Local Flood Risk Management Strategy

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MANCHESTER CITY COUNCIL

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B L A N K

Foreword

Flooding can be devastating to people and businesses, property and the environment. Settlements often developed next to rivers, but as they grew the potential risks from flooding were not always adequately considered. Parts of Manchester are at potential risk of flooding during extreme weather events, and due to its urban nature, many of the natural processes that would previously have acted to mitigate flood risk no longer do so. The artificial drainage infrastructure of the City is designed to withstand storms of certain intensity but needs to be maintained and in places reinforced. Climate change is expected to increase occurrences of severe weather, including more intense and extended periods of rainfall and the City must adapt to meet this challenge.

The Flood & Water Management Act 2010 set out new roles and responsibilities for the Council and others in terms of local flood risk management. Although we cannot remove all risk of flooding, through collaborative working between the Council, the Environment Agency, United Utilities and other stakeholders, this risk can be managed more effectively. Funding must be used wisely and so priorities need to be identified, and developing a robust evidence base to inform future interventions is key.

Manchester has developed and prospered alongside its waterways and throughout its history people have had to deal with the consequent risks of flooding. Today and for the future, Manchester's Local Flood Risk Management Strategy seeks to ensure that we continue to do so through actions based on the most robust evidence and effective working relationships. This strategy has been refined following a period of public consultation and provides a framework for effective local flood risk management in Manchester.

Councillor Kate Chappell, Executive Member for the Environment

Executive Summary

Flood risk is an increasingly important issue in England due to climate change and cities, such as Manchester, which have often developed next to rivers, can be particularly vulnerable. It is not economically possible to prevent all flooding from occurring, but there are actions that can be taken by individuals, businesses, government and the wider community, to manage the risks and reduce the impacts of flooding with the resources available.

The Flood Risk Regulations 2009 (FRR) and the Flood & Water Management Act 2010 (FWMA) set out a range of new duties and responsibilities for the Environment Agency (EA), local authorities and others in planning for and delivering effective flood risk management. Upper-tier local authorities such as Manchester City Council are now designated as Lead Local Flood Authorities (LLFAs) and are responsible for leading on local flood risk management, which is defined as flooding from ground water; from surface water during and after heavy rain storms; and from what are termed 'Ordinary Watercourses' – all rivers and streams that are not designated as 'Main Rivers', as well as canals and ponds. The EA has an overview for all flood risk management in England, with specific responsibility for leading on flood risk management from the sea, from reservoirs and from rivers designated as 'Main Rivers'. A 'Flood' is defined in the FWMA as where land not normally covered by water becomes covered by water from either heavy rainfall; a river overflowing or breaching its banks; a dam overflowing or being breached; tidal waters; groundwater or anything else.

Clearly defined roles and responsibilities are a foundation of the Government's approach to flood risk management, however, another essential component is partnership working. This is in recognition that there is seldom one organisation responsible for a flood, and that there are many organisations that can influence flood risk and help to manage it. Risk Management Authorities (RMAs) are defined in the FWMA, and have specific roles and functions in terms of flood risk management. Within Manchester there are five RMAs:

- The Environment Agency (EA)
- United Utilities (UU)
- The Highways Agency (HA)
- The Council as Lead Local Flood Authority (LLFA)
- The Council as Local Highway Authority (LHA)

The other main flood risk stakeholders in Manchester are the Canal and River Trust, as Navigation Authority for the Ashton Canal and Rochdale Canal, and

Peel Holdings, as Navigation Authority for the Bridgewater Canal and Manchester Ship Canal. By sharing information, planning investment and working together to deliver the LFRMS it is expected that significantly more will be achieved than by working individually, and to this end the Council will look to develop partnership working arrangements with relevant stakeholders to help manage local flood risk effectively.

The LLFA's local leadership role will be very important in developing and maintaining effective partnerships and communicating risk to affected stakeholders, and the LFRMS will set out how the LLFA, and to different degrees other RMAs, will undertake their local flood risk management functions going forward. Manchester's LFRMS will be an important tool to help everyone understand and manage risk within the City and will set out a risk-based approach to achieve the best results possible using the budgets and resources available. It will look to reduce both the likelihood of flooding occurring and the impacts of a flood should it happen, promoting the use of a wide range of measures to manage local flood risk, including what affected communities can do for themselves.

The LFRMS is not a response plan for dealing with major flooding incidents; the Local Resilience Forum is producing a Multi-Agency Flood Plan for the City which will deal with these incidents from a civil contingencies perspective, whilst the emergency services will continue to respond to flooding emergencies according to their procedures and resources.

Aim and Objectives

The LFRMS's overall aim is to ***Ensure that local flood risk is properly managed by using the full range of options in a coordinated way***. This will be achieved by meeting overarching objectives for managing local flood risk:

- Reduce the likelihood, severity and consequences of flooding from Ordinary Watercourses, from Groundwater, and from Surface Water Runoff.
- Seek opportunities to improve water quality and biodiversity through flood risk management activities.

To meet these objectives will take a range of actions, from different stakeholders and at different spatial levels. This will involve:

- Developing effective Communication protocols between the main local flood risk management stakeholders within Manchester to:
    - Ensure stakeholders are aware of their legal roles and responsibilities for flood risk management,
    - Warn communities of potential risk and engage with them in terms of managing risk and improving resilience,

    - Investigate floods that occur,
    - Coordinate responses to flood events,
    - Plan and coordinate investment,
    - Share information,
    - Enable flood incidents, or problems with flood defences or drainage infrastructure to be reported.
- Improving knowledge of drainage infrastructure within or affecting the city, to identify priorities, help inform interventions, and thereby effectively manage risk.
- Developing an appropriate policy response framework for local flood risk management to inform and direct the work of the Council as LLFA and other stakeholders, including a basis for prioritising interventions, and an up-to-date evidence base.
- Cooperating to maximise funding from all available sources to enable appropriate flood risk management interventions to be progressed, such as flood defence / drainage infrastructure capacity works at priority locations;
- Monitoring and maintaining flood defence / drainage infrastructure, including responsive maintenance to address problems should they arise;
- Engaging with the planning process to ensure flood risk is appropriately considered in new developments / landscaping.

Local Flood Risk in Manchester

Local flood risk within Manchester is widespread and comes from a range of different sources, often interacting with each other. Surface water flood risk often interacts with sewers, highway gullies and non-main rivers, many of which are culverted or partly culverted and form much of the drainage infrastructure for the City. Non-main rivers generally drain into larger main rivers which the EA manage flood risk from, such as the Mersey; Corn Brook poses a significant predicted risk of flooding during severe storms, although there will be some risk from all non-main rivers, most of which have not been modelled.

All rivers in Manchester will eventually drain into the Manchester Ship Canal and from there to the Irish Sea. There are also three broad canals in Manchester: the Ashton Canal and the Rochdale Canal which extend from the City Centre through east and north Manchester to Ashton under Lyne and Rochdale respectively - part of the Rochdale Canal close to Manchester is designated as a Special Area of Conservation (SAC); and the Bridgewater Canal which extends westwards from the City Centre into Trafford and Salford.

Flood risk from groundwater has not been historically significant, although an increasing number of flood incidents from groundwater have been reported in recent years. The reason for this is not certain, and a combination of factors, including changing weather patterns and the upkeep of drainage infrastructure, may be responsible for the increase.

Risk is a combination of probability and consequence, so an assessment of flood risk and how this risk is managed should consider both the likelihood of a flood occurring, how severe it would be and what would be affected by it. Records of historical flooding, together with modelled predictive risk should provide a good basis for establishing the likelihood of a flood event occurring and its severity, although it should be recognised that climate change may mean that flood events are more likely to occur and be more severe, going forward. Combining this information on the likelihood and severity of floods, with information about existing properties and infrastructure that would be affected, should help to identify areas at particular risk, and how this risk could be managed.

There are many options for managing risk ranging from improving awareness and knowledge, establishing effective communication mechanisms between stakeholders, developing flood warning systems, maintaining relevant infrastructure, providing new infrastructure and improving resilience; there are also a number of different sources of funding, most of which require some form of partnership working. This document will provide the basis for prioritising risk management work, in recognition of the limited resources relative to the scale and often ongoing nature of the task.

The potential impacts from climate change may include more intense and longer lasting storms, and consequently increased flood risk. It will be important to consider potential climate change in terms of future drainage maintenance or other flood risk management interventions.

Local Flood Risk Management Policies

The following policies represent a framework through which local flood risk can be managed in Manchester. Certain LFRMS policies are, however, specific to the LLFA whilst others are relevant to all RMAs within the Manchester.

The statutory requirements for RMAs in terms of the LFRMS, are set out in Section 11 of the FWMA, and are summarised in the table below:

RMA	***Act in a manner that is consistent with the National Flood & Coastal Erosion Risk Management Strategy, in exercising their flood risk management functions***	***Act in a manner that is consistent with Local Flood Risk Management Strategies, in exercising their flood risk management functions***	***Have regard to both the National and the Local Flood Risk Management Strategies, in exercising their flood risk management functions***	***Have regard to both the National and Local Flood Risk Management Strategies in undertaking any other function that may have a bearing on Local Flood Risk Management.***
EA	*Does not apply to writing the NFCERMS*	*Applies*	*Applies*	*Applies*
HA	*Applies*	*Applies*	*Applies*	*Applies*
LHA	*Applies*	*Applies*	*Applies*	*Applies*
LLFA	*Applies*	*Applies*	*Applies*	*Applies*
UU	*Applies*	*Does not Apply*	*Applies*	*Applies*

Further guidance about the application of the LFRMS may be provided by the LLFA from time to time.

The LFRM policies provide the basis for all local flood risk management actions and are listed below. Some policies are specific to the LLFA, but in general terms they apply to all RMAs within the City, as well as other stakeholders.

LFRM Policy 1 Work to maintain and improve the local flood risk management evidence base will be undertaken to support both risk assessment and the prioritisation of future actions to manage risk, in line with the Aim and Objectives of the Local Flood Risk Management Strategy (LFRMS).

LFRM Policy 2 Local Flood Risk Management interventions will seek to reduce the likelihood, severity and consequences of flooding from ordinary watercourses, ground water and surface water runoff. Interventions that reduce the risks to People, especially vulnerable people; Residential Properties, particularly basement flats; and Critical Infrastructure will be prioritised. Priority locations that have been subject to recorded incidents of local flooding will normally be prioritised over those areas where risk is just modelled.

LFRM Policy 3 Local Flood Risk Management Authorities and other key stakeholders will work together in partnership to progress

priority interventions that support the aim and objectives of the Local Flood Risk Management Strategy (LFRMS).

LFRM Policy 4 Monitor and maintain drainage infrastructure within Manchester to support the aim and objectives of the Local Flood Risk Management Strategy (LFRMS).

LFRM Policy 5 Promote awareness of local flood risk and ways that the risk can be managed by people and communities.

LFRM Policy 6 Ensure that local flood risk is properly considered for new development proposals.

LFRM Policy 7 Ensure that the Lead Local Flood Authority (LLFA) responds to appropriate consultation exercises on matters affecting local flood risk management.

LFRM Policy 8 Ensure that the Lead Local Flood Authority (LLFA) investigates and reports on flood incidents appropriately.

LFRM Policy 9 Aim to contribute towards the achievement of sustainable development in undertaking flood risk management functions.

Local Flood Risk Management Actions

An Action Plan accompanying the LFRMS provides a list of local flood risk management actions, which will be updated over time as actions are completed and new ones identified. Actions to manage local flood risk in Manchester will be risk based and proportionate and directed by the LFRMS policies. The primary focus will be on annual funding bids, including joint work with partner organisations, in order to improve the understanding of risk and progress appropriate interventions and resilience measures. Modelled risk, reported flooding incidents, known problems, bid scores and political priorities will all inform future interventions, and in many cases the work will be iterative: funding for studies will help inform works / measures to reduce risk, and identify the people / organisations responsible, which will take place over several years.

The LFRMS will be reviewed from time to time and updated to accord with changed circumstances, including new legislation.

Table of Contents

Foreword

Executive Summary

Chapter 1 – Introduction 12

Flood Risk Regulations 2009 and Flood & Water Management Act 2010 12

Chapter 2 - Roles and Responsibilities.....16

Flood Risk Management.....16

Risk Management Authorities.....18

The Environment Agency……..…….19

United Utilities ……..……..…….20

The Highways Agency…….……20

The Lead Local Flood Authority……..……...20

The Local Highway Authority…….……...21

Navigation Authorities……..……..……..……..21

Infrastructure Providers……..…….21

Public……..…….…….…….21

City of Manchester Flood Risk Management Partnership Arrangements… 22

Chapter 3 – Aim and Objectives 25

National Strategy 25

Aim of Local Strategy.....27

Objectives of Local Strategy 27

Chapter 4 Local Flood Risk.....29

Flood risk from Ordinary Watercourses……..…29

Flood risk from Groundwater…….……..37

Flood risk from Surface Water Runoff……39

Chapter 5 - Risk Management Framework.....44

Flood Risk Management Policies.....50

LFRMS Actions.....58

Chapter 6 - Updates and Monitoring 60

Appendix A - Evidence Base and Contextual Information

Appendix B - List of FRM Stakeholders and contact details in Manchester

Appendix C - Organogram

LFRMS Action Plan

Chapter 1 – Introduction

This chapter provides a short introduction to Manchester and the legislative framework for flood risk management, particularly the Flood & Water Management Act 2010.

1.1 The City of Manchester is located to the south and west of the Pennines, the source of the City's principal rivers, the Mersey and the Irwell. Manchester was an important centre in Roman and Medieval times, but grew significantly during the industrial revolution in the 18th and 19th centuries, which has shaped both the built environment - cotton mills, grand civic buildings, and terraced housing – and the actual landscape in terms of canals and reservoirs. The City today contains a mix of housing types, including concentrations of apartments in the City Centre, together with pre-war suburbs and post-war housing estates, with employment concentrated in the City Centre and at more peripheral locations in the north and east of the City and close to Manchester Airport.

1.2 Over half a million people live in Manchester, including one of the largest student populations in Europe, and the City is at the heart of the Greater Manchester City Region which has a population of almost 2.7 million people. Transport infrastructure converges on the City Centre, whose population increases significantly during the day with workers, shoppers and visitors. The City has a predominantly urban character, although many homes have gardens, and there are many parks and landscaped areas, often associated with the rivers and canals.

1.3 Flood risk is an increasingly important issue in England due to climate change, and cities, which have often developed next to rivers, can be particularly vulnerable. It is not economically possible to prevent all flooding from occurring, but there are actions that can be taken by individuals, businesses, government and the wider community, to manage the risks and reduce the impacts of flooding with the resources available. Working collaboratively with all stakeholders will help actions to be coordinated and investment aligned, to manage risk more effectively.

Flood Risk Regulations 2009 and Flood & Water Management Act 2010

1.4 In 2007 the European Floods Directive (Directive 2007/60/EC) was passed in response to serious flooding incidents that had taken place in previous years, including from the Elbe and Danube rivers. Also in 2007 the United Kingdom suffered a number of serious flood incidents, which led to the Pitt Review of how the country responds to flooding.

1.5 The Flood Risk Regulations 2009 (FRR) transpose the European Floods Directive into domestic law, and the Flood and Water Management Act 2010 (FWMA) responds to the findings of the Pitt Review. These pieces of legislation together set out a range of new duties and responsibilities for the Environment Agency (EA) and for local authorities and others, in planning for, and delivering effective flood risk management.

1.6 The FRR prescribe an ongoing six-yearly cycle of work to manage 'significant' flood risk (2010 – 2015, 2016 – 2021 etc.) In summary, the process involves the EA and upper tier local authorities (in their new role as Lead Local Flood Authorities (LLFAs)) agreeing areas where flood risk would have 'significant' harmful consequences to human health, economic activity and the environment, and where this coincides with clusters of population greater than 30,000 people. This is a high threshold and only ten such areas were identified in England, of which Greater Manchester was one, including much of the City of Manchester. For any local authority falling within one of these Flood Risk Areas, the next stage of the six-yearly cycle is triggered, which involves assessing the probability and extent of the flood risk and the hazards posed in more detail, with Flood Risk and Flood Hazard Maps to be published by December 2013, which will inform the Flood Risk Management Plans which are required by December 2015, before the cycle begins again in 2016. Working with the other Greater Manchester authorities, the Council has provided information to the EA to enable them to meet the requirements of the FRR in terms of Flood Risk and Flood Hazard Maps. The approach to producing Flood Risk Management Plans is being developed by the EA at present.

