



Birmingham City Council

Local Flood Risk Management Strategy for Birmingham



October 2017

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Forward

I am pleased to be launching this Flood Risk Management Strategy for Birmingham. This document is an important step forward for how we manage flood risk in Birmingham in the future.

The extensive flooding experienced across the UK in recent years highlights the devastating effect that flooding can have on homes and businesses. It is not purely the economic loss, flooding can cause considerable stress and anxiety to people. Birmingham may not have seen the major river flooding events that tend to dominate the headlines; however Birmingham has experienced a number of large scale floods in recent years. While we can never prevent floods from occurring altogether, we can better manage the risk.

The Flood and Water Management Act 2010 was created to ensure that flood risk is managed more effectively in the UK. The Act gives Lead Local Flood Authorities important new duties, powers and responsibilities in relation to flood risk management. As the Lead Local Flood Authority, Birmingham City Council has a duty to 'develop, maintain, apply and monitor' a Local Flood Risk Management Strategy. This Strategy focuses on local flood risk resulting from surface water, groundwater and ordinary watercourses flooding.

This strategy sets out the current level of flood risk in Birmingham and what actions are proposed to manage this risk into the future. It is not possible to protect all households from all sources of flood risk, but we are keen to ensure that all forms are managed in a coordinated way and tackled according to the level of risk. It is important to remember that partnership working is essential to ensuring a joined up approach to flood risk management, we cannot do this alone and we need the support of the Environment Agency, Severn Trent Water, government agencies, businesses, the community and individual householders.

This strategy sets out how Birmingham City Council with its flood risk management partners intends to manage flooding. We hope that this strategy will improve your understanding of your flood risk, the actions we propose to manage that risk and what you can do as an individual to manage this risk.

Councillor Lisa Trickett

Cabinet Member for Clean Streets, Recycling and Environment

Birmingham City Council



Abbreviations

| Term | Meaning / Definition |
|-------|--|
| AMP | Asset Management Plan |
| BAP | Biodiversity Action Plan |
| BCC | Birmingham City Council |
| BDP | Birmingham Development Plan |
| CCTV | Closed-circuit television |
| CFMP | Catchment Flood Management Plan |
| CIL | Community Infrastructure Levy |
| EA | Environment Agency |
| FCERM | Flood and Coastal Erosion Risk Management |
| FLAG | Flood Action Group |
| FDGIA | Flood Defence Grant in Aid |
| FMfP | Flood Map for Planning |
| FRMP | Flood Risk Management Plan |
| FRR | Flood Risk Regulations |
| FWMA | Flood and Water Management Act |
| HRA | Habitats Regulation Assessment |
| LLFA | Lead Local Flood Authority |
| Ofwat | Office of Water Services |
| PFRA | Preliminary Flood Risk Assessment |
| RBMP | River Basin Management Plan |
| RFCC | Regional Flood and Coastal Committee |
| RMA | Risk Management Authority |
| ROFRS | Risk of Flooding from Rivers and Seas |
| RoFSW | Risk of Flooding from Surface Water |
| SAB | SuDS Approving Body |
| SEA | Strategic Environmental Assessment |
| SHLAA | Strategic Housing Land Availability Assessment |
| SFRA | Strategic Flood Risk Assessment |
| SPD | Supplementary Planning Document |
| SuDS | Sustainable Drainage System |
| SWMP | Surface Water Management Plan |
| WaSC | Water and Sewerage Companies |

| Term | Meaning / Definition |
|------|---------------------------|
| WFD | Water Framework Directive |

1. Introduction

1.1 Legislative Background

The severe rainfall and flooding events of 2007 highlighted the need to improve the understanding of flood risk so that we can better prepare for future events. Following these events, Sir Michael Pitt published his review 'Lessons Learned from the 2007 Floods', which contained 92 recommendations for Government, Environment Agency, Local Authorities and other agencies around flooding, flood management and preparedness.

The Flood and Water Management Act 2010 (FWMA) was published as part of the Government's response to the Pitt Review. The Act is intended to create a more integrated, comprehensive and risk-based approach to managing flood risk and coastal erosion. The Act gives the Environment Agency a new strategic overview role for all forms of flooding whilst continuing its roles and responsibilities for fluvial flooding from main rivers, reservoirs and coastal flooding. County Councils and Unitary Authorities take on a new leadership role in local flood risk management, as the 'Lead Local Flood Authority (LLFA)' with responsibilities for ordinary watercourses, surface water and groundwater.

In addition to the FWMA, the Flood Risk Regulations (FRR) came into force in 2009 and implement the requirements of the European Floods Directive, which aims to provide a consistent approach to managing flood risk across Europe. Under the regulations and in line with the FWMA, LLFAs are responsible for undertaking the development of Flood Risk Management Plans for local sources of flood risk, primarily from surface water, groundwater and ordinary watercourses.

1.2 National Strategy

The FWMA requires the Environment Agency to develop, maintain, apply and monitor a strategy for Flood and Coastal Erosion Risk Management (FCERM) in England. The national strategy describes what needs to be done by all the authorities involved (including the Environment Agency, local authorities, internal drainage boards, water and sewerage companies (WaSCs) and highways authorities) to reduce the likelihood of flooding and coastal erosion, and to manage their consequences. The National Strategy became a statutory document on 18th July 2011.

The overall aim of the National FCERM Strategy for England 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. It is designed to support local decision-making and engagement in FCERM, making sure that risks are managed in a co-ordinated way across catchments and along the coast.

The National Strategy sets out strategic aims and objectives for managing flood and coastal erosion risks and the measures proposed to achieve them. It states that Government will work with individuals, communities and organisations to reduce the threat of flooding and coastal erosion by:

- 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 make their property more resilient; and

- 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.

1.3 Local Strategy

The FWMA requires Birmingham City Council as LLFA to develop, maintain, apply and monitor a strategy for local flood risk management in its area. The Strategy will set out the objectives for managing local flood risk and the measures proposed to achieve those objectives.

The Local Flood Risk Management Strategy is required to consider the impact and consequences of local flood risk together with the interface between the main rivers and local flood risk sources. The strategy should specify:

- the risk management authorities in the authority's area;
- the FCERM functions that may be exercised by those authorities in relation to the area;
- the level of local flood risk;
- the objectives for managing local flood risk;
- the measures proposed to achieve those objectives;
- how and when the measures are expected to be implemented;
- the costs and benefits of those measures, and how they are to be paid for;
- how and when the strategy is to be reviewed; and
- how the strategy contributes to the achievement of wider environmental objectives.

Local strategies for FCERM must also be consistent with the national strategy for FCERM and should be guided by the following principles which have been established by the National FCERM Strategy for England:

- community focus and partnership working;
- a catchment based approach;
- sustainability;
- proportionate, risk based approaches;
- multiple benefits; and
- beneficiaries should be encouraged to invest in risk management.

