riparian owners	A riparian owner is someone who owns land or property through which a watercourse flows, or the land adjacent to a watercourse.
Risk	In flood risk management, risk is a function of the probability of a flood occurring and the consequence of the flood.
Sewer flooding	Flooding from the public sewer system which can be caused by limited capacity or blockages.
Shoreline Management Plan (SMP)	A plan for managing flood and erosion risk for our particular stretch of shoreline, looking at the short, medium and long term. The main aim is to develop a sustainable management approach for the coastline.
Strategic Flood Risk Assessment (SFRA)	Refines areas of flood risk to provide more information for planning purposes. Used to inform the Local Plan with regards to site allocations. Covers all sources of flooding.
Surface water flooding (also known as pluvial flooding)	Occurs when usually intense precipitation falls onto the ground, flows over or collects on the surface and does not enter a watercourse or drainage system.
Sustainable Drainage Systems (SuDS)	A sequence of drainage techniques aimed at mimicking natural processes for surface water management. Where possible this should involve returning water to the ground by infiltration. SuDS will manage flood risk, improve water quality and improve amenity and biodiversity.
Water Framework Directive (WFD)	A European Community Directive (2000/60/EC) of the European Parliament and Council designed to integrate the way water bodies are managed across Europe. It requires all inland and coastal waters to reach "good status" by 2015 through a catchment-based system of River Basin Management Plans.

Maps – Figures 1 to 34

Appendix A
Contact details for Risk Management Authorities

North Lincolnshire Council

General Enquiries	01724 297000
Address	8-9 Billet Lane Normanby Enterprise Park Scunthorpe North Lincolnshire DN15 9YH
Email	highwaymaintenanSe@nSrtSnSs.gSv.uk
Website	http://www.northlincs.gov.uk/

Environment Agency

General Enquiries	03708 506 506 (Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary)
Floodline	0845 988 1188 (Charges are between 1p and 11p per minute depending on the time of day for landline customers. Charges for mobiles are between 12p and 41p per minute)
Address	Environment Agency Northern Area Office Waterside House Waterside North Lincoln LN2 5HA
Email	enquiries@environment-agency.gov.uk
Website	www.environment-agency.gov.uk

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Shire Group of IDBs

General Enquiries	01302 337798
Fax	01302 329887
Address	JBA Consulting Epsom House Chase Park Redhouse Interchange Doncaster South Yorkshire DN6 7FE
Email	info@shiregroup-idbs.gov.uk
Website	http://www.shiregroup-idbs.gov.uk/

North East Lindsey Drainage Board

General Enquiries	01469 588991
Address	North East Lindsey Drainage Board High Street Ulceby North Lincolnshire DN39 6TG
Website	http://www.northeastlindsey-idb.org.uk

Isle of Axholme and North Nottinghamshire Water Level Management Board – Water management consortium

General Enquiries	01507 328095 *The Gables Business Court* *Belton Road, Epworth* *Doncaster* *South Yorkshire* *DN9 1JL*
Email	enquiries@lmdb.co.uk
Website	http://www.wmc-idbs.org.uk/loAaNN/

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Anglian Water

Reporting a leak	0800 771 881 (Freephone number but charges may apply to mobiles)
Water supply and sewerage service queries and emergencies	08457 145 145 (Charges are between 1p and 11p per minute depending on the time of day for landline customers. Charges for mobiles are between 12p and 41p per minute)
Address	Anglian Water Customer Services PO Box 10642 Harlow CM20 9HA
Website	www.anglianwater.co.uk

Severn Trent Water

Report a sewer blockage or flooding (24 hour emergency number)	0800 783 4444 (Freephone number but charges may apply to mobiles)
Online enquiries	http://severntrentwater.custhelp.com/
Website	https://www.stwater.co.uk/

Call charge information was obtained from https://www.gov.uk/call-charges.

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Appendix B
Plans showing boundaries of the Risk Management Authorities

Appendix C
Settlement Area Pro-formas