1.7 The FWMA received royal assent on 8 April 2010, and set out the duties and responsibilities for flood risk management, and the powers to implement them. In summary, the EA has an overview for all flood risk management in England, with specific responsibility for leading on flood risk management from the sea, from reservoirs and from rivers designated as 'Main Rivers'. Upper-tier local authorities such as Manchester City Council are designated as LLFAs and are responsible for leading on local flood risk management, which is defined as flooding from ground water; from surface water during and after heavy rain storms; and from what are designated as 'Ordinary Watercourses' – all rivers and streams that are not designated as 'Main Rivers', as well as canals and ponds. The EA and LLFAs are designated as Risk Management Authorities (RMAs), along with Water Companies, Highway Authorities and where they exist, Internal Drainage Boards and District Councils. The Flood Risk Management functions that RMAs may undertake are wide-ranging, but could include physical works to protect properties or to improve drainage or to restore natural processes, making arrangements for forecasting, or warning and communicating flood risk information.

1.8 Clearly defined roles and responsibilities are a foundation of the Government's approach to flood risk management, however, another very

important aspect is partnership working. The effective management of flood risk will involve a range of stakeholders, sharing information and combining funding to develop projects and plan investment. The FWMA requires RMAs to cooperate with each other in terms of flood risk management, but engaging with the other stakeholders and the wider community will help to manage risk more coherently and maximise investment. This will be particularly important in terms of managing flood risk from canals, because Navigation Authorities are not designated as RMAs, and so have no statutory flood risk management duties, although do have a duty or power…to work, maintain, conserve, improve or control any canal or other inland navigation or navigable river (Land Drainage Act 1991), functions which would seem to overlap with flood risk management functions for LLFAs contained within the FWMA.

1.9 The LLFA's local leadership role will be very important in developing and maintaining effective partnerships and communicating risk to affected stakeholders, and the Local Flood Risk Management Strategy (LFRMS) will set out how the LLFA, and to different degrees other RMAs, will undertake their local flood risk management functions going forward. Manchester's LFRMS will be an important tool to help everyone understand and manage risk within the City and will set out a risk-based and proportionate approach to achieve the best results possible using the budgets and resources available. It will look to reduce both the likelihood of flooding occurring and the impacts of a flood should it happen, promoting the use of a wide range of measures to manage local flood risk.

1.10 The LFRMS is not a response plan for dealing with major flooding incidents; the Local Resilience Forum is producing a Multi-Agency Flood Plan (MAFP) for the City which will deal with these incidents from a civil contingencies perspective, whilst the emergency services will continue to respond to flooding emergencies according to their procedures and resources. These are separate but related functions, the LFRMS should help to reduce the likelihood and consequences of flood events, whilst the MAFP will set out the approach for dealing with major flood events should they occur.

1.11 It is important to remember that flooding is a natural process that doesn't stop at administrative boundaries. Manchester's LFRMS therefore needs to fit within a coherent suite of strategies over topographically or hydraulically linked areas. For Manchester, this means that the LFRMSs for neighbouring parts of Greater Manchester and Cheshire East will help address any cross boundary local flood risk management issues, whilst the Lancashire and Derbyshire LFRMSs will be important contextually.

1.12 The Government is phasing the commencement of the duties and powers contained within the FWMA, and from 1st January 2013 the following are the main elements pertinent to the Council, with full details available from the Department for the Environment, Food and Rural Affairs (DEFRA):

Section 7 National Flood and Coastal Erosion Risk Management Strategy - Provides a national context for LFRMSs, which must be consistent with it (Commenced).

Section 9 Local Flood and Coastal Erosion Risk Management Strategies: England - Provides details on the content of the LFRMSs (Commenced).

Section 11 Effect of national and local strategies: England - Provides details on the use of the LFRMSs (Commenced).

Section 13 Cooperation and arrangements - Provides the formal basis for RMAs to cooperate and share information (Commenced).

Section 14 Power to Request Information - Provides the formal basis for how LLFAs can request flood risk management information from individuals (Commenced).

Sections 16 & 17 (Funding & Levies) - Provides the basis for the EA to make funds available for flood risk management and to levy charges on LLFAs (Commenced).

Section 19 Local Authorities: investigations - Provides details for LLFAs to investigate flood incidents in their area (Commenced).

Section 21 LLFAs: duty to maintain a register - Provides details for how LLFAs are to provide a register of structures or features that will have a significant effect on flood risk in its area (Commenced).

Sections 22-26 Inclusive - Regional Flood and Coastal Committees - Provides details regarding the establishment and operation of Regional Flood and Coastal Committees (Commenced).

Section 27 Sustainable Development - Provides details for how certain authorities, including LLFAs and Highway Authorities, should aim to make a contribution towards sustainable development in exercising flood risk management duties (Commenced).

Section 30 Schedule 1 Designation of Features - Provides details for how LLFAs can designate certain features (Commenced)

Section 31 Schedule 2 Amendment of other Acts - Includes various powers including Consenting (or Refuse/Enforce) for works to ordinary watercourses (Commenced).

Section 32 Schedule 3 Sustainable Drainage - Various functions including the establishment of a Sustainable Drainage Systems (SuDS) Approval Body (SAB) (Not commenced and details unknown)

Chapter 2 - Roles and Responsibilities

This chapter introduces what is meant by flood risk management, lists who the Risk Management Authorities and other main stakeholders in Manchester are, and the proposed approach to flood risk management in the city.

Flood Risk Management

2.1 The Flood & Water Management Act 2010 (FWMA) sets out what is meant by 'Flood Risk' - an occurrence assessed and expressed…'as a combination of the probability of the occurrence with its potential consequences'...in respect of a flood. The harmful consequences to human health; the social and economic welfare of individuals and communities; infrastructure; and, the environment including cultural heritage in particular should be considered in assessing risk. (Section 2 FWMA).

2.2 The Act also sets out what is meant by 'Risk Management' – including anything done for the purpose of analysing, assessing or reducing a risk or a component of risk, or altering the balance of factors combined in assessing a risk. In particular, flood risk management could include things done that increase the probability of a flood occurring, but which reduce or alter the consequences, or that could increase the probability of a flood occurring at one time or in one place, but reduce the probability of it occurring at another time or in another place. The following are examples of things that might be done in the course of flood risk management in Manchester:

(a) Planning, erecting, maintaining, altering or removing buildings or other structures (including structures built or used for flood defence purposes),

(b) Maintaining or restoring natural processes,

(c) Reducing or increasing the level of water in a place (whether or not it results in a change to the water level in another place),

(d) Carrying out work in respect of a river or other watercourse (such as taking things out of it or supporting or diverting the banks),

(f) Using statutory or other powers to permit, require, restrict or prevent activities,

(g) Making arrangements for financial or other support for action taken by persons in respect of a risk of, or in preparing to manage the consequences of, flooding or coastal erosion,

(h) Making arrangements for forecasting and warning,

(i) Preparing, gathering and disseminating maps, plans, surveys and other information, and

(j) Providing education and giving guidance (including, for example, guidance on changes to land management).

(Section 3, FWMA)

2.3 Risk is a combination of probability and consequence, so an assessment of flood risk and how this risk is managed should consider the likelihood of a flood occurring, how severe it would be and what would be affected by it. Records of historical flooding, together with modelled predictive risk, should provide a good basis for establishing the likelihood of a flood event occurring and its severity, although it should be recognised that climate change may mean that flood events are more likely to occur and be more severe in the future. Combining this information on the likelihood and severity of floods, with information about existing properties and infrastructure that would be affected, should help to identify areas at particular risk, and how this risk could be managed.

2.4 It is important to remember that modelled risk is a point-in-time assessment and is limited in terms of its accuracy by the data and methodology used, and weaknesses in either will reduce the confidence that can be had in the modelling. Climate change and other factors such as development may also have a bearing on the accuracy of predictions going forward. Records of historical flooding incidents from ordinary watercourses, ground water and surface water runoff are not comprehensive at present, however, with the establishment of the Council as Lead Local Flood Authority (LLFA) it is anticipated that a much improved means of recording actual flooding will operate going forward. This will cover floods that require formal investigation and reporting (under Section 19 of the FWMA) to smaller scale events that will nonetheless improve understanding of flood risk within the City. Combining modelled information with records of actual flooding should help improve confidence, and by also considering information about existing properties and infrastructure that would be affected, should help to identify areas at particular risk.

2.5 There are many options for managing risk ranging from improving awareness and knowledge, establishing effective communication mechanisms between stakeholders, developing flood warning systems, maintaining relevant infrastructure, providing new infrastructure and improving resilience; there are also a number of different sources of funding, most of which require some form of partnership working. This document will provide the basis for prioritising risk management work, in recognition of the limited resources relative to the scale and often ongoing nature of the task.

2.6 Managing risk to existing residents and businesses is the primary purpose of this document, because the Planning system regulates new development, including in terms of flood risk. It will, however, be important for the LLFA, and other key flood risk management stakeholders to engage in the Planning

process, because in addition to enabling new developments to be progressed safely in terms of flood risk, such schemes can contribute towards managing existing flood risk, such as by reducing surface water runoff, or by providing flood defences. The Local Flood Risk Management Strategy (LFRMS) will help inform how the LLFA engages with the Planning process in terms of seeking to influence development proposals in terms of effective flood risk management. Notwithstanding this, developing effective links between the Planning process and the local flood risk management process will be important going forward.

2.7 The Government, working with the Insurance industry, is currently progressing Flood Re, a means to ensure that homes built prior to 1 January 2009 and in Council Tax bands A-G can continue to obtain reasonably priced insurance, through the provision of a limit on premiums in high risk areas; this would be paid for by a levy on all home insurance premiums. Properties built after 1 January 2009 would not be covered, to avoid incentivising building in areas of high flood risk, and the availability of reasonably priced insurance may turn out to be the most effective means of controlling development in inappropriate flood risk locations. If developers are concerned that people may not buy their new homes because of the risk of flooding or very expensive insurance premiums, they are unlikely to want to build in such locations.

Risk Management Authorities

2.8 The Act defines a number of organisations as Risk Management Authorities (RMAs), with specific roles and functions in flood risk management. Within Manchester there are five RMAs:

- The Environment Agency (EA)
- United Utilities (UU)
- The Highways Agency (HA)
- The Council as Lead Local Flood Authority (LLFA)
- The Council as Local Highway Authority (LHA)

2.9 RMAs must be consulted on the preparation of Local Flood Risk Management Strategies. The statutory requirements for RMAs in terms of LFRMSs, are set out in Section 11 of the FWMA, and are summarised in the table below:

RMA	Act in a manner that is consistent with the National Flood & Coastal Erosion Risk Management Strategy, in exercising their flood risk management functions	Act in a manner that is consistent with Local Flood Risk Management Strategies, in exercising their flood risk management functions	Have regard to both the National and the Local Flood Risk Management Strategies, in exercising their flood risk management functions	Have regard to both the National and Local Flood Risk Management Strategies in undertaking any other function that may have a bearing on Local Flood Risk Management.
EA	Does not apply to writing the National Strategy	Applies	Applies	Applies
HA	Applies	Applies	Applies	Applies
LHA	Applies	Applies	Applies	Applies
LLFA	Applies	Applies	Applies	Applies
UU	Applies	Does not Apply	Applies	Applies

RMAs must cooperate with other RMAs in undertaking their flood risk management functions, which are wide-ranging, and could include responding to flooding incidents, undertaking works to protect properties or to improve drainage or to restore natural processes, making arrangements for forecasting or warning and communicating flood risk information.

Environment Agency

2.10 The Environment Agency (EA) has a national strategic oversight role for all forms of flood risk and a local operational role in regard to flood and coastal erosion risk management. The EA is required to publish the National Strategy which seeks to provide a clear national framework for all forms of flood and coastal erosion risk management. The EA's role includes leading on flood risk management from main rivers, the sea and large reservoirs as well as involvement with emergency planning. The EA has permissive powers to carry out works to maintain and improve its assets on main rivers. This can include any structure or appliance for controlling or regulating flow of water into or out of the channel. The overall responsibility for maintenance of main rivers, however, lies with the riparian owner. The EA also has a regulatory role in consenting works carried out by others in or adjacent to main rivers.

2.11 The EA can also bring forward flood defence schemes through the Regional Flood and Coastal Committees (RFCCs), and it will work with LLFAs and local communities to shape schemes which respond to local priorities. RFCCs play an important local role in guiding flood and coastal management activities within catchments and along the coast, advising on and approving programmes of work for their areas and continuing to raise local levies to fund local priority projects and works. RFCCs also provide for local democratic

input through the majority membership of representatives from LLFAs; in the North West this is done on a sub-regional basis with Greater Manchester having three Members. The EA contributes to the development of multi-agency flood plans, which are developed by Local Resilience Forums to help the organisations involved in responding to a flood to work better together. It also contributes to the National Flood Emergency Framework for England which includes guidance on developing and assessing these plans. It works with the Met Office to provide forecasts and warnings of flooding from rivers and the sea in England.

United Utilities

2.12 United Utilities is the regional water and sewerage company for the North West. Water and sewerage companies (WaSCs) are RMAs and are responsible for the public sewerage system in their areas. WaSCs are able to undertake improvements to sewerage infrastructure, which forms part of the overall drainage infrastructure for an area, within the price limits for customer bills set by the water industry's economic regulator – the Office of Water Services (Ofwat). As part of this WaSCs:

- Respond to flooding incidents involving their assets;
- Investigate reports of flooding incidents;
- Maintain a register of properties that have flooded as a result of hydraulic inadequacy of the sewer network (this is referred to as the DG5 register); and
- Undertake capacity improvements to alleviate sewer flooding on the DG5 register (subject to Ofwat agreeing the appropriate funding).

Highways Agency

2.13 The Highways Agency is an executive agency, part of the Department for Transport. It is responsible for operating, maintaining and improving the strategic road network in England. The Highways Agency is responsible for the drainage of these routes and must also ensure that road projects do not increase local flood risk or adversely affect local water bodies. In its sustainable development plan 2012 - 2015, the Highways Agency sets out plans to develop a flood risk management strategy.

Lead Local Flood Authority

2.14 Upper-tier local authorities (including Unitary Authorities such as the Council) are designated as Lead Local Flood Authorities (LLFAs) and are responsible for leading on local flood risk management, which is defined as flooding from ground water; from surface water during and after heavy rain storms; and from what are designated as 'Ordinary Watercourses' – all rivers and streams that are not designated as 'Main Rivers', as well as canals and ponds and small reservoirs.

Local Highway Authority

2.15 The Local Highway Authority is another function of upper–tier local authorities, and is responsible for the maintenance of all adopted highways and associated infrastructure within its area, including gullies and drains.

2.16 There are further stakeholders that are not statutory RMAs but who can have important flood risk management roles and some of these are listed below.

Navigation Authorities

2.17 The Canal & River Trust was set up in 2012 to take over the role of Navigation Authority from British Waterways in respect of 2,000 miles of historic waterways across England. The Manchester Pennine section of the Canal and River Trust is responsible for the maintenance (and historically for flood risk management) of the Ashton Canal and Rochdale Canal within Manchester. The Manchester Ship Canal Company and the Bridgewater Canal Company are the eponymous Navigation Authorities and both are owned by Peel Holdings.

Infrastructure Providers

2.18 In addition to United Utilities, other infrastructure providers such as Network Rail, Transport for Greater Manchester, Manchester Airport Group, National Grid Gas and Electric, Electricity North West and Telecommunication companies, whilst not RMAs, may have assets that are of considerable importance with regard to planning for flood events. It is important that essential infrastructure is resilient and that flood risk management issues are factored into investment plans to ensure continuity of service in an emergency.

The Public

2.19 Landowners, householders or businesses whose property is adjacent to an ordinary watercourse are likely to be riparian owners with associated responsibilities. Riparian owners have a right to protect their property from flooding and erosion but in most cases will need to discuss the method of doing this with the LLFA for ordinary watercourses, or the EA for Main River. They also have responsibility for maintaining the watercourse and ensuring free flow with no obstruction, diversion or pollution to the watercourse. Sustainable Drainage Systems (SuDS), such as ponds, sumps, swales or permeable paving, or more conventional drainage infrastructure such as underground attenuation tanks are generally privately owned and maintained, although provide a wider public function. Upon commencement of Section 32 and Schedule 3 of the FWMA, the SuDS Approving Body (SAB) will take over the maintenance of adopted SuDS that are serving more than one property.

City of Manchester Flood Risk Management Partnership Arrangements

2.20 Clearly defined roles and responsibilities are a foundation of the Government's approach to flood risk management, however, another essential component is partnership working. This is in recognition that there is seldom one organisation responsible for a flood. However, as there are many stakeholders without formal roles in the Act that can also influence flood risk and help to manage it, broader partnership working arrangements than just between RMAs will be necessary. The more stakeholders are able to find opportunities to work together, the better use will be made of funding, resources and expertise.

2.21 Led by the Council as LLFA, local flood risk management partnership arrangements will be developed between the RMAs, the Navigation Authorities for canals and other key stakeholders in the city to enable the exchange of information, the planning of investment and through collaborative working the delivery of the LFRMS.

2.22 The list of main local flood risk management stakeholders, and their contact details in terms of local flood risk management in Manchester, is provided in Appendix B. Their role and input will vary considerably and there will be other bodies not listed with important parts to play.