1.4 Objectives

The overarching aim of this strategy is to ensure that local flood risk is understood and managed in a coordinated way in Birmingham. The objectives by which we will achieve this vision are set out below:

- **Stakeholder Responsibilities and Partnership Arrangements** - identify all stakeholders with a role in flood risk management, set out their responsibilities and work with them to adopt a partnership approach to managing local flood risk;
- **Local Flood Risk** - develop a clear understanding of flood risk from surface water, groundwater and ordinary watercourses and set out how this information will be communicated and shared;
- **Asset Management** - outline how local flood risk assets are identified, managed and maintained and develop a clear understanding of riparian responsibilities;

- **Responding to Flooding** - define the criteria and procedure for responding to and investigating flooding incidents, and set out the role of emergency planning, flood action groups and individual property owners;
- **Managing Flood Risk** - define the criteria for how and when flood risk management measures will be promoted to ensure that they provide value for money whilst minimising the long-term revenue costs and maximising external funding contributions;
- **Flood Risk and Development** - minimise the impact of development on flood risk by developing guidance, policies and standards that manage flood risk and reduce the flood risk to existing communities; and
- **Environmental Implications** - adopt a sustainable approach to managing local flood risk by ensuring actions deliver wider environmental benefits.

The information, actions and measures developed to achieve these objectives are set out in the following sections of the Strategy.

2. Stakeholder Responsibilities and Partnership Arrangements

“Identify all stakeholders with a role in flood risk management, set out their responsibilities and work with them to adopt a partnership approach to managing local flood risk”

2.1 Flood Risk Management Authorities Roles and Responsibilities

There are a number of stakeholders in Birmingham that have responsibilities for the management of flood risk. These organisations and their responsibilities are outlined below:

2.1.1 Birmingham City Council

A number of departments within the City Council are involved in flood risk management and response, either because they are the landowners with a watercourse, responsible for land drainage, provide an emergency response and/or work with the community to assist and enable them to prepare for and respond to an emergency.

Flood Risk Management Team

The Flood Risk Management Team provide the City Councils compliance with the roles of the LLFA and the Land Drainage Authority.

Lead Local Flood Authority

The role of the LLFA is undertaken by the Flood Risk Management Team. In addition to this the LLFA has further responsibilities under the FRR. The main responsibilities of the LLFA are outlined in the Table 2.1 together with a reference to where this responsibility is covered further in the Strategy.

| Legislation | Power or Duty | Responsibility | Further detail in Strategy |
|-------------|---------------|--|----------------------------|
| FWMA | Duty | Develop, maintain, apply and monitor a strategy for local flood risk management | This document |
| FWMA | Duty | Cooperate with other flood risk management authorities | Section 2 |
| FWMA | Duty | Investigate and publish reports of flooding incidents | Section 2 |
| FWMA | Duty | Maintain a register of structures or features which have a significant effect on flood risk in their areas | Section 4 |
| FWMA | Duty | Consent works on ordinary watercourses | Section 4 |

| Legislation | Power or Duty | Responsibility | Further detail in Strategy |
|-------------|---------------|---|----------------------------|
| FWMA | Duty | Establish a Sustainable Drainage Systems (SuDS) Approving Body (SAB) with responsibility for approval, adoption and maintenance of SuDS that serve more than one property. Note: This has not been enacted and the Government has introduced an alternative approach using the planning regime. | Section 7 |
| FWMA | Power | Do work and manage flood risk from ordinary watercourse, surface water and groundwater | Section 6 |
| FWMA | Power | Request information from any person in connection with the authorities flood risk management functions | Section 5 |
| FWMA | Power | Designate features or assets which affect flood risk | Section 4 |
| FRR | Duty | Prepare a Preliminary Flood Risk Assessment about past floods and the possible consequences of future floods and to identify areas of significant flood risk | Section 3 |
| FRR | Duty | Produce flood hazard and flood risk maps for each significant flood risk area | Section 3 |
| FRR | Duty | Prepare a flood risk management plan for the management of significant flood risk within indicative flood areas | Section 3 |

Table 2.1 – Lead Local Flood Authority Responsibilities

Land Drainage Authority

The Flood Risk Management Team has responsibility for natural drainage and ordinary watercourses. As Land Drainage Authority they have:

- permissive powers associated with the prevention, mitigation and remedying of flood damage;
- powers to maintain and improve existing watercourses;
- powers to construct new works for the benefit of its area; and

- byelaws in relation to development.

However, many watercourses are the responsibility of land owners but the Council has powers to regulate and enforce duties on land owners. In general the Council works with landowners to maintain and improve watercourses.

Highway Authority

The Street Services Division undertake the role of Highway Authority and is responsible for highways maintenance including highway drainage. The maintenance of highway assets is undertaken by Amey the Council's Maintenance and Management Partner under a 25 year Private Finance Initiative Contract.

Waste Management

Waste Management within Local Services are responsible for street cleansing and the removal of any leaf fall or litter on the highway.

Planning Authority

The Planning Service undertakes the role of Planning Authority and is responsible for developing strategies and determining planning applications.

The Planning Authority has to ensure that flood risk is taken into account at all stages in the planning process by:

- Developing strategies and local plans which take account of flood risk and climate change
- Producing, maintaining and reviewing a Strategic Flood Risk Assessment (SFRA) to ensure that development is located in the lowest areas of flood risk
- Considering flood risk when determining planning application.

Emergency Response and Community Resilience

The Resilience Team is responsible for ensuring corporate emergency management and business continuity arrangements are maintained in order to respond effectively to a range of emergencies within Birmingham including flooding. In addition, the team provides specialist advice and support to directorates to enable council-wide compliance with statutory resilience duties under the Civil Contingencies Act 2004 and in their delivery of emergency response arrangements to incidents. As a Category 1 responder under the Civil Contingencies Act 2004, the Council has a duty to assess the risk of emergencies occurring, maintain effective emergency plans and business continuity arrangements, warn and inform the public, co-operate and share information with partner agencies and promote business continuity to businesses and voluntary organisations.

The main activities in relation to emergency response and community resilience undertaken by the Resilience Team include: development of the Multi-agency Flood Plan for Birmingham (through the multi-agency Birmingham Resilience Group), provision of a 24 hour duty officer system, maintenance of response capacity in terms of equipment and resources and development of a range of activities and exercises to engage communities and promote emergency preparedness. Where a significant flooding incident occurs which requires additional support from across the Council, officers from the team will activate the Corporate Emergency Plan arrangements which includes the opening of the Council Emergency Co-ordinating Centre.

Districts within The Place Directorate have a role in flood planning, engaging with communities, responding to flooding emergencies at the scene and supporting local recovery after an event.

Land Owner

Birmingham City Council owns land across the City, this is managed by a number of departments including; Housing, Leisure and Education that are responsible for the maintenance of parks and other public spaces. As Landowner they also have riparian responsibilities to ensure that

watercourses are maintained. Housing also have responsibilities as Landlord for their tenants, some of these properties will be at flood risk or will have flooded historically.

Reservoir Undertakers / Landowners

Leisure Services within the Place Directorate are the undertakers for the City Council owned reservoirs and the landowner of three reservoirs (for which Environment Agency and the Canal and Rivers Trust are undertakers). Reservoir undertakers are generally the owners or operators of a reservoir and have ultimate responsibility for the safety of the reservoir. The Environment Agency hold a register of all large raised reservoirs within Birmingham and are the enforcement authority that make sure they are maintained in accordance with the Reservoir Act 1975.

Scrutiny

The FWMA made amendment to the Local Government Act 2000, under Section 21F, requiring all LLFAs to review and scrutinise the actions of Flood Risk Management Authorities that may affect the local authority's area.