2.23 It is recognised that many of the RMAs and stakeholders listed here will have established policies and procedures for managing flood risk issues or responding to flooding incidents; partnership working would not seek to replace these established procedures, rather it will help the stakeholders to improve communication, build relationships and over time, align relevant aspects of their work. This will help to improve local flood risk management.

2.24 Landowners in particular have important roles and responsibilities in relation to watercourses on, or which flow through their land, including in relation to flood risk management. Following a catchment / watercourse approach, riparian landowners along non-main rivers will be engaged as relevant, whilst other landowners will also be engaged as relevant.

2.25 Not all stakeholders will be involved with all aspects of the work, for example, riparian landowners are unlikely to be interested in flooding from ordinary watercourses other than their own; there are few synergies between Bury Council and Cheshire East Council, other than that they both border Manchester; Transport providers and utility companies will be interested in managing flood risk in terms of its effect on their infrastructure or facilities, rather than in managing flood risk in the round; Civil Contingencies and the Local Resilience Forum will be interested in responding to flood events. This means that both functional and spatial partnership arrangements will be

needed, particularly where responsibility is not clear. Furthermore, direct partnership working between stakeholders, with the LLFA generally acting as the nexus, will in most cases be more efficient than seeking to develop a single broad holistic partnership and engage stakeholders in work that has little direct relevance to them.

2.26 Having some high–level commitment to partnership working within the main stakeholder organisations will be important, although most of the actual work will be at a more operational level, and will entail direct working between partners on matters of shared or overlapping responsibility. Flooding is often the result of a combination of factors and seldom stops at an administrative boundary, so a flexible and responsive approach will be needed to manage risk effectively in the short, medium and longer term.

2.27 The residents and businesses of Manchester are important stakeholders, and engaging effectively with them will be a fundamental part of managing flood risk going forward; this is likely to be on a localised basis - dealing with specific issues in particular areas. It is important that property owners who may be at risk of flooding are aware of the risk and take steps towards ensuring that their property is resilient.

2.28 Likewise developers may wish to engage with some of the key stakeholders in relation to their sites and schemes, rather than in terms of overall flood risk management. The Government are keen for people and businesses to participate in flood risk management, and that people who would benefit from flood defence works should be encouraged to pay towards this. As the National Strategy notes, there is the opportunity for significantly more risk management activity to take place if alternative sources of funding can be secured in each area to reflect the local benefits that would be delivered. Any funding found locally can supplement the amounts available nationally and mean as many communities as possible can be protected.

2.29 Funding for local flood risk management is complicated and contains many uncertainties; notwithstanding the position in the National Strategy, residents are unlikely to be willing to contribute towards a scheme to tackle a flood risk solely on the basis of modelled predictions and without actually experiencing an event. Furthermore, it is important that residents are aware that they would not be investing in certain protection, but in measures to reduce risk or improve resilience; residents could therefore make an investment and still experience flooding. Many residents may not have spare money available to contribute towards schemes, although there is an allowance in the Flood Funding Calculator for places with high levels of multiple deprivation in partial recognition of this.

2.30 The LLFA would provide a lead role on this work, preparing and submitting funding bids to the RFCC that have been agreed as priorities and which may

be joint bids with other RMAs or local communities. Providing the resources and knowledge and expertise to support local communities and to help them engage in flood risk management and with relevant stakeholders and for small scale projects submit their own bids. The limited funding available means that a proportionate and risk based approach that seeks to maximise resources and thereby provide the widest benefit to the City will be needed. This unfortunately means that not every location that suffers from flooding will be identified for a funding bid, and not all bids that are submitted will be successful.

2.31 All Stakeholders will work directly with each other on matters of shared or overlapping responsibility, or where responsibility is not clear. In most cases this will be more efficient than seeking to engage partners in work that has little relevance to them.

Chapter 3 – Aim and Objectives

This chapter sets out the aim and objectives of the National Strategy and the Local Flood Risk Management Strategy for Manchester.

National Strategy

3.1 The National Flood & Coastal Erosion Risk Management Strategy (the National Strategy), produced by the Environment Agency (EA) working jointly with the Department for the Environment, Food and Rural Affairs (DEFRA), was first published in September 2011. The Flood & Water Management Act 2010 (FWMA) states that Local Flood Risk Management Strategies (LFRMSs) must be consistent with the National Strategy, the overall aim of which is "to ensure the risk of flooding and coastal erosion is properly managed by using the full range of options in a co-ordinated way."

3.2 The National Strategy sets five objectives to support its delivery. These are:

- understanding the risks of flooding and coastal erosion, working together to put in place long-term plans to manage these risks and making sure that other plans take account of them;
- avoiding inappropriate development in areas of flood and coastal erosion risk and being careful to manage land elsewhere to avoid increasing risks;
- building, maintaining and improving flood and coastal erosion management infrastructure and systems to reduce the likelihood of harm to people and damage to the economy, environment and society;
- increasing public awareness of the risk that remains and engaging with people at risk to encourage them to take action to manage the risks that they face and to make their property more resilient;
- improving the detection, forecasting and issue of warnings of flooding, planning for and co-ordinating a rapid response to flood emergencies and promoting faster recovery from flooding.

3.3 The National Strategy sets out six Guiding Principles to be followed which are summarised below:

- **Community focus and partnership working -** Risk management authorities need to help communities understand and actively prepare for the risks of flooding, and encourage them to have direct involvement in decision-making and risk management actions. Lead Local Flood Authorities (LLFAs), working together with Regional Flood and Coastal Committees (RFCCs), will be able to consider how both the costs and benefits of investment made as part of LFRMSs should be spread between geographical areas, communities and sectors. Working in partnership to develop and implement local strategies will

enable better sharing of information and expertise, and the identification of efficiencies in managing risk.

- **A catchment based approach** - In understanding and managing risk, it is essential to consider the impacts on other parts of the catchment. Activities must seek to avoid passing risk on to others within the catchment without prior agreement. In developing local strategies LLFAs should ensure that neighbouring LLFAs within catchments are involved in partnerships and decision making.
- **Sustainability** - LLFAs should aim to support communities by managing risks in ways that take account of all impacts of flooding (for instance on people, properties, cultural heritage, infrastructure, environment and the local economy) and the whole-life costs of investment in risk management. Risk management measures should take account of potential risks that may arise in the future and be adaptable to climate change. Where possible, opportunities should be taken to enhance the environment and work with natural processes, of which flooding is one. Adopting more sustainable approaches to the management of flood risks can greatly improve the environmental condition of rivers, wetlands, coastal areas, and the social and economic circumstances around and within settlements.
- **Proportionate, risk-based approaches** - It is not technically, economically or environmentally feasible to prevent flooding and coastal erosion altogether. A risk-based management approach targets resources to those areas where they have greatest effect. Risk management measures consider both the probability of a flood event happening and the consequences that might arise if it did. All aspects of risk management should be carried out in a proportionate way that reflects the size and complexity of the risk and society's ability to manage it. Investment in managing risk, and who pays for it, should reflect the benefits that result.
- **Multiple benefits** - As well as reducing the risks to people and property, flood risk management can bring significant economic, environmental and social benefits. It can enhance and protect the built and natural environment, cultural heritage and biodiversity by preventing loss and damage to habitats and heritage assets and reducing pollution. It can contribute to regeneration and income generation, protect infrastructure and transport links, and contribute to economic growth. In all instances, flood risk management should avoid damaging the environment and seek to provide environmental benefit, as required by the Habitats, Birds and Water Framework Directives. It is important that communities are able to shape risk management actions to take account of local priorities, and that this is supported, where appropriate, by local contributions to achieve additional benefits that might not be possible otherwise. This principle should also apply to other activities, for example development, land use or infrastructure planning where flood risk management benefits may also be achieved alongside the main objectives.

- **Beneficiaries should be allowed and encouraged to invest in local risk management** - The benefits achieved when flood risks are managed are in many cases localised and lead to personal or private gain through the protection of specific individuals, communities and businesses. They can also be public, through the reduction of future costs to society arising from incident recovery. The private as well as public nature of the benefits suggests that costs should not fall to the general taxpayer alone. If they did, future plans would always be constrained by what central government could provide. If costs are borne by national budgets alone, there would be a lack of local incentive to take sensible steps to reduce risk where possible, to avoid actions that might increase it, and to keep the costs of risk management actions proportionate. Overall, there is the opportunity for significantly more risk management activity to take place if alternative sources of funding can be secured in each area to reflect the local benefits that would be delivered. Any funding found locally can supplement the amounts available nationally and mean as many communities as possible can be protected.

Aim of Manchester's Local Flood Risk Management Strategy (LFRMS)

3.4 The LFRMS's Aim is to ***Ensure that local flood risk is properly managed by using the full range of options in a coordinated way***. This is a purposefully high level aim which is very similar to the overall aim of the National Strategy, but applied at the local level. The aim will be achieved through the delivery of the LFRMS Objectives, which have been arrived at following the Strategic Environmental Assessment process.

Objectives of Manchester's Local Flood Risk Management Strategy (LFRMS)

3.5 The LFRMS objectives for managing local flood risk are:

- Reduce the likelihood, severity and consequences of flooding from Ordinary Watercourses, from Groundwater, and from Surface Water Runoff.
- Seek opportunities to improve water quality and biodiversity through flood risk management activities.

3.6 These are overarching objectives that will be achieved by a range of actions, from different stakeholders and at different spatial levels, and together are consistent with both the objectives and guiding principles of the National Strategy. This will involve:

- Developing effective Communication protocols between the main local flood risk management stakeholders within Manchester to:

    - Ensure stakeholders are aware of their legal roles and responsibilities for flood risk management,
    - Warn communities of potential risk and engage with them in terms of managing risk and improving resilience,
    - Investigate floods that occur,
    - Coordinate responses to flood events,
    - Plan and coordinate investment,
    - Share information,
    - Enable flood incidents, or problems with flood defences or drainage infrastructure to be reported.
- Improving knowledge of drainage infrastructure within or affecting the city to identify priorities, help inform interventions, and thereby effectively manage risk.
- Developing an appropriate policy framework for local flood risk management to inform and direct the work of the Council as LLFA and other stakeholders, including a basis for prioritising interventions, and an up-to-date evidence base.
- Cooperating to maximise funding from all available sources to enable appropriate flood risk management interventions to be progressed, such as flood defence / drainage infrastructure capacity works at priority locations;
- Monitoring and maintaining flood defence / drainage infrastructure, including responsive maintenance to address problems as they arise;
- Engaging with the planning process to ensure flood risk is appropriately considered in new developments / landscaping.

3.7 Sources of local flooding will be discussed in Chapter 4 and the detailed approach to delivering the objectives is set out in the Risk Management Framework in Chapter 5. Linked to this will be the Action Plan, containing an updateable list of priority actions / schemes for local flood risk management and attached to the LFRMS.

Chapter 4 – Local Flood Risk

This chapter sets out the different types of local flood risk that the Council as Lead Local Flood Authority is responsible for leading the management of, together with known areas of risk in Manchester – although some caution is needed when viewing this information because of the limitations of flood risk modelling.

4.1. The Flood & Water Management Act 2010 (FWMA) Section 1 defines a 'Flood' as where land not normally covered by water becomes covered by water from either heavy rainfall; a river overflowing or breaching its banks; a dam overflowing or being breached; tidal waters; groundwater or anything else. However, the Act also specifies that a 'Flood' does not include a flood from any part of a sewerage system, unless wholly or partly caused by an increase in the volume of precipitation entering or otherwise affecting the system, or a flood caused by a burst water main. Within the parameters of a 'Flood' there are three categories of local flooding for which the Lead Local Flood Authority (LLFA) is responsible and which will be the focus of the Local Flood Risk Management Strategy (LFRMS); flooding from ordinary watercourses, flooding from groundwater, and flooding from surface water runoff.

Flood risk from Ordinary Watercourses

Non-Main Rivers

4.2. The Environment Agency (EA) has divided the North West of England into 13 catchments, which are distinct areas of land that collect precipitation and drain naturally into a single river system. There are two Catchments covering Manchester - the Irwell and the Upper Mersey. The Irwell Catchment covers parts of southern Lancashire and northern and eastern Greater Manchester, and includes the City Centre, much of Central Manchester and all of East and North Manchester. The Upper Mersey Catchment covers north eastern Cheshire and southern Greater Manchester, and includes the remainder of Central Manchester and all of South Manchester, Wythenshawe and the Airport.

4.3. Both Catchments contain Main Rivers such as the Irwell, Irk, Medlock, and Mersey, as well as many smaller Non-Main Rivers which generally drain into them. Many of these watercourses, and particularly the Non-Main Rivers, are culverted or partly culverted, which can cause further complications in assessing and managing risk. For example, if a culvert becomes blocked with debris, or collapses, the water would flood out, so regular inspections and consequent maintenance works are an important way of managing the risk from culverts, linked to the Council's Asset Register.

4.4. Flooding from ordinary watercourses includes flooding from any watercourse that does not form part of a main river, as defined by the Water Resources Act 1991 and therefore includes canals - the Ashton, Bridgewater and Rochdale canals pass through Manchester, ponds and small reservoirs (estimated capacity of less than 10,000sqm), drainage ditches and all non-main rivers. Main rivers are generally larger watercourses, such as the River Mersey, however, within Manchester a number of smaller watercourses are also classified as main rivers, whilst the River Irwell in the City Centre is an ordinary watercourse.

4.5. There are approximately 143 km of non-main rivers across the City, and some 93 km are underground ('hidden' watercourses). The function and flood risk from these 'hidden' watercourses is much less understood than the flooding from surface watercourses. There are several hundred inlet/outlet structures along these watercourses that if not properly maintained to allow free flow of water, could pose significant flood risk to adjacent areas. Figure 1A shows an inlet in good condition where water can flow without obstructions, and Figure 1B shows an inlet that has become blocked with debris over time.

Figure 1A: Example of inlet structures for ordinary watercourses in Manchester (Good condition)

Figure 1B: Example of inlet structures for ordinary watercourses in Manchester (Bad condition)

4.6 Figure 2 shows the River Irwell / Ship Canal and River Mersey along with their tributaries within Manchester. Many of these rivers connect with neighbouring districts, and it is important to recognise that activities in other districts can have a bearing on flood risk in Manchester and vice versa.

4.7 Both Catchments eventually drain into the Irish Sea via the Manchester Ship Canal which was created in the late nineteenth century by canalising stretches of the Lower Irwell and Mersey, to allow large ships to dock in Manchester City Centre. Although named as a canal, the Ship Canal is actually a 'canalised' river and hence its flooding mechanisms have more in common with a river than a typical canal. However, the situation is more complicated than for a conventional river with water levels in the canal carefully monitored and controlled by a system of sluices by the Manchester Ship Canal Company, which is the Navigation Authority for the watercourse and owned by Peel Holdings.

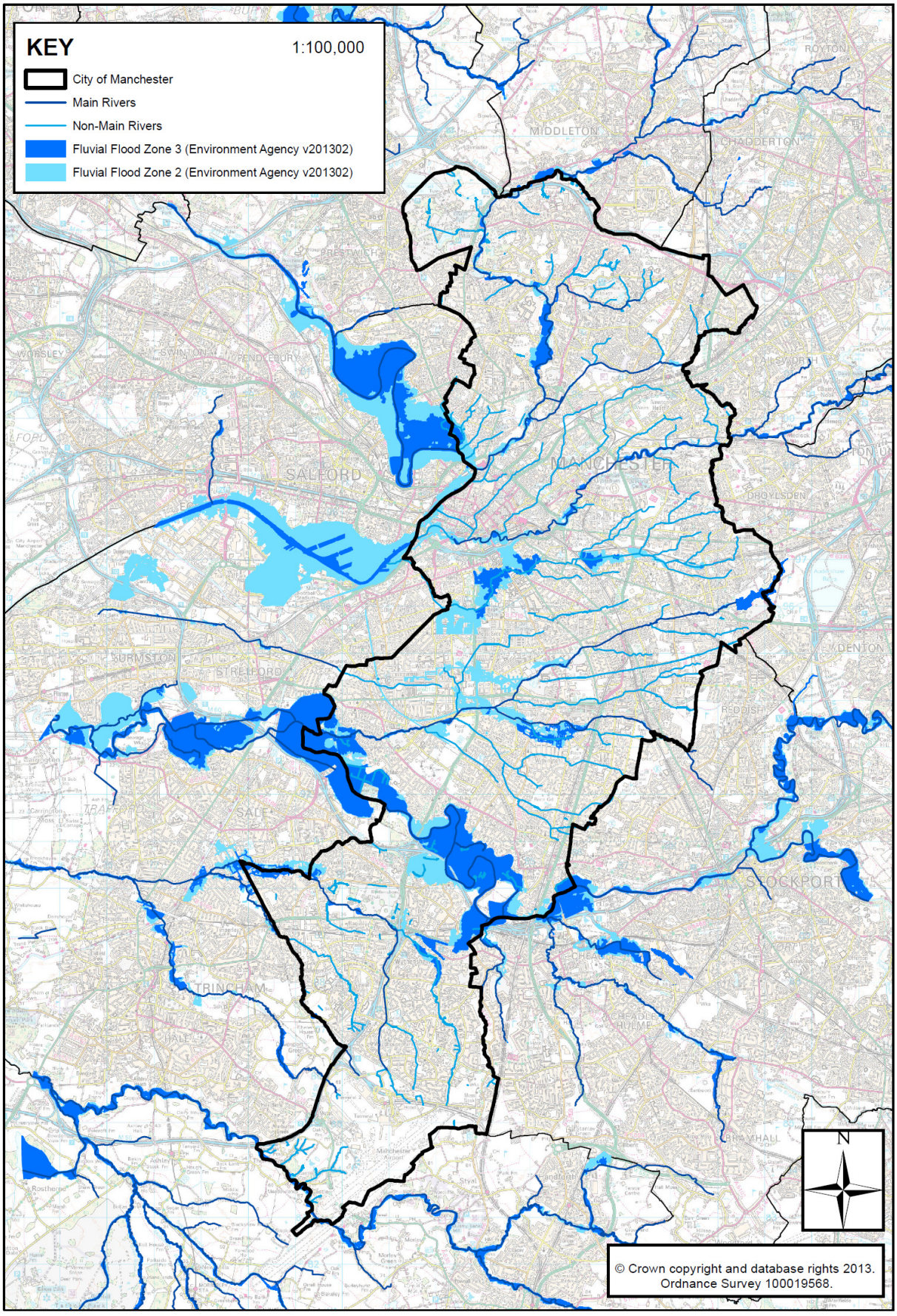

Figure 2: Rivers

4.8 The EA's on-line flood map shows modelled flood risk from a range of different sources affecting Manchester, including main rivers and some non-main rivers; this is the most up-to-date information on modelled risk from rivers and other sources and is available to view on the EA website. The EA's flood map shows areas predicted to have a greater than 1% chance (Flood Zone 3, High Probability) and a 0.1% to 1% chance (Flood Zone 2, Medium Probability) of flooding from main rivers (and some non-main rivers) in any given year. The EA do warn that the Flood Map should be seen as a guide only - it is not intended to be accurate at the individual property level.

4.9 The Environment Agency have modelled flood risk from the 'Grey' Irwell as it passes through the City Centre in Manchester, as part of the modelling of the Ship Canal, recognising that functionally it is the same watercourse. This has produced flood zones showing the extent of modelled risk. Corn Brook, which flows westwards into the Ship Canal to the immediate south of the City Centre, has also been modelled by the Environment Agency and the modelled flood zones show a considerable risk of flooding during severe storms,. Most Non-Main Rivers in Manchester have not been modelled in this way, so there is currently a significant data gap in this respect.

4.10 A 2012 High Court Judgement regarding the status of the sluice gates on the Manchester Ship Canal concluded that the sluice gates that are used to control the water levels should not be regarded as formal flood defences. The Flood Map has been updated to reflect this situation, although this issue does not affect land in Manchester and is referenced for context only.

Canals

4.11 In addition to the Manchester Ship Canal, which is classed as an ordinary watercourse and a small part of which is within Manchester, there are three more conventional broad canals within the City. The Ashton Canal, Bridgewater Canal and Rochdale Canal were initially built to serve some of the growing industrial centres of the North during the Industrial Revolution. They are fairly shallow canals that have raised embankments in places and today are mainly used for tourism. The Ashton Canal extends eastwards into Tameside, whilst the Rochdale Canal extends north-eastwards into Oldham, Rochdale and West Yorkshire. Both canals converge in the City Centre, before the Rochdale continues until it converges with the Bridgewater Canal in Castlefield Basin; the Bridgewater Canal extends south-westwards into Trafford, although there is also an interaction with the (Main River) Medlock. The Ashton Canal and Rochdale Canal are both owned by the Canal and River Trust, which is also the statutory Navigation Authority for both watercourses; the Bridgewater Canal is run by the Bridgewater Canal Company (owned by Peel Holdings) which is also the statutory Navigation Authority for the canal. Under the Flood & Water Management Act 2010, Navigation Authorities do not have a flood risk management function, although they do have a statutory function to maintain their canal for

navigation, which seems to overlap with local flood risk management functions of the LLFA.

4.12 Part of the Rochdale Canal close to Manchester has been designated as a Special Area of Conservation (SAC), because it contains a significant population of floating water-plantain (*Luronium natans)* in a botanically diverse waterplant community which also holds a wide range of pondweeds. The canal has predominantly mesotrophic water and this population of *Luronium* is representative of the formerly more widespread canal populations of north-west England, although the Rochdale Canal supports unusually dense populations of the plant. The conservation objective for the European interest of the SAC is to maintain, in favourable condition, the habitats for the population of Floating water-plantain (*Luronium natans*).

4.13 A number of factors may adversely affect the SAC some of which are related to flooding or flood risk management works. Reducing flood risk can help improve the SAC by reducing pollution into the Rochdale Canal from surrounding land and drainage infrastructure (surface water runoff), and by maintaining the canal within its channel, however, flood risk management works need to be carefully considered to ensure they do not adversely affect the SAC. Works to the Canal and the land immediately adjoining it, including planting, will, in particular, require careful consideration in terms of potential adverse impacts on the SAC.

4.14 The broad canals do not pose a direct flood risk as they are controlled water bodies with regulated flows however the Manchester Salford Trafford Hybrid Strategic Flood Risk Assessment (SFRA) considered the residual flood risk from overtopping and bank breaches. The probability of overtopping or a breach occurring is considered to be low, primarily due to the monitoring and maintenance activities of the Navigation Authorities, but should a flood event occur the consequences could be significant, particularly for a breach. All three canals are felt to be at some risk of overtopping as a result of high inflows exceeding the canal capacity during storm events, particularly the Bridgewater Canal because of the interaction with the river Medlock and the Rochdale Canal. An overtopping risk to the Ashton Canal from a blockage of the bywash at Ancoats was also identified, whilst potential breach locations were identified based upon the geography of areas, including the raised embankment of the Rochdale Canal at Miles Platting, and from a breach in Oldham which would affect land in Manchester.

4.15 The residual risk map for canal flooding (Figure 3), whilst the best available modelled risk information currently available, does have limitations and caution is needed in the use of this information.

Ponds and Small Reservoirs

4.16 The final grouping of ordinary watercourses for which the LLFA is responsible for leading the management of risk from is ponds and small reservoirs. The Environment Agency are responsible for leading on flood risk management from reservoirs over 25,000 cubic metres in capacity, and this will increase to all reservoirs over 10,000 cubic metres in capacity once the Flood & Water Management Act 2010 is fully commenced. LLFAs are responsible for leading flood risk management from the remaining small reservoirs and ponds, in conjunction with the owners of the reservoirs. The overall responsibility for carrying out work to manage reservoir safety lies with the reservoir owner/operator who should produce a flood plan. As Manchester City Council owns a number of these reservoirs, plans will be put in place to establish flood risks for each reservoir and devise inspection and maintenance regimes based on flood risk.

4.17 Like the broad canals the risk of flooding from ponds and small reservoirs is residual from overtopping or bank breaches. The probability of overtopping or a breach occurring following intense or extended periods of heavy rain is considered to be generally low, with regular inspections of banks and associated drainage infrastructure and appropriate maintenance work. The main ponds and reservoirs that are within Manchester are also presented in Figure 3, the larger ones are not the Council's responsibility in terms of flood risk management.

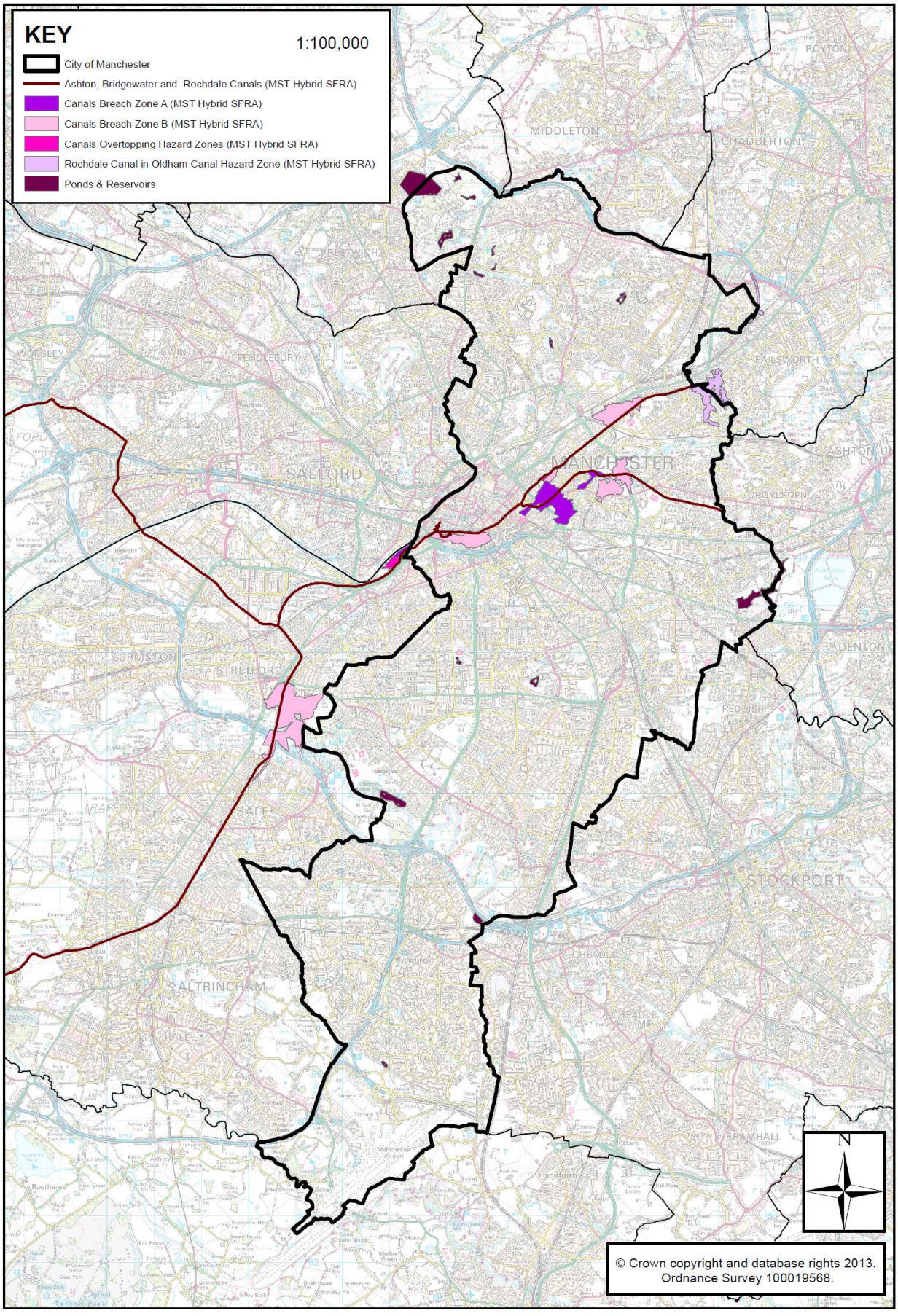

Figure 3: Canals, Ponds and Reservoirs

Flood risk from Groundwater

4.18 Groundwater means all water which is below the surface of the ground and in direct contact with the ground or subsoil; groundwater flooding occurs when the ground becomes saturated with water, often after extended periods of heavy rain, and often interacting with other sources of flooding. Groundwater flooding can be affected by a range of factors, including geology, surface covering, topography, and the presence of former coal mines. Further information on groundwater flooding is available in the hybrid Strategic Flood Risk Assessment (SFRA) on the Council's website and on the EA's website and the cross-boundary geological features, including aquifers linked to groundwater are shown on Figure 4, along with the Areas Susceptible to Groundwater Flooding. Further work to establish the extent of groundwater risk, including reported incidents and interactions with other sources would be helpful to future risk management; however, groundwater flood risk is difficult to map with accuracy and understanding interactions with other sources of flooding below the surface of the ground is not straightforward. Recorded groundwater flooding incidents can be helpful in gauging the accuracy of risk mapping, which without ground-truthing should be treated with some caution.

4.19 Flooding from groundwater can occur in areas within certain types of geology when the water table rises to the surface. This can vary seasonally with rainfall, or with abstraction, and unlike fluvial flooding or surface water runoff, its effects are often not immediately manifest, and can last for extended periods of time, typically weeks or months rather than hours or days. Groundwater flooding does not generally pose a significant risk to life due to the slow rate at which the water level rises; however, it can cause significant damage to property, especially in urban areas where water can rise up through basements and ground floors. The Environment Agency has also produced some guidance for properties that may be at modelled groundwater risk, and how they can be made more resilient.

4.20 The EA has identified areas at potential risk of groundwater flooding – the Areas Susceptible to Groundwater Flooding, however this is a very broad-scale approach based largely on geology. The detailed mapping of groundwater flood risk is very complex, but the Manchester Salford Trafford Hybrid SFRA has attempted to refine the risk within the City to some extent, based on the best available information at the time it was produced. The information in the Hybrid SFRA should not however be viewed as fully comprehensive due to the nature of groundwater flooding and there are potentially additional areas of risk within the City.

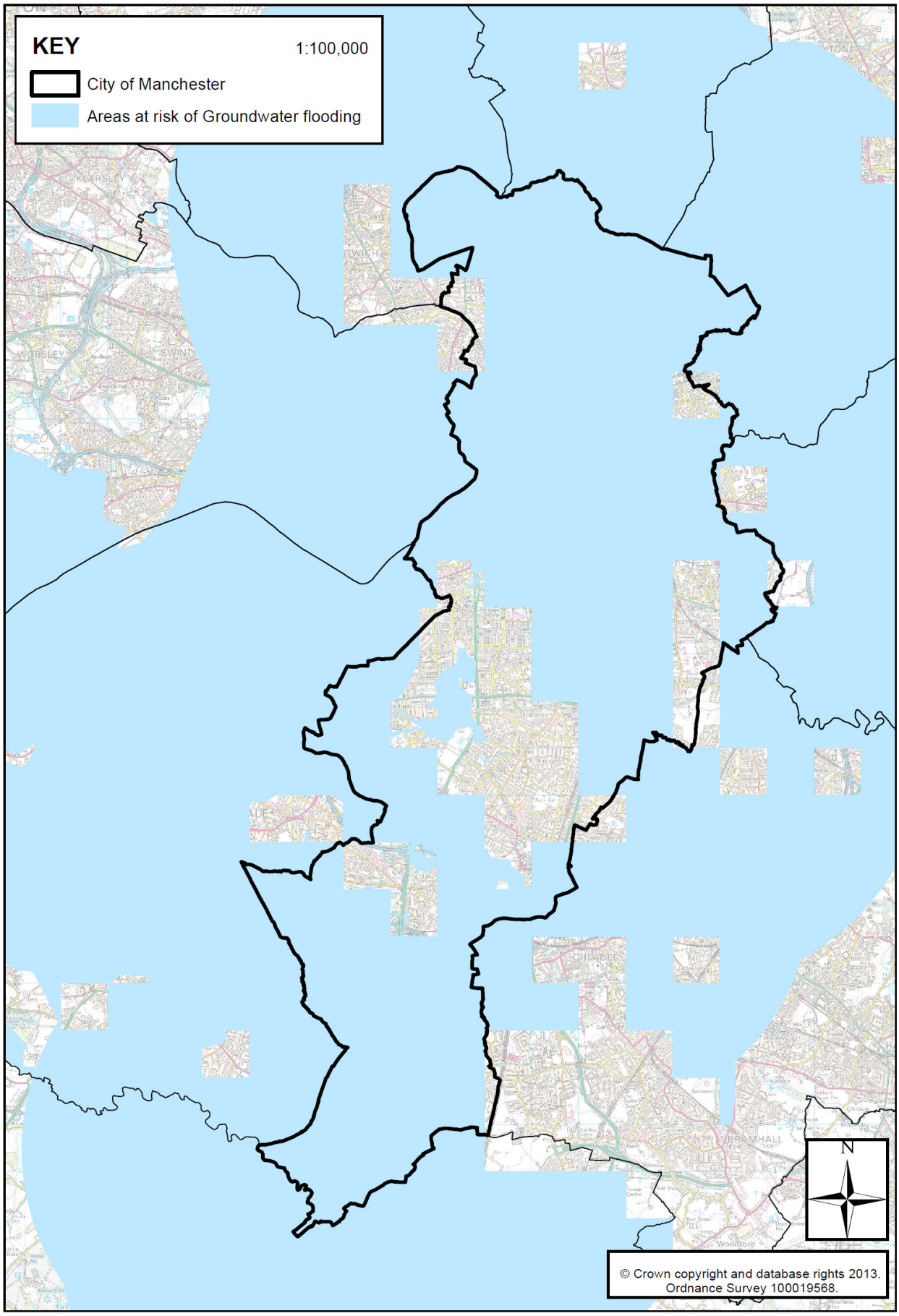

Figure 4: Groundwater

4.21 The SFRA includes information from a number of different sources, Environment Agency potential groundwater rebound areas, groundwater emergence maps produced by the Department for the Environment, Food and Rural Affairs (DEFRA), data from the Coal Authority and drift geology mapping from the British Geological Survey. The likelihood of groundwater flooding occurring in Manchester is considered to be generally low however the increasing use of infiltration Sustainable Drainage Systems (SuDS) may have the potential to increase groundwater flood risk locally, so careful consideration and design will be needed.