In 2010, prior to this change in legislation, a cross committee and cross party working group was set up to scrutinise flood risk management and response in Birmingham. The review produced 12 recommendations, which were established to assist the City Council in mitigating and responding to flooding and to ultimately assist residents in being better prepared for flooding. The recommendations were tracked and subsequently the Committee receives an annual update on the work undertaken on Flood Risk Management in Birmingham

Environment Agency

The Environment Agency has a strategic overview role for all forms of flooding and is required to publish a National Strategy as set out in Section 1.2.

In addition to its national strategic role, the Environment Agency is responsible for the management of flood risk from Main Rivers, Reservoirs and the Sea as well as undertaking an emergency planning, development planning and environmental protection role as outlined below:

- **Main Rivers:** The Environment Agency has permissive powers to carry out maintenance or improvement work on Main River and can bring forward flood defence schemes. Under the terms of the Water Resources Act 1991 and the Midlands Land Drainage Byelaws, the prior written consent of the Environment Agency is required for any proposed work or structure in, under, over or within 8m of the top of bank of a designated Main River.
- **Reservoirs:** The Environment Agency is the enforcement authority for the Reservoirs Act 1975. The responsibility for carrying out work to manage reservoir safety lies with the reservoir owner/operator.
- **Emergency Planning:** The Environment Agency contributes to the multi-agency flood plan. The Agency also works with the Met Office to provide flood warnings from river and sea to the public, media and partner organisations. The Agency also works with Birmingham City Council and communities affected by flooding from Main River in developing Flood Action Groups (FLAGs) and Community Flood Plans.
- **Development Planning:** The Environment Agency is a statutory consultee for all planning applications in flood zone 2 and 3 and applications greater than 1 hectare in flood zone 1. It should be noted that as of 1st January 2014, the EA Midlands Central area no longer provides bespoke comments on sites in flood zone 1.
- **Environmental Protection:** The Environment Agency has an environmental protection role in managing water quality.

The Environment Agency also has an environmental protection role to protect and improve water, land and biodiversity.

2.1.2 Water Companies

Severn Trent Water is the sewerage undertaker that covers the Birmingham area; they are also the water supply company for the majority of the Birmingham area, with South Staffs Water covering parts of Sutton Coldfield.

Severn Trent Water provides clean, safe and reliable drinking water to around 8 million people throughout the Midlands and mid-Wales. They then take away and clean their waste water before returning it to our region's rivers. They are one of the largest WaSC in England and Wales. As a WaSC they are regulated by the economic regulator Ofwat (Office of Water Services) through 5 year Asset Management Plan (AMP) cycles.

The current Asset Management Period runs to 2020, Severn Trent Water have developed their business plan to cover this period; it sets out 10 key objectives with 45 associated measures of success. These reflect statutory duties, customer priorities and customer willingness to pay. Further information is available at: www.stwater.co.uk/2020-plan

Duty to Effectually Drain

Severn Trent Water has a duty to provide, maintain and operate systems of public sewers and works for the purpose of effectually draining our area, this duty relates to premises for 'domestic sewerage purposes'. In terms of wastewater this is taken to mean the ordinary contents of lavatories and water which has been used for bathing, washing and cooking purposes and for surface water the removal from roofs and yards / land appurtenant to the premises. WaSCs have no duties relating to highway drainage, land drainage and watercourses; however they do accept highway drainage by agreement with the Highway Authority. They also accept trade effluent.

Wastewater Assets

Severn Trent Water operates a network of sewers, pumping stations sewage treatment works in order to undertake their duties. The sewers are categorised as foul only sewers, surface water sewers or combined sewers (convey both foul and surface water). On the 1st October 2011 many (although not all) private sewers were transferred to them under The Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. For further information about the transfer of private drains and sewers go to: www.stwater.co.uk/waste/responsibility-for-sewer-pipes/

Severn Trent Water undertake a range of activities to monitor and manage the sewerage network including telemetry, Closed-circuit television (CCTV), asset surveys and hydraulic modelling. They also repair, rehabilitate, replace and cleanse (e.g. jetting) where and when required.

Managing New Connections

The Water Industry Act 1991 gives the owner of premises a right to connect to a public sewer to dispose of foul and surface water. Severn Trent Water undertake assessments to check that the sewerage system and treatment works can accommodate additional flows from new developments and re-developments. Where required, they increase the capacity of their system to accommodate the additional flows. They are not a statutory consultee in the planning process; however they work with developers and local planning authorities to ensure surface water discharge to public sewers is controlled and restricted.

Civil Contingencies Act 2004 – Emergency Planning

As a Category 2 responder under the Civil Contingencies Act 2004 Severn Trent Water work with a number of Local Resilience Forums. As part of their regulations they are required to have robust plans in place to deal with any water related incidents including managing loss of piped water through alternative supplies plans and through industry mutual aid arrangements.

Flood and Water Management Act 2010 – New Duties

Severn Trent Water are a Risk Management Authority (RMA) as defined within the FWMA. Whilst many new duties refer to LLFAs, as a RMA water companies also have new duties such as ‘having regard to the local strategies’ ‘acting consistently with the national strategy’ ‘co-operating with other RMAs’ and ‘providing information’.

2.1.3 Highways England

Highways England is an Executive Agency of the Department for Transport and is responsible for operating, maintaining and improving the strategic road network in England on behalf of the Secretary of State for Transport. It acts as the Highway Authority for the M6 in Birmingham.

2.1.4 New Frankley in Birmingham Parish Council

New Frankley in Birmingham Parish Council, in the South West corner of Birmingham was established in 2000 as a means of improving the environment within the community. The Parish Council in partnership with the Neighbourhood Forum and Birmingham City Council has developed the Frankley Flood Action Plan which outlines the community arrangements in Frankley to report locations where action is urgently required to prevent the possibility of flooding and to deal with a flood event.

The Parish Council plays a vital role carrying out a number of flood warden duties.

2.1.5 Householders and Businesses

Landowners who own land bounding upon a lake, river, or other body of water are, under common law, riparian owners. Riparian owners have the right to receive a flow of water in its natural state, and the right to protect their property against flooding from the watercourse and also to prevent erosion of the watercourse banks or any structures. Responsibilities include the maintenance of the bank and bed of that section of watercourse, in order to avoid any obstruction of flow in the watercourse. Further details of can be found in ‘Living on the Edge – A guide to your rights and responsibilities of riverside ownership’ produced by the Environment Agency.

Flood Action Groups

FLAGS have been established in Birmingham in order to mobilise a joined up response by the local community. Their role may include; advising residents when warnings are issued, disseminating advice and information at any time of the day or night, supporting vulnerable members of the community, initiating the distribution/placing of flood products, setting up local patrols to monitor the situation and providing vital information during flood events to responding agencies e.g. reporting blocked culverts.