Flood risk from Surface Water Runoff

4.22 Surface water runoff occurs when rainwater (including snow and other precipitation) which is on the surface of the ground and has not entered a watercourse, drainage system or public sewer. Surface water flooding occurs when precipitation is unable to drain away and begins to pool on the surface, often in topographic low-spots, or during / after high intensity storms. Surface water drainage infrastructure is complex and consists of many elements with different jurisdiction. Simple drains that evacuate surface water from one property are responsibility of the riparian owner. Public surface water, foul and combined sewers draining more than one property are the responsibility of United Utilities. Surface water drains and gullies on the motorways are the responsibility of the Highways Agency (HA). There are several thousand km of highway drains across Manchester and in excess of 100,000 highway gullies that could be blocked during these storms that are the responsibility of the Local Highway Authority (LHA). All these sources of flooding could be combined with flooding from rivers, canals, ordinary watercourses or flooding due to high groundwater that adds to the complexity of the problem.

4.23 It is important to emphasise that surface water runoff flooding is amongst the most difficult type of flooding to accurately model. Almost all modelled predictive risk (including the EA's surface water flood maps, and the strategic surface water flood map in the Greater Manchester Surface Water Management Plan (SWMP) makes assumptions about surface drainage rates which may or may not be accurate. This is because the actual capacity of and interactions between different surface water systems is usually difficult to establish, due to fragmented ownership and a lack of comprehensive records about capacity, condition and connections. As a result, a blockage in one part of the system may have unforeseen consequences beyond the immediate area or no noticeable effect at all – and none of this will be evident until a sufficiently intense or lengthy storm occurs. Improving understanding of surface water drainage infrastructure capacity and connectivity and establishing responsibilities and appropriate communication maintenance regimes should enable the surface water drainage system to operate effectively going forward, and highlight areas where, during extreme weather events, further capacity or alternative means of managing surface water would be necessary to manage flood risk.

4.24 Flooding from surface water occurs where rainwater is unable to drain away sufficiently quickly and begins to pool on the surface, or flow overland. Generally, topographic low spots are more prone to surface water ponding, whilst surface water overland flows can occur anywhere there is a gradient. Trees and water-permeable surfaces such as soil, grass, or gravel can help reduce surface water accumulation and runoff, whilst impermeable surfaces, such as tarmac or concrete can exacerbate the issue. Insufficient capacity, or blockages to drainage infrastructure including sewers and highway drains, can also result in surface water flooding, or worsen the effects.

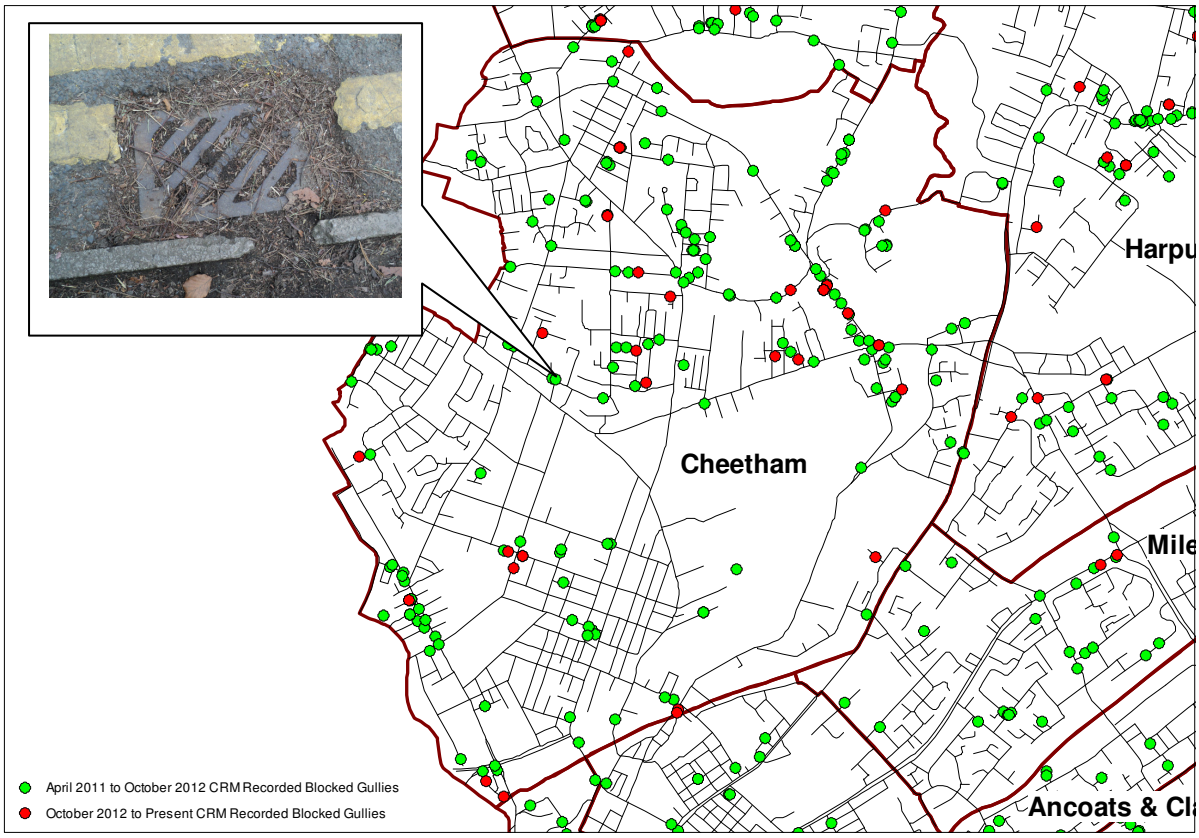

Figure 5: Excerpt of the map of blocked gullies reported in period of 12 months

4.25 Flooding from blocked sewers / highway drains is the responsibility of United Utilities / the Highway Authority respectively, except where the flooding is wholly or partly caused by precipitation entering or affecting the drainage systems, in which case the LLFA is also involved. Under Section 11 of the Flood and Water Management Act 2010, the Highway Authority when undertaking a flood risk management function should act in a manner consistent with the LFRMS, and have regard to it in undertaking any other function that may affect flood risk; United Utilities is required to have regard to the LFRMS in undertaking any flood risk management actions or other actions that may affect flood risk.

4.26 Information on surface water flooding is available within the hybrid SFRA on the Council's website, and through the strategic surface water flood map within the Greater Manchester Surface Water Management Plan (SWMP), extracts from which showing the predicted effects of 1 in 30 year and 1 in 200 year storms are provided in Figures 6A and 6B. The EA provide two modelled sources of surface water runoff information – the Areas Susceptible to Surface Water Flooding maps, and the Flood Map for Surface Water, which has recently been updated; both have strengths and weaknesses and cover a range of storm scenarios and flood depths.

4.27 The Flood Map for Surface Water on the EA's website provides the best available information on surface water flood risk in Manchester at the present time. Figures 6A and 6B (below) are taken from the SWMP which informed the December 2013 update to the Flood Map for Surface Water, and are consequently a fair, point-in-time reflection of risk in Manchester. The Flood Map for Surface Water, whilst the best available modelled risk information, does include significant assumptions about drainage, and the complexity of, and knowledge gaps with, Manchester's drainage infrastructure, and the propensity for this to change over time, means that caution is needed in the use of this information, particularly without ground-truthing. This caution also applies to Figures 6A and 6B.

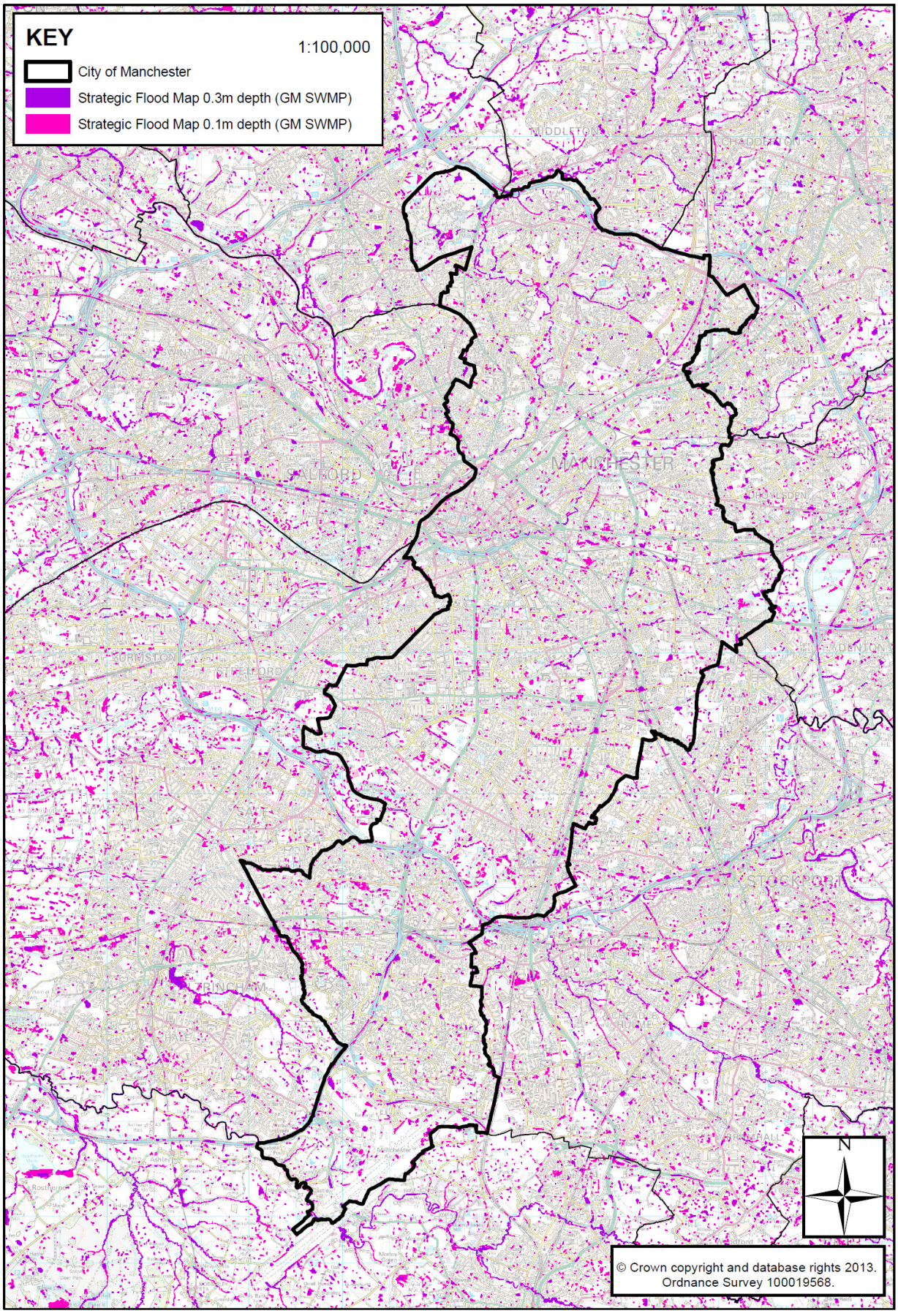

Figure 6A: Surface Water Runoff from 1:30 year storm

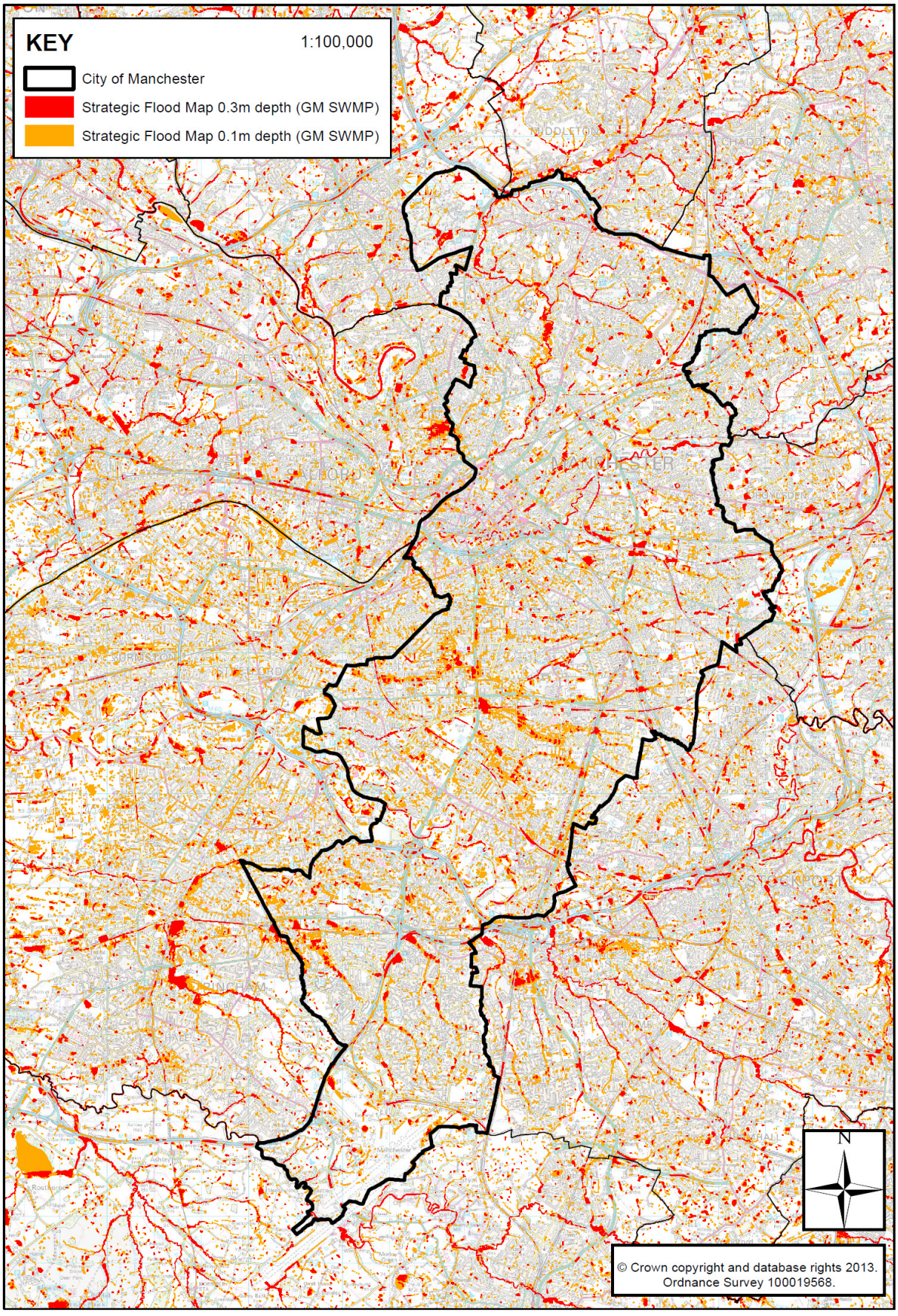

Figure 6B: Surface Water Runoff from a 1:200 year storm

Chapter 5 - Risk Management Framework

This chapter sets out the approach managing the identified local flood risks in Manchester, including the local flood risk management policies linked to updateable actions.

5.1 There are many options for managing risk ranging from improving awareness and knowledge, establishing effective communication mechanisms between stakeholders, developing flood warning systems, maintaining relevant infrastructure, providing new infrastructure and improving resilience; there are also a number of different sources of funding, most of which require some form of partnership working.

5.2 The overall approach to managing flood risk from ordinary watercourses, surface water and groundwater will be risk-based and proportionate, and will involve improving understanding of flood risk including through modelling and the recording of flood incidents, maintaining the drainage infrastructure of the City, bidding for funds to progress flood risk management interventions in partnership with stakeholders and communities and publicising risk and what people can do to help manage this risk for themselves. Opportunities to enhance the environment and contribute to broader sustainability objectives will be pursued as an integral part of the approach, and harm to designated environmental locations, including the Rochdale Canal Special Area of Conservation (SAC) in Oldham, will be avoided.

Managing Flooding Risk from Non–Main Rivers

5.3 As mentioned earlier, it is not technically, economically or environmentally feasible to completely prevent flooding. The Council has created an Asset Register that maps all ordinary watercourses within the City. Alignment and condition of many 'hidden' watercourses are still unknown that would require further investigation. Information on all inlet/outlet structures is being recorded and a risk based approach will be applied to assess maintenance and upgrade of these structures taking into account the size and complexity of risk. The assessment will identify where the highest risks are and the priorities for taking actions within the available budget.

5.4 The connections between many of the smaller culverted watercourses and the sewer network / highway gullies are not fully understood, largely because of different ownerships, works to the culverts being undertaken on a piecemeal basis, and records being lost over time. The drainage 'infrastructure' for Manchester is essential to managing flood risk and engagement between the main local flood risk management stakeholders and the riparian landowners for Main and Non-Main rivers will be important to help ensure that it continues to function properly.

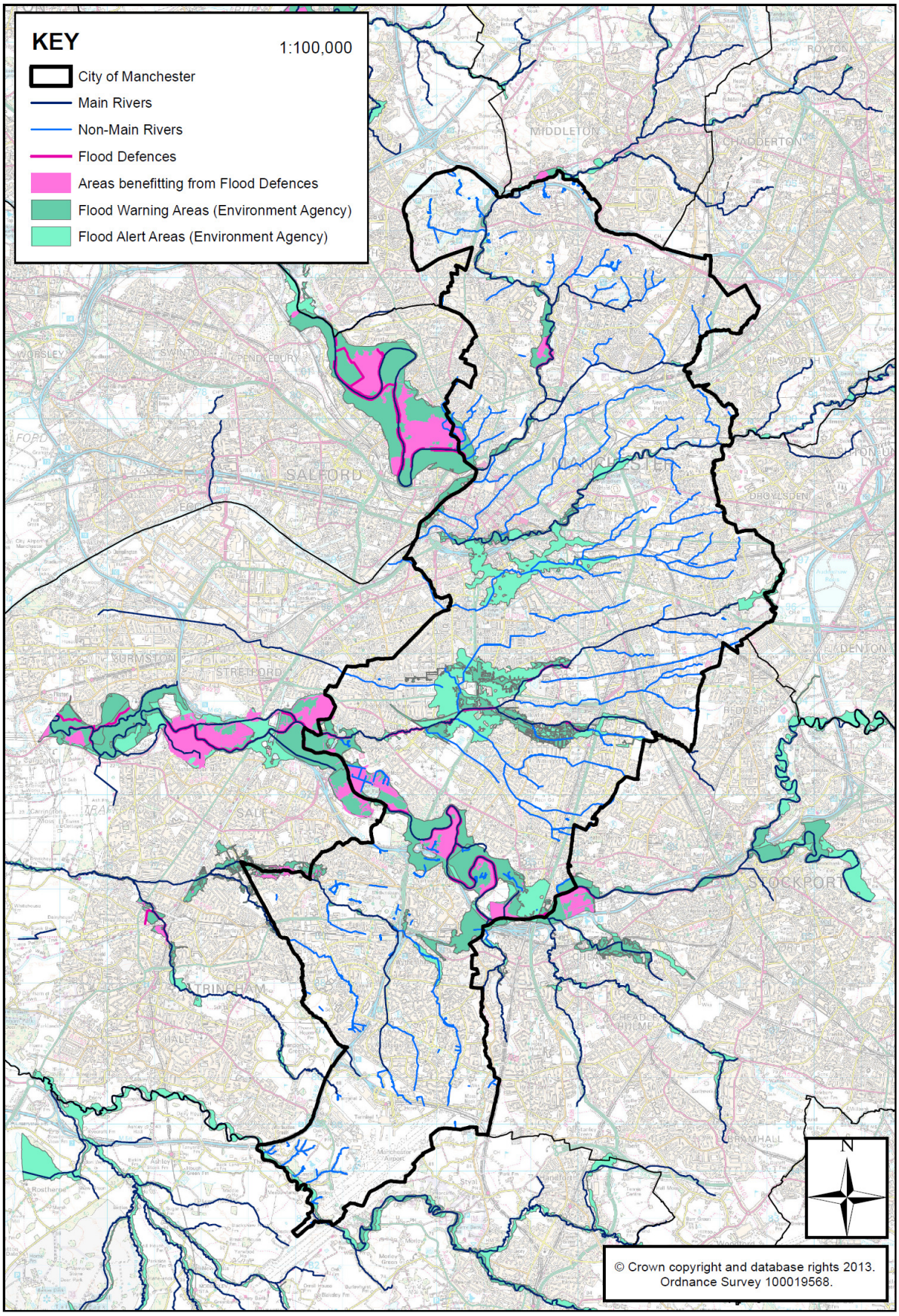

Figure 7 – Environment Agency Flood Risk Management measures

5.5 Building upon the overall approach set out in paragraph 5.2, the approach to managing flood risk from non-main rivers will look to:

- Develop a better understanding of how non-main rivers, sewers, highway gullies and other drains function together, and how these can be efficiently inspected and maintained.
- Develop a better understanding of the consequences of different storms for non-main rivers within Manchester, including the implications of potential channel or culvert blockages. This will supplement the information that the Environment Agency provide in terms of fluvial flood zones and warning / alert areas, and will help inform future flood risk management interventions.
- Provide information about flood risk from non-main rivers and what people and businesses can do to manage this risk themselves, including measures to make their properties more resilient to flooding.

5.6 For illustrative purposes, Figure 7 shows the various Flood Warning and Flood Alert Areas within Manchester, together with flood defences and the areas benefitting from these defences. These generally relate to Main River flooding, although some Non-Main rivers, including Corn Brook and the Grey Irwell are included.

Managing Flood Risk from Canals, Ponds and Small Reservoirs

5.7 Broad canals (the Ashton Canal, the Bridgewater Canal and the Rochdale Canal) do not pose a direct flood risk as they are controlled water bodies with regulated flows. The Manchester Salford Trafford Hybrid Strategic Flood Risk Assessment (SFRA) considered the residual flood risk from overtopping and bank breaches, which are shown in Figure 3. The probability of overtopping or a breach occurring is considered to be low, primarily due to the monitoring and maintenance activities of the Navigation Authorities, but should a flood event occur the consequences could be significant, particularly for a breach. The Hybrid SFRA assessment did not involve a detailed assessment of the condition of the broad canals and associated infrastructure and so the level of confidence in this information will be limited.

5.8 Ponds or small reservoirs that fall within the definition of ordinary watercourses are also the responsibility of the Lead Local Flood Authority (LLFA) although the risk of such flooding is residual from overtopping or bank breaches. The probability of overtopping or a breach occurring following intense or extended periods of heavy rain is considered to be generally low, with regular inspections of banks and associated drainage infrastructure and appropriate maintenance work.

5.9 Building upon the overall approach set out in paragraph 5.2, the approach to managing flood risk from canals, ponds and small reservoirs will look to:

- Develop a better understanding of the condition of the canals and their infrastructure to provide context to the breach and overtopping modelling outputs and identify risk areas.
- Develop a better understanding of how the Navigation Authorities will fulfil their statutory duty to manage and maintain their canals as navigable waterways, including responding to breaches and overtopping.
- Work with Navigation Authorities and other land owners to manage the residual risk from canals, ponds and small reservoirs, including through regular inspections of assets, and provide information about residual flood risk from canals, ponds and small reservoirs and what people and businesses can do to help manage this residual risk themselves.
- Avoid any harmful effects of flood risk management schemes on the Rochdale Canal Special Area of Conservation (SAC) in Oldham.

Managing Flood Risk from Groundwater

5.10 There are not extensive records of historical flooding from groundwater in Manchester. In recent years, there has been an increased number of flooding incidents recorded with groundwater and springs as primary source of flooding, especially in the areas where no groundwater flooding has been recorded previously. This could be linked with increased rainfall events due to climate change. Further work to establish where there is a spatial risk of groundwater flooding in the City should be undertaken.

5.11 Building upon the approach set out in paragraph 5.2, the approach to managing flood risk from groundwater will look to:

- Develop a better understanding of groundwater issues and any interactions with other sources of flooding and Sustainable Drainage Systems (SuDS).
- Provide information about groundwater flood risk and what people and businesses can do to help manage this risk themselves. Individual property owners can make their properties more resilient to groundwater, such as by installing pumps to manage water levels, or 'tanking' basements to prevent water rising up into the property. The Environment Agency (EA) and National Flood Forum (NFF) provide useful information and guidance on groundwater flooding.
- Bid for funds to manage risk or improve resilience in priority locations, based on modelled predicted risk and historical flooding events and in collaboration with affected communities. Due to the scale of groundwater flood risk and the resources available, providing LLFA funding or bidding for funds for individual properties is unlikely to be a priority.

Managing Flood Risk from Surface Water Runoff

5.12 The extent, frequency, impact and management of flood risk from surface water is relatively poorly understood, and one of the main reasons for this uncertainty is the

complexity of the drainage infrastructure, particularly in an urban area, and the lack of a comprehensive understanding of how it functions together. This can mean that a blockage or a capacity issue in one part of the system may have far-reaching consequences for other areas, even ones seemingly unconnected; the situation can also be exacerbated by the often localised nature of intense storms. Sewers, highway drains and culverted watercourses are usually in different ownerships but may have become linked over time, although there may not be accurate records to show this. As a result, most modelling, including the EA national datasets and the Greater Manchester Surface Water Management Plan (SWMP) include assumptions for how much surface water can be expected to drain away, rather than actual drainage rates. Of course, even if the actual capacity of all drainage infrastructure was known instead of using assumed drainage rates, the system could still be overloaded by a storm of sufficient duration and intensity, and blockages would also affect the operation of the system.

5.13 The EA has produced a number of different surface water models; the Areas Susceptible to Surface Water Flooding (AStSWF) maps and the Flood Map for Surface Water (FMfSW) are both primarily based on terrain modelling to identify low-points where surface water runoff is likely to accumulate after different storm events. The Manchester Salford Trafford Hybrid SFRA uses the AStSWF maps whilst the more recent Greater Manchester SWMP Strategic Flood Map used the FMfSW, although this was then developed further with United Utilities and the Environment Agency in terms of the allowances for drainage. The Strategic Flood Map in the SWMP has helped to inform the updates to the Flood Map for Surface Water in terms of Greater Manchester, which fulfils the requirements of the Flood Risk Regulations 2009 (FRR) and is considered to be the best available modelled information currently available for surface water runoff in Manchester. However, the Flood Map for Surface Water does not contain actual drainage rates just assumed ones, so should be treated with some caution. A number of priority areas were identified through the SWMP process as a result of the strategic flood map and the presence of vulnerable receptors and this information will help inform future interventions together with more detailed local information and recorded flood incidents.

5.14 The Manchester Salford Trafford Hybrid SFRA identifies nearly the entire City as being within a Critical Drainage Area, whilst the SWMP identifies further areas at potential risk. Critical Drainage Areas are those identified from historical flood events and/or modelled data as having a significant risk from surface water flooding and include drainage catchments for the sewer network. The drainage infrastructure across the City changes over time as new developments are constructed, is in multiple ownerships and varying condition, and is complex by its very nature. In light of the existing Critical Drainage Areas in the SFRA and the widespread surface water flood risk, and with the agreement of the Environment Agency and other key stakeholders, establishing a Critical Drainage Area covering the whole of the City would be an effective means of managing surface water runoff going forward.

5.15 One of the ways that surface water runoff can be managed is by attenuating precipitation that falls, either through hard engineering – underground storage tanks for example – or through SuDS – which replicate natural features such as sumps, swales and ponds, or through the use of permeable paving or planting schemes, including rooftop planting. SuDS can also have wider benefits in terms of improving water quality and biodiversity. New developments are required by local Planning policy to minimise surface runoff and developing appropriate attenuation systems as part of schemes is one of the most effective ways of doing this. Given the presence of contaminated land in many parts of Manchester as a legacy of its industrial past, careful consideration of appropriate ways of managing surface water risk without spreading pollution will be needed.

5.16 In terms of SuDS, Schedule 3 of the Flood & Water Management Act 2010 (FWMA) introduces new procedures for approving drainage systems linked to construction work. The Government envisages that for developments that require planning permission, this process will run alongside the planning process, with upper-tier local authorities such as the Council becoming SuDS Approving Bodies (SABs); development that will have drainage implications will require SAB approval as well as planning permission. Where planning permission is not required, a stand alone process would be required. The detail of a number of significant aspects, such as what types of development the new approval procedures will apply to, or whether the introduction will be phased, and issues around standards, have not yet been finalised by the Government, although it is expected that the procedures will commence in April 2014.

5.17 The commencement of this part of the Act will end the automatic right for new developments to connect their drainage systems to the public sewers, which had been the historical paradigm for dealing with rainwater. Furthermore, once approved the SAB becomes responsible for the maintenance of the SuDS in perpetuity. The Government intends that the SAB will operate on a cost-recovery basis, and no additional funding has been identified in this respect. It is likely that the drainage engineers working for the LLFA would need to assess potential SuDS, although it is not yet clear what scope for negotiation with schemes there would be. The Government has consulted on potential national standards for SuDS, but to date no final standards have been produced.

5.18 The function of the SAB will be increasingly important in helping to manage surface water runoff going forward, and it will be important for the SAB and the LLFA to work well together, and with the Local Planning Authority where relevant. Once the Government has determined how the SuDS approval system will operate in practice, then appropriate governance and procedural arrangements can be developed in response and further guidance about the application of the LFRMS in this respect may be issued as a result.

5.19 There are no extensive records of historical flooding from surface water runoff in Manchester - the SWMP lists only five incidents between 1911 and 2012, all of which were in south Manchester and a number of which included interactions with

rivers. However, the recent alignment of drainage and highway functions has revealed that there are hundreds of cases of blocked highway gullies each year, some of which have resulted in properties being flooded. Incidents of surface water flooding will now be better recorded, and this will help inform future maintenance, and where necessary works to increase capacity or attenuation within the City's drainage system. Collaborative working on funding bids and aligning investment through partnership working will help to deliver more coherent benefits.

5.20 Building upon the approach set out in paragraph 5.2, the approach to managing flood risk from surface water will look to:

- Develop a better understanding of how Manchester's drainage infrastructure operates.
- Systematically record and investigate flooding incidents to gain better understanding of sources of flooding and collect evidence for future risk based assessments.
- Promote effective communication between relevant Risk Management Authorities (RMAs) in terms of drainage infrastructure and progress appropriate inspection and maintenance measures.
- Provide information about flood risk from surface water and what people and businesses can do to manage this risk themselves, including measures to make their properties more resilient to flooding.
- Bid for funds to reduce / manage risk or improve resilience in priority locations, based on modelled predicted risk and historical flooding events and in collaboration with affected communities. Encourage partnership funding with other RMAs.
- Engage with the Planning and SAB processes to minimise surface water runoff from new developments, including through the effective use of SuDS. Ensure that the overland flow routes have been incorporated into the development proposals that minimise flood risk to people and properties.
- Due to the scale of surface water flood risk and the resources available, providing LLFA funding or bidding for funds for individual properties is unlikely to be a priority.
- Avoid any harmful effects of flood risk management schemes on the Rochdale Canal Special Area of Conservation (SAC) in Oldham.

Flood Risk Management Policies

The following policies represent a framework through which local flood risk can be managed in Manchester. Certain LFRMS policies are, however, specific to the LLFA, whilst others are relevant to all RMAs within the Manchester. The statutory requirements for RMAs in terms of the LFRMS, set out in Section 11 of the Flood & Water Management Act 2010, are summarised in the table below:

RMA	*Act in a manner that is consistent with the National Flood & Coastal Erosion Risk Management Strategy, in exercising their flood risk management functions*	*Act in a manner that is consistent with Local Flood Risk Management Strategies, in exercising their flood risk management functions*	*Have regard to both the National and the Local Flood Risk Management Strategies, in exercising their flood risk management functions*	*Have regard to both the National and Local Flood Risk Management Strategies in undertaking any other function that may have a bearing on Local Flood Risk Management.*
EA	*Does not apply to writing the NFCERMS*	*Applies*	*Applies*	*Applies*
HA	*Applies*	*Applies*	*Applies*	*Applies*
LHA	*Applies*	*Applies*	*Applies*	*Applies*
LLFA	*Applies*	*Applies*	*Applies*	*Applies*
UU	*Applies*	*Does not Apply*	*Applies*	*Applies*

5.21 Section 9 (8) of the Flood & Water Management Act 2010, allows LLFAs to issue guidance about the application of their LFRMS and this will be used as appropriate to help support effective local flood risk management.