Table 2.1 shows the established FLAGS in Birmingham.

| Flood Action Group | Area Covered |
|------------------------------|---|
| Selly Park South | Cecil Road, Fashoda Road, Hobson Road, Kitchener Road, Dogpool Lane and Moor Green Lane |
| Rea Valley | Middlemore Road, West Heath Road, Station Road and Coleys Lane |
| Frankley Neighbourhood Forum | Miranda Close, Oberon Close, Fisher Close, Ringwood Drive, Gannow Green Lane and New Inns Lane |
| Witton | Brookvale Road, Electric Avenue, Deykin Avenue, Tame Road, Brantley Road, Westwood Road and Westwood Avenue |

Table 2.2 – Established Flood Action Groups

2.1.6 Canal and River Trust

The Canal and River Trust are the charity entrusted with the care of waterways in England and Wales. The Trust is a navigation authority. It inspects, maintains and operates the water control structures within its ownership primarily to meet its statutory obligation to maintain navigation.

In terms of managing flood risk, the primary responsibility for land drainage and flood prevention rests with private parties. The Trust does not have any specific statutory responsibilities in relation to flooding and, therefore, its responsibilities are those of an owner and operator of its canals and other waterways.

As a reservoir undertaker the Canal and River Trust has responsibility for the safety of the reservoirs under its control.

2.1.7 Responder Agencies

West Midlands Police

The police responsibility in flooding will generally only be during a major incident. During an incident the police are responsible for the coordination of the emergency services, local authorities and other organisations and the saving of lives (with the other emergency services);

West Midlands Fire Service

The primary areas of West Midlands Fire Service responsibility in flooding will be during a major incident. During a major flooding incident the fire service are responsible for life-saving through search and rescue, preservation and protection of property, salvage and damage control operations, strategic leadership responsibility during the response phase for rescue, water rescue and pumping operations, facilitating the provision of national resources and providing substantial command and control capability for fire resources.

Other flood risk management organisations

There are a range of other relevant organisations that have a key role to play in managing flood risk in Birmingham. (e.g. Network Rail, Natural England). These organisations will be involved as required to support flood alleviation projects, or to provide information, support and input on a project-by-project basis.

2.2 Governance & Partnership Working

2.2.1 Flood Risk Management Structure

To ensure the effective management of flood risk, Birmingham City Council has developed partnerships with Severn Trent Water, the Environment Agency and other key stakeholders over a number of years.

Birmingham City Council has worked with its partner organisations to develop a three tiered approach to managing flood risk. Table 2.3 shows the three tiered structure.

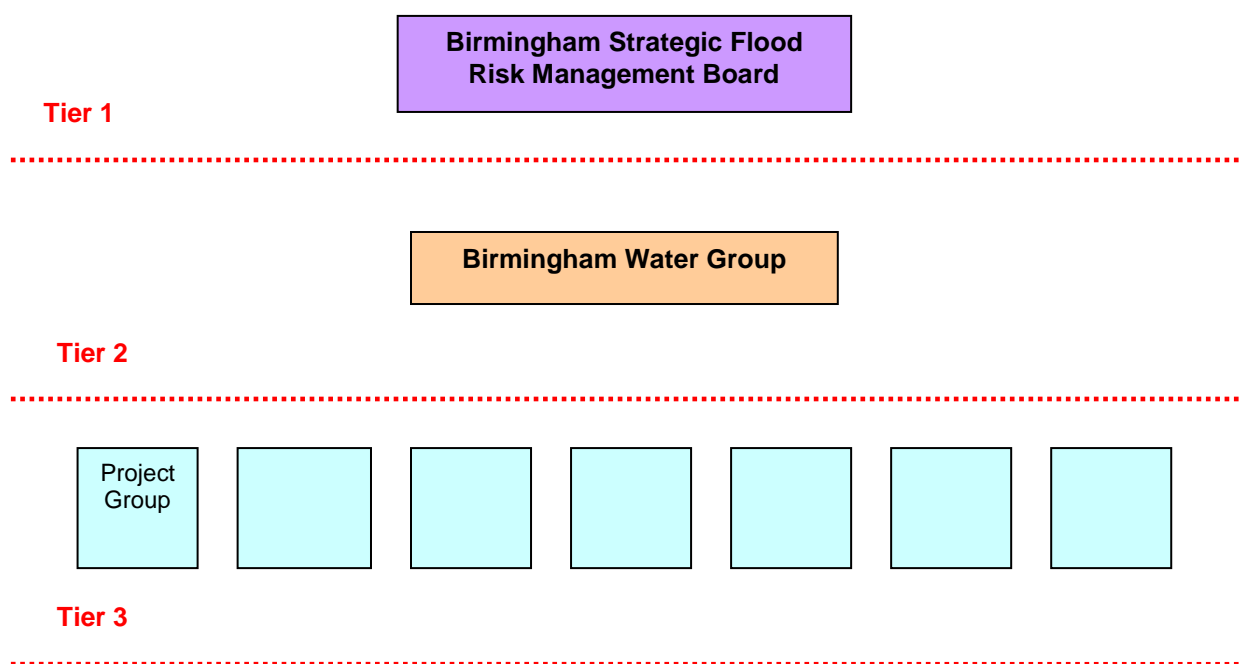


Table 2.3– Birmingham Three Tiered Flood Risk Management Structure

2.2.2 Tier 1 – Birmingham Strategic Flood Risk Management Board

The Strategic Flood Risk Management Board is a Member-led partnership with representatives from Birmingham City Council, Severn Trent Water and the Environment Agency. It aims to set the strategic policy and agree investment priorities and service targets for managing and mitigating flood risk in Birmingham.

A Memorandum of Understanding has been developed to encourage the essential sharing of information amongst the Group members in an efficient and effective way, and to set the governance rules to ensure that no party's confidentiality, intellectual property rights or commercial interests would be compromised.

2.2.3 Tier 2 – Birmingham Water Group

The Birmingham Water Group is an operational level group with senior officers and specialists from Birmingham City Council, Severn Trent Water and the Environment Agency representing all relevant flood risk management work areas, including; drainage engineers, planners, emergency planners, development control, flood risk mapping, asset management, climate change adaptation and green infrastructure. The aim of the group is to ensure a joined up approach to all flood and water management activities within and across each organisation.

2.2.4 Tier 3 – Project Specific Partner Groups

Individual project specific groups meet to discuss local drainage and flooding issues and solutions. This approach ensures that issues and concerns are communicated to those who need to deal with them. Progress, news and events are shared at regular meetings.

A number of projects that have been completed or are underway with their own project specific partner groups these include:

- Birmingham Surface Water Management Plan (SWMP) & Preliminary Flood Risk Assessment (PFRA)
- River Cole Local Flood Risk Management Plan
- Wood Brook SWMP

- Rea Catchment Partnership

2.2.5 Other Partnerships

There are a number of other partnerships in Birmingham whose primary function is not flood risk management, however flood risk management is included in their remit. Notable groups are:

- Birmingham Resilience Group/Local Resilience Forum
- Birmingham and Black Country Local Nature Partnership
- Birmingham and Black Country Nature improvement Area
- Tame, Anker and Mease Catchment Partnership

Policies

The following policy has been developed in response to this objective:

Policy 1:

The City Council **will** operate a flood risk management governance structure to support a partnership approach to managing flood risk.

3. Local Flood Risk

“Develop a clear understanding of flood risk from surface water, groundwater and ordinary watercourses and set out how this information will be communicated and shared”

3.1 Causes and Types of Flood Risk

Birmingham’s location, as well as topographical and geological characteristics, makes it susceptible to different types of flooding, from rivers, surface water and groundwater, as well as risks from sewers, reservoirs and canals.

Flooding is usually caused by natural weather events such as heavy intense storms or prolonged extensive rainfall when the volume of water overflows and inundates land which is usually dry. Due to the nature of the landscape and the urban nature of Birmingham flash floods are most commonly experienced and people often have little time to prepare or evacuate.

There are other factors which can cause or contribute to flooding these include:

- Inadequate maintenance of watercourses
- Blockage or collapse of sewer networks
- Blocked highway gullies
- Insufficient drainage networks
- Exceedance of the design standard of flood defence schemes
- Failure of flood defence schemes
- Inappropriate development in floodplains
- Inappropriate design of buildings, car parks etc.
- Inappropriate design of infill development
- Hard paving of front and rear gardens

3.1.1 Watercourse (Fluvial) Flooding

Flooding from rivers, called fluvial flooding, occurs during heavy or prolonged rainfall, or rapid snow melt, when a watercourse cannot convey the volume of water draining into it from the surrounding land. This can happen, for example, when heavy rain falls on an already waterlogged catchment or where blockages within the channel cause water to back-up. In the natural environment, flood plains are areas intended for overbank flow; however there are many cases of building on flood plains in Birmingham due to its urban nature.

Urbanisation has a real impact, with faster run-off rates from upstream urban areas due to impermeable surfaces and manmade drainage systems resulting in an increase in flow in the rivers downstream. Fluvial flooding can also cause sewers to back-up and flood households.

Nationally, fluvial flooding is a huge issue. Birmingham does not have large rivers that result in the sort of dramatic flooding that attracts national attention. There are however, 12 Main Rivers in Birmingham with numerous ordinary watercourses and countless unnamed streams and ditches. These can result in significant localised flooding simultaneously at several locations throughout the city.

The river system largely falls within the following river catchments:

- *River Tame* (through Handsworth, Perry Barr, Witton, Gravelly Hill, Bromford and Castle Vale);
- *River Rea* (from Frankley through Longbridge, Northfield, Kings Norton, Stirchley, Selly Park to Highgate, Digbeth, Duddeston and Nechells);
- *River Cole* (through Yardley Wood, Billesley, Hall Green into Sparkhill, Yardley, and Stechford).

Each of these have been heavily modified in places by human activity – some parts of these rivers now flow within engineered walls which have changed the shape, size and course of that river.

3.1.2 Surface Water (Pluvial) Flooding

Surface water is rainwater which is on the surface of the ground and has not entered a watercourse, drainage system or sewer. Surface water flooding occurs where high rainfall exceeds the drainage capacity in an area. Surface water cannot then enter the system or infiltrate into the ground and the drainage network overflows, with manholes surcharging. It is more difficult to predict and pinpoint than river or coastal flooding.

One of the most obvious and immediate forms of surface water runoff is on the highway. Highway drainage is generally the responsibility of the local authority as the highway authority. In the case of Birmingham City Council, maintenance of highway drainage is undertaken by Amey, the Council's Maintenance and Management Partner. Generally highways are drained by means of traditional gullies (drains) at the side of the road which drain to sewers or watercourse.

3.1.3 Groundwater Flooding

Groundwater flooding occurs when water levels in the ground rise above surface levels or into the basement of buildings. It is most likely to occur in areas underlain by permeable rocks, called aquifers. These can be extensive regional aquifers, such as chalk or sandstone; or may be more local sand or river gravels in valley bottoms underlain by less permeable rocks.

A geological fault crosses Birmingham from the north west to the south east, passing just to the south of the city centre. The underlying impermeable clay predominantly to the south traps water in the predominantly sandstone to the north. Historically this has been a source of water extraction mainly for industrial use. However this has reduced significantly with the decline in manufacturing industries, which is thought to be a contributory factor to groundwater levels in the City rising back to natural water table levels.

Some work has been done on understanding the nature of the groundwater problem in the city, including some research undertaken by University of Birmingham, and some predictions of future groundwater levels made. The Environment Agency reported that levels are stabilising, however, some property owners are unaware that there has always been water under floors or in cellars. More long term monitoring data is needed to assess the long-term implications for Birmingham.

Under the FWMA, LLFAs as the management authority for local groundwater flood risk.

3.1.4 Sewer Flooding

Sewer flooding occurs when sewers are overwhelmed by heavy rainfall or when they become blocked. The likelihood of flooding depends on the capacity of the local sewerage system.

Severn Trent Water is responsible for public sewers. Runoff from roofs and properties either drains to surface water sewers (which then typically discharge to a watercourse) or a combined sewer which under normal conditions conveys a mixture of foul and surface water to a sewage treatment works.

A large proportion of sewer floods are due to operational issues such as blockages, some resulting from inappropriate items being disposed of into sewers. Millions of pounds of damage is

caused each year as blocked drains cause sewer flooding, over 75% of which is as a result of preventable blockages such as fats, oils and grease being poured directly down kitchen sinks.

Individual property and land owners have responsibility for their own piped drainage infrastructure. Where piped drainage becomes part of the general shared infrastructure it is generally adopted as public and becomes the responsibility of Severn Trent Water.

3.1.5 Reservoirs and Pools

The failure of a reservoir dam can present a catastrophic or major flood risk. Large Raised Reservoirs present a specific risk during times of heavy rainfall. Any overtopping can cause a threat to the stability of dams.

There are 22 Large Raised Reservoirs within Birmingham. The EA is the enforcement authority for all reservoirs; the City Council has responsibility for 11 of these as the owner. The remaining reservoirs are the responsibility of the Environment Agency (3), Severn Trent Water (5), Canal and River Trust (1) and private companies (2).

The reservoirs owned by the City Council are designed to protect against a rainfall event that statistically should only occur once in 10,000 years or greater. Over topping is permitted in certain cases and the dam has to be designed and maintained so that any erosion will not undermine the stability of the dam.

3.1.6 Canal Breach and Overtopping

The Birmingham Canal Navigations system extends for approximately 160 miles. The canals converge in the city centre at Gas Street Basin.

Canals can breach or overtop as a result of elevated water levels from heavy urban runoff. When the canal system is overtopped due to inundation there is little that can be done as the canals are designed to take set amounts of water. There are water control structures to assist in water management; however these are only designed for normal levels of water.

3.2 Assessment of Historic Local Flood Risk

There is a history of flooding in Birmingham; recent years have seen a number of flooding events affecting Birmingham (September 1998, April 1999, June 1999, July 2000, June 2005, June 2007, July 2007, September 2008, June, July, September and November 2012, July 2013 and June 2016). During these events there are reports of flooding from watercourses, surface water, sewers and groundwater. However due to the urbanised nature of the Birmingham catchment there are often significant interactions between sources of flooding and it is not always possible to ascertain the source of the flooding. Main River flooding for example (the responsibility of the Environment Agency) is often combined with flooding from ordinary watercourses and localised surface water flooding.