5.22 **LFRM Policy 1: Work to maintain and improve the local flood risk management evidence base will be undertaken to support both risk assessment and the prioritisation of future actions to manage risk, in line with the Aim and Objectives of the Local Flood Risk Management Strategy (LFRMS).**

The local flood risk management evidence base would include:

- Information about infrastructure, including ownership, capacity and condition, monitoring and maintenance, potentially linked to the Asset Register and Designated Features;
- Modelled flood risk information, including potential climate change scenarios;
- Information about local flood events;
- Information about works to ordinary watercourses;

A risk based and proportionate approach to local flood risk management requires an up-to-date and appropriately detailed evidence base that is readily accessible, including through GIS. Different stakeholders are responsible for different elements of the evidence base and information will be shared between partners as necessary. Opportunities for combined studies will be supported to improve the understanding of local flood risk management.

5.23 **LFRM Policy 2: Local Flood Risk Management interventions will seek to reduce the likelihood, severity and consequences of flooding from ordinary watercourses, ground water and surface water runoff. Interventions that**

reduce the risks to People, especially vulnerable people[1]; Residential Properties, particularly basement dwellings; and Critical Infrastructure[2] will be prioritised. Locations that have been subject to recorded incidents of local flooding will normally be prioritised over those areas where risk is just modelled.

Whilst every effort will be made to reduce local flood risk across the City, limited resources will require some prioritisation. Policy 2 sets out the broad parameters for prioritising interventions, although other factors[3] will also be pertinent to the process. Protecting commercial properties, built and cultural heritage, and the natural environment are also important, but with limited resources not everything can be a priority; in this context, individual properties are unlikely to be priorities. Contributory funding from beneficiaries can help make schemes deliverable however, it is important that public funding remains focused on areas of greatest risk.

5.24 **LFRM Policy 3: Local Flood Risk Management Authorities and other key stakeholders will work together to progress priority interventions that support the aim and objectives of the Local Flood Risk Management Strategy (LFRMS).**

Agreeing roles and responsibilities for flood risk management tasks within Manchester will be important, particularly given the complex and interconnected nature of drainage infrastructure and the apparent legislative overlap between LLFAs and Navigation Authorities in managing flood risk from canals. Cooperation is a cornerstone of the LFRMS, and through partnership working the key stakeholders will develop measures to align investment over time, and thereby more effectively manage local flood risk. Local Flood Risk Management Interventions can vary in scope considerably, and would include undertaking detailed investigations, modelling of flood risk, establishing warning / alert systems, designating features, or undertaking capital works to physically manage local flood risk. Sharing information and producing joint funding bids will also help to maximise available resources, and reduce flood risk from ordinary watercourses, groundwater and surface water runoff. The LFRMS Action Plan will include an updateable list of work including interventions.

5.25 **LFRM Policy 4: Monitor and maintain drainage infrastructure within Manchester to support the aim and objectives of the Local Flood Risk Management Strategy (LFRMS).**

Drainage infrastructure will only operate effectively if it is adequately maintained, and regular ongoing inspections linked to maintenance programmes are an essential part of managing local flood risk. United Utilities are responsible for the sewer network, the Highway Authorities are responsible for Highway drains and Navigation Authorities are responsible for the maintenance of their canal networks,

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[1] Such as elderly people, people with disabilities, or young children.
[2] Such as transport, utilites and facilities required in an emergency.
[3] Such as the type, scale, severity and frequency of flooding, the opportunities for joint working, political priorities, etc.

whilst Riparian Landowners are generally responsible for the maintenance of ordinary watercourses passing by or adjoining their land.

5.26 The LLFA, working in partnership with the key stakeholders, will help to develop effective inspection procedures linked to maintenance works for the key stakeholders, and will support collaborative working in relation to this going forward, however, it will be important for RMAs and other key stakeholders to maintain their parts of the drainage infrastructure of the city.

5.27 The implications of a growing population on infrastructure capacity will also be important to consider, and the LLFA can help facilitate effective sharing of information about new developments, to help inform future planning of infrastructure capacity investment within, or affecting, the city. Furthermore, a recognition that severe storm events are likely to increase in the future with climate change means that an effective drainage system will be a vital component in managing local flood risk. An effective approach to the maintenance of adopted SuDS will need to be developed by, or on behalf of, the SAB, and synergies with other maintenance programmes, such as for parks or highway drains should be considered.

5.28 **LFRM Policy 5: Promote awareness of local flood risk and ways that the risk can be managed by people and communities.**

Flooding can be an emotive subject, with the potential to severely affect people's lives and property and it is important that people are made aware of the risks they may be at and what they can do to manage this risk.

5.29 The LFRMS sets out the approach to communicating risk within the City, which will need to not only manage risk, but also manage expectations. The potential for climate change to increase local flood risk should also be communicated.

Understanding Risk

5.30 As referred to in Chapter 4, the most up-to-date information on modelled risk is available on-line, and the Council's web-site will direct residents and businesses to where this information can be accessed. This is generally modelled information, and it is important to recognise that people or businesses may not always be aware of the potential flood risk their property is at, for example if there has never been a flood whilst they have been there, or there is not an obvious source of flooding nearby, such as a river. It is important that people are aware of potential risk but also understand the severity and nature of the risk, the technical limitations that modelling has, and other factors that may affect whether a flood will occur. Understanding risk is essential to better prepare for and manage it.

5.31 The Government is clear that flood risk management should be proportionate and that it is not technically, economically or environmentally feasible to prevent flooding altogether. A risk-based management approach targets resources to those areas where they have greatest effect, but this may mean that not everywhere that is at potential risk will be addressed as quickly as residents or businesses may wish.

5.32 It should also be noted that the Insurance industry has access to all of the EA's datasets and other information in determining their property premiums; the modelled information referred to in the LFRMS should be known to the insurance industry.

Preparing for flooding

5.33 It is important to communicate to residents and businesses what can be done to prepare for flooding. Properties can be made more resilient to flooding, warning and alert systems can be established, and with effective maintenance of drainage and flood defence infrastructure and assets, and additional works (which eventual beneficiaries could contribute towards) the existing risk can be managed effectively.

5.34 A range of products are available to prevent water from entering properties, from barriers for doors and airbricks, to sewer pipe valves, to the 'tanking' of basements to prevent groundwater penetration; pumps can also be used to control groundwater levels beneath properties. It is important to understand the type of flood risk that properties face and the limitations and advantages of using property level resilience measures. The EA provides a wide range of information in this respect.

5.35 The EA operates a flood warning service throughout England. Using the best available technology, the EA monitors rainfall and river levels and uses this information to forecast the possibility of flooding. If flooding is forecast, one of three different warning types are issued:

- Flood Alert – Flooding is possible, be prepared. This is issued 2–48 hours in advance.
- Flood Warning – Flooding is expected, immediate action is required. This is issued 1/2–24 hours in advance.
- Severe Flood Warning – Severe flooding, a danger to life. This is issued when flooding poses a significant threat to life.

Within Manchester the service covers areas at risk of flooding from rivers and is available by a range of different means, including by subscribing to phone, text, email or fax alerts; by the flood warnings website; by calling Floodline (0845 988 1188); through the media; through RSS feeds; and, in some areas by Flood Wardens and Sirens / Loudhailers. The LLFA will work with the EA and others to see whether this service could prudently be expanded geographically or in scope.

5.36 Preparing a flood plan for what to do in the event of a flood warning being issued or a flood occurring is sensible and the EA offer guidance as to what this could involve for a person or for a community, including more vulnerable people. Information is available on their website.

Reporting Flooding

5.37 Communities should be encouraged to engage with the risk management authorities and others, such as by reporting flood incidents or blocked drains / watercourses, to help RMAs to respond to incidents before problems arise.

5.38 The Council's web-site will also provide information on who to contact should you become aware of a flood or drainage infrastructure problem in your area. This is important for two reasons, firstly, so that the immediate threat to people and property can be addressed by the relevant body, and secondly, by recording instances of flooding, the extent, depth, duration and cause, RMAs can build up a picture of actual flooding in addition to modelled risk. This can help inform future studies and investigations, maintenance investment and capital investment works and thereby improve how local flood risk is managed.

Managing Flood Risk

5.39 The main local flood risk management stakeholders will engage with residents and businesses and other stakeholders in managing local flood risk. In addition to the LFRMS which will be publicly available, additional information will be provided on the Council's website, including links to partner organisations, to help people better understand flood risk and plan and act accordingly.

5.40 In some areas local communities may wish to do more to manage the risk, or the Council or others may be considering investment in flood risk management works or activities. In such cases, and tailored to suit the circumstances, there will be appropriate engagement between all affected stakeholders.

5.41 Understanding flood risk is a prerequisite for its effective management and this extends to the actions of individual property owners. Riparian landowners should understand their responsibilities to maintain their watercourses and avoid obstructing the flow; the benefits of SuDS and the adverse consequences of creating impermeable surfaces should also be communicated to property owners to help inform their actions. Taken together, many small scale actions can add up to significant benefits.

<u>LFRM Policy 6</u>: Ensure that local flood risk is properly considered for new development proposals.

5.42 Development is regulated through the Planning system and by formally consulting the LLFA on new planning applications[4], local flood risk issues can be considered at an appropriate stage. The Local Planning Authority already consults the EA,

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[4] Type and spatial area to be determined, as well as information required – e.g. FRA – linked to what the NPPF states (footnote 20, Paragraph 103, NPPF).

United Utilities, the Highway Authorities, and Navigation Authorities on certain categories of development in certain areas, so extending this to the LLFA seems both sensible and achievable. The National Planning Policy Framework and its Technical Guidance contains a considerable amount of information on flood risk, including guidance for when a site specific flood risk assessment (FRA) would be required to accompany a planning application; in many cases FRAs will assist the LLFA in commenting on a development proposal. Guidance about the interactions between the LLFA and the Planning and SAB processes will be issued as required once details of the commencement are known.

5.43 The LLFA will seek to reduce the risk of flooding to new and existing properties through its comments on new developments. Addressing flood risk is an established part of the Local Planning Authority's work and the LLFA will support this, thereby enabling new developments to progress safely, whilst helping to reduce risks to existing properties. The comments of the other RMAs will also be important in assessing the impact of new developments on local flood risk, given the inter-connected nature of drainage infrastructure.

5.44 One of the most effective ways of reducing local flood risk through the planning process is by minimising surface water run-off rates from new developments, and considering this at an early stage in the process should help the development of effective solutions. The local planning authority and developers may therefore want to discuss development or landscaping schemes with the LLFA prior to the submission of a planning application.

5.45 Critical Drainage Areas are those where the risk of surface water flooding is significant. The Manchester Salford Trafford Hybrid SFRA identifies Critical Drainage Areas covering nearly the entire City, whilst the GM SWMP strategic flood map has identified further areas of modelled risk in areas that were not included in the SFRA. In light of this, and the LLFA's lead role in managing surface water flood risk, it is proposed that the whole of the City is now classified as a Critical Drainage Area. This precautionary approach will regularise the current anomalous situation and help to manage surface water flood risk more effectively going forward, by ensuring that all planning applications will need to consider drainage implications, consistent with the National Planning Policy Framework. It is also recognised that this should be proportionate to the scale of the development.

5.46 Within Critical Drainage Areas, and consistent with Core Strategy policy EN14 Flood Risk, developers should aim to *minimise* surface water runoff from developments, and achieve *at least* the following runoff rates:

- Greenfield runoff on Greenfield sites up to a 1 in 100 year storm event, including consideration of climate change
- A 50% runoff rate reduction for Brownfield sites, with an aim of reducing runoff to Greenfield rates up to a 1 in 100 year storm event, including consideration of climate change

These are not local Sustainable Drainage System (SuDS) standards but adopted planning policy, provided because of the overlapping nature of Planning and SuDS Approving Body processes.

5.47 Surface water runoff rates can be reduced by a range of measures, both conventional engineering and Sustainable Drainage Systems (SuDS); and the relationship between the SAB and the LLFA will be important in this regard once this aspect of the FWMA commences. The presence of contaminated land within Manchester, as a result of its industrial past means that careful consideration of attenuation mechanisms will be needed.

5.48 **LFRM Policy 7: Ensure that the Lead Local Flood Authority (LLFA) responds to appropriate consultation exercises on matters affecting local flood risk management.**

A wide range of documents or works programmes that have a bearing on local flood risk management may be subject to consultations, including national and local government policy and strategy documents, business investment plans, and environmental improvement projects and programmes. Working with key stakeholders and with neighbouring local authorities, particularly at a Greater Manchester level, responding to consultations can help shape relevant policies, strategies and work programmes.

5.49 **LFRM Policy 8: Ensure that the Lead Local Flood Authority (LLFA) investigates and reports on flood incidents appropriately.**

Section 19 of the FWMA requires the LLFA, so far as it considers necessary or appropriate, to investigate when a flood incident occurs in its area, establish which Risk Management Authority has responsibility and whether they have, or intend to, exercise their risk management functions in respect of the flood. In addition to flooding from ordinary watercourses, groundwater, or surface water runoff, in this context a flood would also include a flood from main rivers and reservoirs, but would not include a flood from the sewerage system, unless wholly or partly caused by an increase in the volume of precipitation entering or otherwise affecting the system, or a flood caused by a burst water main, which would be the responsibility of United Utilities.

5.50 There is considerable discretion in terms of when the LLFA should undertake this function, and as a result, the Council as LLFA, working with the other 9 Greater Manchester Councils through the Association of Greater Manchester Authorities (AGMA), has developed a process for helping determine when and how to investigate and report on floods. Where a flood has resulted in:

- Internal property flooding - residential/commercial
- Economic disruption
- Risk to life or public health
- Critical services, infrastructure or installations being affected

- Flood defence measures being deployed.
- Recurring flooding incidents

then it is considered to be a 'significant' flood that requires investigation under Section 19 of the FWMA. A flood that has only affected non-priority highways, or parks, gardens or open space and which poses no threat to life or public health is not considered to automatically require further investigation / reporting.

5.51 The 'AGMA Policy for Investigating Floods' is not a conventional policy as such, provides practical assistance to the LLFA in terms of Section 19 of the Act. In addition to the criteria listed above, the LLFA will generally investigate any local flood risk incident that has been reported to them, and record the results within its own database to improve understanding of local flood risk, and to help inform future flood risk management interventions, such as maintenance, capital works or warning systems. The investigation will follow a similar approach to that developed by AGMA and will be proportional to the incident, and will not normally be published.

5.52 **LFRM Policy 9: Aim to contribute towards the achievement of sustainable development in undertaking flood risk management functions.**

Section 27 of the FWMA requires the LLFA and Highway Authorities, in exercising a flood risk management function to aim to make a contribution towards the achievement of sustainable development, and it is proposed to widen this aim to all stakeholders working within the City in this regard.

5.53 There are many ways that this aspiration can be progressed, including through actions that reduce pollution and improve water quality and habitats, to support biodiversity, as well as considering mitigation and adaptation to future climate change. The provision of SuDS as part of new developments or through retro-fitting can have positive effects in this respect; the provision of more conventional green infrastructure, such as the provision of trees at appropriate locations in streets is also positive.

5.54 Over time, the LFRMS and the Flood Risk Management Plan required under the Flood Risk Regulations 2009 should contribute towards meeting the requirements of the European Water Framework Directive, and will help inform the latest North West River Basin Management Plan. By engaging with appropriate stakeholders and sharing information and best practice, it is intended that many aspects of sustainable development can be integrated into flood risk management tasks.

LFRMS Actions

A list of flood risk management actions is included in the Action Plan attached to the LFRMS, which will be updated regularly over time, as actions are completed and new ones identified. Actions to manage local flood risk in Manchester will be risk based and proportionate, directed by the LFRMS

policies, and will involve all affected stakeholders. The primary focus will be on annual funding bids, including joint work with partner organisations, in order to improve the understanding of risk and progress appropriate interventions and resilience measures. Modelled risk, reported flooding incidents, known problems, bid scores and political priorities will all inform future interventions, and in many cases the work will be iterative: funding for studies will help inform works / measures to reduce risk, and identify the people / organisations responsible, which will take place over several years.

Chapter 6 - Updates and Monitoring

This chapter sets out how the Local Strategy will be kept up-to-date, including the periodic issuing of guidance, and how progress with the Strategy will be monitored.

6.1 The Council, as Lead Local Flood Authority (LLFA), is required, amongst other things, to maintain and monitor its Local Flood Risk Management Strategy (LFRMS).

6.2 The LFRMS will be updated as needed, and potentially aligned with the 6-yearly Flood Risk Regulations 2009 cycle to reduce duplication. New legislation, or significantly changed circumstances may mean that a complete or partial review will be needed

6.3 Under Section 9 (8) of the Flood & Water Management Act 2010 (FWMA), LLFAs may issue guidance about the application of their LFRMS, and the commencement of the Sustainable Drainage System (SuDS) Approving Body (SAB) function in Section 32 and Schedule 3 of the FWMA is something that could be effectively addressed through this mechanism. The interactions between the Local Planning Authority, the SAB and the LLFA will need to be assessed and procedures developed accordingly once this part of the Act has commenced, including the publication of the National Standards.