Following these events flood surveys have been used by the City Council to capture data on the properties that have flooded and the extent of this flooding. The flood survey responses are recorded in a GIS database. It is important to remember that the data will not include every report of flooding for the following reasons:

- Not all flooding locations are reported to the council during or after an event.
- Not all flooding locations have historically been sent a flood survey. The protocol for sending out surveys is outlined in Section 5.
- Not all residents that are sent surveys return them.
- There is potential for under or over reporting the extent of flooding

In total 637 flood surveys have been returned reporting property internal flooding following events between 1998 and 2016, as shown in Table 3.1.

| Event | No. of Properties Flooding Internally |
|---------------------------------|---------------------------------------|
| 26 th September 1998 | 16 |
| 26 th April 1999 | 27 |
| 2 nd June 1999 | 18 |
| 6 th July 2000 | 52 |
| 28 th July 2005 | 16 |
| 14 th June 2007 | 111 |
| 20 th July 2007 | 25 |
| 6 th September 2008 | 126 |
| 28 th June 2012 | 18 |
| 6 th July 2012 | 4 |
| 24 th September 2012 | 0 |
| 25 th November 2012 | 0 |
| 23 rd July 2013 | 0 |
| 8 th June 2016 | 67 |
| 10 th June 2016 | 5 |
| 16 th June 2016 | 133 |
| Other | 19 |

Table 3.1– Flood Surveys Returned Indicating Internal Property Flooding

In addition to this, Severn Trent Water maintains a register of properties and external areas (such as gardens, highways, and open spaces) which have suffered and are at risk of rainfall related flooding from public sewers. This register is called the Sewer Flood Risk Register. It does not include flooding caused by blockages.

Birmingham City Council also publishes its historic flooding [online](#), to protect the sensitivity of this data and to build up an understanding of the areas that are susceptible to flooding, this has been plotted using postcode polygons whereby each polygon represents one or more properties which have flooded. Each polygon contains data on the number of flooding incidents and the date of each incident.

3.3 Assessment of Predicted Flood Risk

There are a number of national and local sources of data that are available that can be used to assess where there is potential for flooding to occur from watercourses, surface water and groundwater.

3.3.1 Surface Water Flood Risk

3.3.2 National Information on Surface Water Flood Risk

The Environment Agency has produced the Risk of Flooding from Surface Water (RoFSW) dataset which shows predicted surface water flooding.

The dataset is based on a bare earth model edited to account for buildings, roads, flow paths through structures and surface cover.

The mapping shows areas where surface water would be expected to flow or pond.

Three rainfall events, with probabilities of 3.3% (1 in 30), 1% (1 in 100) and 0.1% (1 in 1000) chance of occurring in any year are modelled and mapped.

For each rainfall probability, flood extents are derived; model results are also produced for depth, velocity, hazard rating and flow direction for maximum velocity.

3.3.3 Local information on Surface Water Flood Risk

As part of the [SWMP for Birmingham](#), maps have been developed that indicate the areas shown to be at risk of surface water flooding from a number of sources. This data does not cover the entire City, just those areas that were considered to be at the most significant risk of surface water flooding.

The flood extents are based on detailed hydraulic models that take account of rivers, minor open watercourses and piped networks of culverted watercourses and public sewers. When rainfall is applied to the model, it flows through the systems and floods where they become overloaded. The flow of flood water across the surface is also modelled in key areas, so that flood depths, speed and direction can be plotted.

The SWMP modelling assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):

- 1 in 30 (3.3%)
- 1 in 100 (1%)
- 1 in 200 (0.5%)

The peak depths are mapped to produce the flood outline maps. Depths of flooding less than 0.1m have been excluded for clarity. In addition, these would be unlikely to affect properties and would be seen as normal overland flow or puddles in the heavy rainfall that has been modelled.

3.3.4 Locally Agreed Surface Water Information

The Environment Agency guidance on surface water flood risk information recommends that Lead Local Flood Authorities should review, discuss, agree and record with partners what surface water information best represents local conditions, this is known as "locally agreed surface water information".

Birmingham's locally agreed surface water information will consist of the RoFSW maps overlaid by the SWMP maps in areas where detailed studies were carried out.

The reasoning is that the SWMP process has taken account the effect of the drainage system in much greater detail than the RoFSW maps process in the areas modelled. This means that the results should be more representative of local risk. Outside these areas, we have no specific results to plot, so the maps are the best available. Users may wish to interpret these in the light of comparisons in the detailed areas and to decide accordingly what additional information they may need to assess flood risk.

3.3.5 Groundwater Flood Risk

In response to the need for more information on groundwater flooding, the British Geological Society has produced the first national hazard or susceptibility data set of groundwater flooding. The data is based on geological and hydrogeological information and can be used to identify areas where geological conditions could enable groundwater flooding to occur and where groundwater may come close to the ground surface.

Although this is not a risk data set in that it does not provide information about the likelihood of a groundwater flood occurring, it can be used to provide an understanding of groundwater flooding. The five susceptibility zones are shown in the Table 3.2.

| Geological Class | Susceptibility |
|------------------|-------------------|
| 1 | Very High |
| 2 | High |
| 3 | Moderate |
| 4 | Low |
| 5 | Very Low |
| No data | No susceptibility |

Table 3.2 –Groundwater Susceptibility Zones

3.3.6 Ordinary Watercourses

National Information on Ordinary Watercourse Flood Risk

There are no national datasets that deal solely with predicted fluvial flood risk from ordinary watercourses; however there are a number datasets which contain relevant information, these being:

- Surface Water Management Plan

The SWMP flood extents are based on detailed hydraulic models that take account of rivers, minor open watercourses and piped networks of culverted watercourses and public sewers. Therefore in areas which are covered by the plan they provide a good indication of ordinary watercourse flood risk.

- Risk of Flooding from Surface Water

The RoFSW datasets can be used to make assumptions about the extent of flooding from surface water and small ordinary watercourses as in many cases this will be similar.

- Risk of Flooding from Rivers and Sea (RoFRS) & Flood Map for Planning (FMfP)

Whilst these datasets primarily show flood risk from Main Rivers they also shows flood risk from larger ordinary watercourses where the catchment is greater than 3km². Flood outlines are available for the following ordinary watercourses:

- River Cole
- Chinn Brook
- Hockley Brook
- Griffins Brook
- Chad Brook
- Perry Brook
- Plants Brook

3.3.7 Local Information on Ordinary Watercourse Flood Risk

There is no specific local ordinary watercourse flood risk information for Birmingham; however the outputs from SWMP can be used where available supplemented by the RoFSW, RoFRS and FMfP where appropriate.

Generally, due to the highly urbanised nature of Birmingham and the close interactions between watercourses, sewers and rainfall, Birmingham City Council prefers to undertake integrated modelling that considers how all sources of flooding interact as it is believed that gives a better indication of actual risk. Birmingham City Council will continue to develop these models where appropriate as part of its investigation and understanding of flood risk.

3.3.8 Studies Undertaken to Assess Local Flood Risk

The historic and predicted flood risk to Birmingham is outlined and assessed in a number of studies that have been undertaken in recent years. These studies are outlined below, for further information and mapping of flood risk please refer to the project reports that are available on the Birmingham City Council website.

Strategic Flood Risk Assessment

The purpose of the SFRA is to assess and map all known sources of flood risk, including fluvial, surface water, sewer, groundwater and impounded water bodies, taking into account future climate change predictions, to be used as an evidence base to locate future development, primarily in low flood risk areas.

This comprises two elements.

- The [Level 1 Strategic Flood Risk Assessment](#) (first produced in January 2010 and updated in January 2012) outlines flood risk and planning policies in relation to all locations identified in the Strategic Housing Land Availability Assessment (SHLAA) in terms of flood zones and the sequential test, together with wider guidance for windfall sites (A site which comes forward and receives planning permission in a location which was not anticipated or allocated in the Local Plan for that purpose)
- The [Level 2 Strategic Flood Risk Assessment](#) (April 2012) applies the exception test, by assessing in more detail sites in the SHLAA that are at flood risk but where the City Council would wish to promote due to the wider benefits to Birmingham.

Preliminary Flood Risk Assessment

The Flood Risk Regulations came into force on 10th December 2009 and implement the requirements of the European Floods Directive 2007, which aims to provide a consistent approach to managing flood risk across Europe. Under the regulations and in line with the FWMA, LLFAs are responsible for undertaking a PFRA for local sources of flood risk, primarily from surface water, groundwater and ordinary watercourses. The LLFA is not responsible for assessing the risk from Main Rivers, the sea and large raised reservoirs; this is the responsibility of the Environment Agency. However the interaction of flooding from Main Rivers and reservoirs with local sources needs to be taken into account, this is particularly important in the highly urbanised catchment of Birmingham where flooding regularly occurs as a result of interaction from several sources.

The PFRA is a high level screening exercise which entails collecting information on past (historic) and future (predicted) floods, assembling it into a PFRA report and using it to identify Flood Risk Areas which are areas where the risk of flooding is significant.

The PFRA forms part of a six year cycle of planning based on a four stage process as outlined in Table 3.3. The first round of the PFRA cycle was completed in 2015, with the publication of Flood Risk Management Plan for the Humber River Basin District. The second round of the cycle is underway and the updated [PFRA](#) has been produced.

| Cycle | Stage | Requirement | Publication Date |
|-------|-------|--|------------------|
| 1 | 1 | Prepare Preliminary Flood Risk Assessment | 2011 |
| | 2 | Identify Flood Risk Areas | 2011 |

| Cycle | Stage | Requirement | Publication Date |
|-------|-------|--|------------------|
| | 3 | Prepare Flood Hazard Maps and Flood Risk Maps for each Flood Risk Area | 2013 |
| | 4 | Prepare Flood Risk Management Plans for Each Flood risk Area | 2015 |
| 2 | 1 | Prepare Preliminary Flood Risk Assessment | 2017 |
| | 2 | Identify Flood Risk Areas | 2017 |
| | 3 | Prepare Flood Hazard Maps and Flood Risk Maps for each Flood Risk Area | 2019 |
| | 4 | Prepare Flood Risk Management Plans for Each Flood risk Area | 2021 |

Table 3.3 - Preliminary Flood Risk Assessment Stages.

Surface Water Management Plan

The SWMP process is a framework through which key local partners with responsibility for surface water and drainage in their area work together to understand the causes and effects of surface water flooding and agree the most cost effective and sustainable way of managing the risk for the long term. The emphasis is on ensuring that the plans are evidence based, risk based, future proofed and inclusive of stakeholder views and preferences. Working together helps to ensure innovative solutions and practices.

The SWMP is developed in four phases: Preparation, Risk Assessment, Options, and Implementation and Review. This is a widely adopted best-practice generic approach to evidence and risk based decision making.

The SWMP for Birmingham explains the level of risks posed and sets out who will do what to manage surface water in the area in the form of a long-term action plan. It is designed to influence future capital investment, drainage maintenance, public engagement and understanding, land-use planning, emergency planning and future developments.

The review phase of work, which will include stakeholder and wider community engagement on the plan, will continue for a number of years and to ensure the best possible outcomes, the SWMP will remain 'live' until the final stage of work is complete.

3.3.9 Wider Studies

Catchment Flood Management Plans

Catchment Flood Management Plans (CFMP) are strategic planning documents that provide an overview of the main sources of flood risk and how these can be managed in a sustainable framework for the next 50 to 100 years.

Birmingham is located within sub area 10 (Birmingham and the Black Country) of the River Trent CFMP, this is the most urbanised and populated sub area. The CFMP highlights that flood risk in this area is high with flooding occurring from a wide range of sources including the River Tame and its tributaries, surface water runoff, storm water drainage and sewer overflow.

The vision and preferred policy for this area is 'to take further action to manage flood risk'. This policy is about reducing the risk where the existing flood risk is too high and the CFMP highlights the need to take action in the short term to reduce this level of risk.

The key messages for the Birmingham area are:

- Work with others to minimise disruption to people and communities caused by flooding, taking into account future climate change, and urban growth in the policy unit area.
- Reduce the disruption caused by flooding to transport and infrastructure.
- Reduce the cost of flood damage within the policy unit, particularly where it is high and may be economically viable, within Birmingham and the Black Country.
- Promote and encourage urban drainage systems that will protect and improve water quality within the surrounding watercourses.
- Sustain and increase the amount of Biodiversity Action Plan (BAP) habitat in the catchment.
- Return watercourses to a more natural state, increasing biodiversity and opening up green river corridors throughout the policy unit, particularly through city centre regeneration projects

Flood Risk Management Plans

Flood Risk Management Plans (FRMPs) explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. FRMPs set out how risk management authorities will work with communities to manage flood and coastal risk over the period 2015-2021. Risk management authorities include the Environment Agency, local councils, internal drainage boards, Highways England and lead local flood authorities (LLFAs).

Each EU member country must produce FRMPs as set out in the EU Floods Directive 2007 and Flood Risk Regulations 2010. Each FRMP covers a specific river basin district. There are 11 river basin districts in England and Wales, Birmingham falls within the Humber river basin district.

Each river basin district also has a river basin management plan, which looks at how to protect and improve water quality, and use water in a sustainable way. FRMPs and river basin management plans work to a 6- year planning cycle. The current cycle is from 2015 to 2021. The Humber FRMP sits alongside the Humber river basin management plan.

The actions in the Humber FRMP are known as “measures”. They explain where and how the Environment Agency, and in some instances, other risk management authorities will focus effort and investment to reduce flood risk. The measures are grouped under 4 categories: preventing risk, preparing for risk, protecting from risk, and recovery and review.

River Basin Management Plans

The European Water Framework Directive (WFD), established a legal framework for managing the water environment across Europe. At its heart is an ecosystem approach requiring measures to be taken to encourage the sustainable use of water and to protect and improve inland surface waters, groundwater and coastal waters with the aim of achieving good status. It recognises that interested groups need to work together to design and implement improvements, taking a holistic and integrated approach to managing the water environment.

The WFD calls for a management plan to be developed for each river basin district with Birmingham falling into the Humber River Basin Management Plan. In England the Environment Agency is the competent authority for the WFD and it published the first river basin management plans in December 2009. The 2009 plans outlined the measures needed to bring more waters to good status by 2015 and what needed to be investigated to test whether all waters could justifiably achieve this aim by 2021 or 2027. The plans, including the objectives and measures they contain, must be reviewed and updated every 6 years.

3.4 Communicating and Sharing Flood Risk Information

A large amount of information on flood risk is available to the public on the Direct Gov and Birmingham City Council websites. This includes maps showing flood risk and the flood risk studies undertaken by Birmingham City Council outlined in this section.

When sharing flood risk information publically, Birmingham City Council will not name individual properties that are at flood risk. However we will target communication and awareness campaigns at areas where properties are at risk so that individuals, businesses and communities can understand the risk and make informed decisions on how to plan/manage that risk themselves.