6.4 Further guidance may be issued by the Council from time to time, including potentially guidance for developers on local flood risk issues and how they can be managed in Manchester to help improve quality and reduce delays with the Planning process.

6.3 The LFRMS Evidence Base will be updated regularly - the Environment Agency (EA) flood maps are updated quarterly for example, as new studies or modelling are undertaken or as works to drainage infrastructure or formal flood defences are implemented. It will be important that flood risk management interventions use an up-to-date evidence base, and together with information about recorded flood incidents, this will be the principal basis for identifying LFRMS priorities going forward. An updated evidence base does not necessarily require an updated strategy. In terms of monitoring progress with local flood risk management, devising appropriate measures is fundamental, and also complicated. Flooding is not a regular occurrence and is dependent upon a number of factors, including most notably, the weather. The variable nature of weather alone could make an accurate assessment of

risk management progress difficult to achieve; a spell of really extreme weather could skew recorded figures adversely, and conversely an extended period without extreme weather objective could suggest more progress has been made than has actually been. It will therefore be difficult to establish the effectiveness of the LFRMS unless this is assessed against modelled scenarios, where weather variability can be controlled.

6.5 Not all sources of flooding have been modelled; most non – main rivers for example, and different sources of flooding will often use different assumptions – the more localised effects of surface water flood risk generally use the 1:30 year or 1:200 year storm events, whilst fluvial flood risk based on larger catchments generally use 1:100 or 1:1000 year storm events.

6.6 However, a further cautionary point is that the confidence in modelling is not always very high, and can vary considerably depending upon the assumptions made. Modelled flood risk from surface water runoff for example has many variables, and generally, surface water drainage systems are not fully modelled due to their size and complexity – assumptions are made instead. Even if the full extent of a drainage system is accurately modelled, blockages can skew where the water may go. Groundwater flood risk is known to be difficult to accurately assess. All of this can reduce the confidence that can be had in the modelling, and consequently the effectiveness of performance monitoring. The modelled results will be cross-checked with the reported incidents and local knowledge of the flooding issues. Therefore, it is essential to establish and maintain contacts with public through local groups so the risks can be verified and monitored to inform future strategy updates.

6.7 Trying to establish a citywide figure for properties at risk of flooding would, even using the best available information, be likely to be a significant overestimate; a better approach would be to monitor progress against interventions. For example, extending a flood warning area to cover an additional X number of properties would be empirical data; a successful funding bid to reduce the risk to X number of properties would involve an independent assessment of risk and benefits. The implementation of these interventions would be an effective way of demonstrating that the risk to properties is being reduced, using the resources available. In addition, this approach would not be distorted by the effects of severe weather events causing flooding, which inevitably will happen.

6.8 A monitoring framework to assess interventions against the LFRMS aims and objectives will be developed upon adoption of the LFRMS and will enable annual monitoring of the LFRMS to be undertaken. The LLFA is responsible for monitoring the LFRMS under Section 9 of the FWMA, but will need the cooperation of other RMAs and flood risk stakeholders to do this, supported by Section 13 of the FWMA.

6.9 The monitoring framework may include the following key measures, which will be developed with reference to the Strategic Environmental Assessment (SEA) process and linked to the LFRMS objectives, policies and actions, but could potentially include the following types of measures.

- Reduce the likelihood, severity and consequences of flooding from Ordinary Watercourses, from Groundwater, and from Surface Water Runoff.
    - Numbers of residential properties covered by flood warning / alert areas.
    - Numbers of reactive call-outs to clear blocked drainage infrastructure, divided by type / Risk Management Authority (RMA) responsibility.
    - Number of recorded local flood incidents
    - Number of repeated recorded local flood incidents - i.e. incidents where the spatial cause (blocked trash screen, silted culvert, sewer exceedance etc.) is the same
    - Number of new developments incorporating surface water attenuation - either tanks or SuDS
    - Number of planning permissions granted contrary to the advice of the EA / LLFA on local flood risk grounds in a calendar year
    - Number of Local Flood Risk Management intervention bids made
    - Number of Local Flood Risk Management interventions implemented
    - Value of funding levered into local flood risk management
- Seek opportunities to improve water quality and biodiversity through flood risk management activities.
    - Proportion of rivers with biological quality classed as good or high;
    - Proportion of rivers which pass on chemical status;
    - Surface water bodies reaching 'good' ecological status or 'good' ecological potential
    - Square metres of habitat created / improved

6.10 The key measures will be assessed annually to provide an assessment of progress. Non-local flood risk will not be monitored through the LFRMS, because it is beyond its scope, although the EA have Outcome Measures that they use to assess progress with Main River and Coastal Flood Risk Management, and there may be some scope to align these with the LFRMS key measures.

Appendix A

LFRMS Evidence Base and Contextual Information

A1.1 The following are some of the principal documents that have been used to develop the LFRMS. The SEA Scoping Report provides further information.

National

A1.2 The EA produces various national flood maps which should be the starting place for the consideration of flood risk, as they will generally be the most comprehensive and up-to-date datasets.

A1.3 The National Flood & Coastal Erosion Risk Management Strategy (the National Strategy), produced by the Environment Agency working jointly with DEFRA, was first published in September 2011. The Act states that LFRMSs must be consistent with the National Strategy, the overall aim of which is "to ensure the risk of flooding and coastal erosion is properly managed by using the full range of options in a co-ordinated way."

A1.4 The Flood and Water Management Act 2010 requires certain flood and coastal erosion risk management authorities, including the Council as LLFA and Local Highway Authority, and the Highways Agency to aim to make a contribution towards the achievement of sustainable development when exercising their functions (S.27). It also requires the Secretary of State to issue guidance on how those authorities are to discharge this duty and explain the meaning of sustainable development in this context and this document does that.

A1.5 The National Planning Policy Framework (NPPF) sets out the Government's economic, environmental and social planning policies for England. A key thrust of the NPPF is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan making and decision taking. The NPPF reinforces the requirement for sustainability appraisal and states that it should be an integrated part of the plan preparation process. The associated Technical Guidance provides additional advice to local planning authorities to ensure the effective implementation of the NPPF as it relates to development in areas at risk of flooding and mineral extraction.

Regional

A1.6 The EA's North West River Basin Management Plan identifies the main issues facing the water environment in the North West River Basin District, and the actions that will address them and help to improve water quality and biodiversity. It has been prepared under the Water Framework Directive, which requires public bodies to:

- have regard to the RBMP and any supplementary plans (such as programmes of measures and implementation plans) in exercising their functions, and
- to ensure that actions proposed in the LFRMS:
  - will not conflict with mitigation measures in the RBMP designed to achieve good ecological status or potential for the water body in question, and
  - will not cause deterioration in the status of any water body (including the channel, the flow, and the flora and fauna), and
  - will not prevent future restoration/improvement, and
  - include opportunities for improvement in the status of water bodies to help meet WFD objectives.

A1.7 United Utilities are the Water and Sewerage Company covering the North West (including Manchester) and produce a number of strategy and Policy documents linked to their business and investment planning; these include the United Utilities Strategic Direction Statement 2010 – 2035 which provides a long term context, and the five yearly Price Review / Asset Management Plans set by Ofwat (governing the prices that can be charged to consumers and consequently the investment that can be made in their infrastructure and facilities) the current one being PR09 / AMP5 for the period 2010 – 2015.

Sub-Regional

A1.8 Preliminary Flood Risk Assessment (PFRA) (2011) / Flood Risk & Hazard Maps (2013) / Flood Risk Management Plan (FRMP) (2015)

The Greater Manchester Flood Risk Management Area includes a significant part of Manchester and parts of all other GM districts apart from Wigan. The Flood Risk and Hazard maps and eventual FRMP required by the Flood Risk Regulations 2009 will address flood risk within this area.

A1.9 Neighbouring Councils LFRMSs / Local Plans

Each Council bordering the City of Manchester will either have or be in the process of producing a LFRMS and a Local Plan (including both the Joint Waste DPD and the Joint Minerals DPD). In most cases, neighbouring authorities will not have an adopted Local Flood Risk Management Strategy in

place however, it will be important to engage with them; critical drainage areas for example are likely to extend beyond administrative boundaries, as will many watercourses. Only relevant parts of Local Plans should be considered e.g. land allocations, cross boundary infrastructure / features, flood policies. The following Councils border the City of Manchester and are likely to have local flood risk interactions with Manchester:

- Bury Council
- Rochdale MBC
- Oldham Council
- Tameside MBC
- Stockport MBC
- Cheshire East Council
- Trafford Council
- Salford City Council

The nature and extent of these interactions will vary and will be addressed in the Risk Management Framework.

A1.10 Irwell Catchment Flood Management Plan (2009)

This CFMP gives an overview of the flood risk in the Irwell catchment and sets out the Environment Agency's preferred plan for sustainable flood risk management over the next 50 to 100 years.

A1.11 Upper Mersey Catchment Flood Management Plan (2009)

This CFMP gives an overview of the flood risk in the Upper Mersey catchment and sets out the Environment Agency's preferred plan for sustainable flood risk management over the next 50 to 100 years.

A1.12 Greater Manchester Strategy (2009)

Prosperity for All: The Greater Manchester Strategy was a direct response to the 2009 Budget which gave the Manchester City Region the opportunity to become a pilot statutory city region. This decision allows for the tailoring of programmes at a local level to meet the area's economic, social and environmental needs and for the local authorities in Greater Manchester to have a direct and more dynamic hand in where the future of the city region lies.

A1.13 Greater Manchester Joint Waste DPD (2012)

The Joint Waste DPD sets out a waste planning strategy to 2027 that enables the adequate provision of waste management facilities in appropriate locations for municipal, commercial and industrial, construction and demolition and hazardous wastes. The Plan identifies specific sites and areas for waste management and provides a suite of policies for development management.

A1.14 Greater Manchester Joint Minerals DPD (2013)

The Joint Minerals DPD sets out a Minerals planning strategy to 2027 including the identification of suitable locations for minerals protection and extraction and a suite of policies to be applied in this regard.

A1.15 Greater Manchester Multi-Agency Flood Plan

The Greater Manchester Resilience Forum (GMRF) is a partnership of agencies from across Greater Manchester with responsibility for coordinating and overseeing emergency planning. Its overall purpose is to ensure that there is an appropriate level of preparedness to enable an effective multi-agency response to emergency incidents, including flooding, which may have significant impact on the communities of Greater Manchester.

A1.16 Manchester Salford and Trafford Hybrid Strategic Flood Risk Assessment (SFRA) (2011)

The SFRA was produced to help inform the production of Manchester's Core Strategy and to help with the determination of planning applications within the City. It is a point-in-time document that was finalised in May 2011, and was produced using the best information available at that time.

A1.17 Greater Manchester Surface Water Management Plan (SWMP) (2013)

The SWMP was produced to improve the understanding and future management of surface water flood risk across Greater Manchester, including links to other sources of flooding. The SWMP includes an update of the Environment Agency's flood map for surface water, together with a simple approach to prioritising areas of potential risk based upon modelled flood risk and vulnerable receptors. A number of case studies looking at localised surface water risk in more detail were undertaken and guidance on using the SWMP to develop further projects is also included

Local

A1.18 Local Plan (Core Strategy, extant parts of the Unitary Development Plan (UDP), the Joint Waste Plan and the Joint Minerals Plan)

Manchester's Local Plan is a suite of spatial planning documents. The Core Strategy (adopted July 2012) is the principal document in the Local Plan, and is supplemented by saved policies in the UDP (adopted in July 1995, but partially amended several times in subsequent years), in the Joint Waste Plan (adopted in April 2012) and in the Joint Minerals Plan (adopted April 2013). The Local Plan will help inform future development within the City, and includes guidance for dealing.

A1.19 Sustainable Community Strategy (2006 – 2015)

The Manchester Way is the City's Sustainable Community Strategy and sets out a vision and set of priorities to support continued and sustainable economic growth and ensure that more people and communities share its benefits; it identifies the environment, education, training, poor health and anti-social behaviour as the most important issues that need to be addressed.

A1.20 Climate Change Strategy / Action Plan (2010 – 2020)

Manchester: A Certain Future is a climate change action plan for Manchester which aims to reduce our contribution to global warming, with headline actions to 2020. It forms the starting point actions through to 2050 towards a better adapted, lower carbon future.

A1.21 Green and Blue Infrastructure Strategy

An assessment of the extent and functionality of Green and Blue Infrastructure in Manchester, which aims to recognise gaps, identify priorities, and provide a framework for prioritising investment. It will incorporate a 15-year Green & Blue action plan.

A1.22 Manchester Biodiversity Strategy (2005) and Action Plan (2012-16)

The Strategy outlines what is biodiversity, why it is important, what's already happening and an Action Plan to help protect, conserve and enhance biodiversity in the City. The Strategy also details the important habitats and species present and identifies specific priorities for Manchester

A1.23 Reported and Recorded Flood Incidents

As Lead Local Flood Authority the Council is required to investigate flood[5] incidents within the City to the extent it considers necessary or appropriate, and to report on them (S.19). Over time this will provide a good indication of areas where flooding occurs and the causes.

A1.24 Flood Risk Asset Register and Record / Designations / Consenting for works to ordinary watercourses

As Lead Local Flood Authority the Council is also required to produce a register of structures or features which, in its opinion, are likely to have a significant effect on a flood risk in its area, and a record of information about each of those structures or features, including information about ownership and state of repair. The LLFA may also designate assets or features it thinks may have a bearing on flood risk, and is responsible for consenting for works to ordinary watercourses

A1.25 United Utilities, the Manchester Ship Canal Company, the Bridgewater Canal Company, the Canal and River Trust, the Highways Agency and the Local Highway Authority may also have information regarding the condition of their infrastructure within the City which would be relevant to local flood risk management. The statutory duty to cooperate and share information between flood risk management authorities (S13 of the Flood & Water Management Act 2010) will be useful, although the cooperation and sharing of relevant information between all stakeholders would support effective flood risk management.

[5] A 'flood' is defined under S.1 of the Flood & Water Management Act 2010 as where land not normally covered by water becomes covered by water, including following heavy rainfall, a river overflowing or its banks being breached, a dam overflowing or being breached, groundwater, or anything else (including any combination of factors). However, a 'flood' does not include a surcharge from any part of a sewerage system (unless wholly or partly caused by an increase in the volume of precipitation entering or otherwise affecting the system, or a flood caused by a burst water main.

Appendix B

Main Flood Risk Management Stakeholders in Manchester

The following are considered to be the main local flood risk management stakeholders in Manchester, however, their role and input will vary considerably and there will be other bodies not listed with important parts to play.

Risk Management Authorities

- The Environment Agency
- United Utilities
- The Highways Agency
- The Council as Lead Local Flood Authority
- The Council as Local Highway Authority

Navigation Authorities

- The Bridgewater Canal Company and the Manchester Ship Canal Company (Peel Holdings)
- Canal and River Trust (for the Ashton Canal and the Rochdale Canal)

Transport

- Network Rail
- Transport for Greater Manchester
- Manchester Airport Group

Utilities

- Electricity North West
- National Grid Gas
- National Grid Electricity

Manchester City Council

- Various functions, including:
    - Local Planning Authority
    - Environmental Health (Contaminated Land)
    - Regeneration
    - Landownership

Neighbouring Local Authorities

- Bury Council
- Oldham Council
- Rochdale Metropolitan Borough Council
- Salford City Council
- Stockport Metropolitan Borough Council
- Tameside Metropolitan Borough Council
- Trafford Council
- Cheshire East Council

Emergency Services / Civil Contingencies

- Greater Manchester Police
- Greater Manchester Fire & Rescue Service
- North West Ambulance Service
- Greater Manchester Resilience Forum

Environment

- Groundwork
- Red Rose Forest
- Greater Manchester Ecology Unit (GMEU)
- Greater Manchester Archaeological Service (GMAS)
- Minerals and Waste Planning Unit (MWPU)

General

- The public.
- Multiple landowners along various non-main rivers or whose land contains other ordinary watercourses.
- National Flood Forum (NFF)
- Association of Greater Manchester Authorities (AGMA)

Risk Management Authority	Telephone	Website
Environment Agency	0845 988 1188 (Flood Line)	http://www.environment-agency.gov.uk/homeandleisure/floods/default.aspx
United Utilities	0845 746 2200	http://www.unitedutilities.com/been-flooded.aspx
Highways Agency	0300 123 5000	http://www.highways.gov.uk/traffic-information/
Manchester City Council	0161 234 5004	http://www.manchester.gov.uk/info/100006/environmental_problems/5404/flooding_and_drainage

Organisation	Telephone	Website
Met Office	0870 900 0100	http://www.metoffice.gov.uk/

Appendix C – Organogram

Manchester City Council
Proposed Organisational structure for local flood risk management / links to wider structures