The City Council's website will be reviewed and updated to take account of the latest available information and changes in flood risk management. Links will be provided to other organisation and to available information on flood risk.

Policies

The following policies have been developed in response to this objective:

Policy 2:

The City Council **will** use the most appropriate and up to date data on flood risk to provide an understanding of flood risk in Birmingham.

Policy 3:

The City Council **will** use data, when available, to increase public awareness of local flood risk and encourage communities to take action.

Policy 4:

The City Council **will** maintain a database of properties that have returned flood survey questionnaires and will track the actions taken by flood risk management partners in response to the flooding.

4. Asset Management

‘Outline how local flood risk assets are identified, managed and maintained and develop a clear understanding of riparian responsibilities’

In its role as LLFA and Land Drainage Authority, Birmingham City Council has a role in ensuring that flood risk assets are appropriately identified, maintained and managed as outlined below:

4.1 Asset Register

LLFAs are required, under Section 21 of the FWMA, to ‘establish and maintain a register of structures or features which, in the opinion of the authority, are likely to have a significant effect on a flood risk in its area. The Act also requires that the LLFA must arrange for the register to be available for inspection at all reasonable times.

Birmingham City Council has developed a web-based system that is accessible to the public at all times, it brings together information about flood risk assets that are managed by Birmingham City Council and third parties.

The [asset register](#) shows structures and features that are important to managing flood risk (such as flood defence walls, storage tanks, balancing ponds, land drainage, highway drainage) along with the relevant Flood RMA responsible for their maintenance.

The FWMA requires that only significant assets are included on the register, therefore criteria were applied to determine whether an asset was significant in terms of flood risk and hence every asset in Birmingham is not shown. These criteria are outlined in Appendix A. Furthermore there may be significant assets which we are not aware of at the present time, therefore the asset register will be updated regularly, and additional information will be added as it is identified.

All owners of assets that have been included on the register have been notified and advised that they should have an inspection and maintenance regime in place to ensure that it is operating as designed.

4.2 Asset Inspections

Assets on the register, both Birmingham City Council and third party, are inspected by the Flood Risk Management Team. The frequency of the inspection is dependent on the type of asset and the risk of blockage, varying between 18 months and 15 years. Where an asset inspection identifies an issue with an asset the asset owner is notified and asked to undertake the necessary maintenance works.

4.3 Designation

Birmingham City Council as LLFA has the power to designate any structure or feature which affects local flood risk. Once designated a person may not alter, remove or replace a designated feature without the consent of the responsible authority and a local land charge is designated. The City Council does not currently intend to use these powers.

4.4 Consenting

Birmingham City Council as LLFA is the Authority responsible for regulating activities on ordinary watercourses in Birmingham. As a result Birmingham City Council is legally responsible for dealing with applications for ordinary watercourse land drainage consents.

Any person planning to carry out work that may affect the flow or storage of water in an ordinary watercourse must seek consent from the relevant Authority before any work is commenced.

An ordinary watercourse is defined as any watercourse which is not a main river. A watercourse includes all rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers i.e. being vested in a sewerage undertaker etc.) and passages through which water flows, but may not hold water all the time.

If the watercourse is classed as Main River consent will need to be obtained from the Environment Agency for any works or structures in, under, over or within 8 metres from the top of the bank.

This ordinary watercourse consenting process is in place to ensure that any works carried out do not have a detrimental effect on other people or the environment. It also ensures that any works which may affect flood risk are properly designed. If works are carried out without consent, Birmingham City Council has enforcement powers to remove or modify them.

4.5 Land Drainage Byelaws

In addition to the powers and duties set out in the Land Drainage Act, Birmingham City Council has Local Land Drainage Byelaws for the purpose of preventing flooding or remedying or mitigating any damage caused by flooding in Birmingham. The byelaws only apply to ordinary watercourses that are vested in or under the control of the Council, i.e. chosen to actively maintain, rather than leave in riparian ownership.

4.6 Maintenance of Assets

The City's numerous watercourses, culverts and sewers need regular maintenance to ensure water can flow through freely, as intended.

The City Council's Flood Risk Management Team undertake maintenance of watercourses and culverts where necessary utilising a small revenue budget, including:

- Programmed Maintenance of grills (metal grills on a culvert which prevents debris entering) The frequency of inspection is biannually, quarterly, monthly or weekly dependent upon vulnerability to blockage and resultant flood risk.
- Removal of silt, vegetation and urban debris and other routine maintenance works to watercourses and culverts,
- Additional clearance works prior to or after severe rainfall;
- Inspections and CCTV surveys;
- Removal of vegetation from dam embankments and overflows;
- Fabrications of new grill structures, steel walkways and handrails; repairs to retaining walls, footbridges, sluices and fences; construction of access ramps; plus other minor flow improvement works.

The City Council as the Highway Authority has a duty to maintain the public highway and this includes highway drainage, via gullies which drain into the sewer or highway drains. The City Council has entered into a 25-year contract with Amey for highway maintenance and management services (from June 2010). This means that maintenance of the city's highway infrastructure (including highway drainage) is carried out by a private sector partner (Amey). This contract specifies standards to be met, including maintenance responsibilities for network drainage.

Other areas of the City Council are also involved in asset management, such as the Districts, often with the support of the local community. Within Leisure Services, Grounds Maintenance staff work to keep brooks free from litter to allow water to flow. Maintenance is also carried out by private landowners and Registered Social Landlords.

Power to Carry Out Work under Land Drainage Act

Blockages and debris in watercourses are often the result of fly-tipping and littering. Blockages may also be caused by property owners constructing fences etc. across watercourses on their property boundary. The City Council writes to riparian owners, as necessary, to remind them that it is the responsibility of the properties on either side of the brook to keep it maintained and free from obstruction.

The Land Drainage Act makes it the responsibility of owners of land at the top of the bank of a watercourse to keep it clear of blockages and obstruction to its centre. The City Council has the powers to serve notice on owners of watercourses who allow them to become impeded. The Council also has the powers to carry out any necessary work and recover the cost from the landowner. In both cases this is subject to appropriate noticing.

Policies

The following policies have been developed in response to this objective:

Policy 5:

The City Council **will** maintain a register of significant assets which it believes has an effect on flood risk and carry out routine inspections of these assets.

Policy 6:

The City Council **will not** consent to works on ordinary watercourse that increase flood risk or have a detrimental effect on the environment.

Policy 7:

The City Council **will** undertake maintenance works on watercourses and culverts for which it has responsibility for the purpose of flood risk management where it is essential in the general public interest.

Policy 8:

The City Council **will** use its powers under the Land Drainage Act to remove blockages to watercourses that present a flood risk and recover the costs from the landowner where they have failed undertake their riparian responsibilities.

5. Responding to Flooding

‘Define the criteria and procedure for responding to and investigating flooding incidents, and set out the role of emergency planning, flood action groups and individual property owners’

Birmingham City Council has a role in responding to and investigating flooding incidents. The following section sets out Birmingham City Councils response to local flooding and outlines the role of other groups and individuals.

5.1 Responding to Flooding Incidents

When flooding occurs, or is threatened, people often look to the local authority to take responsibility and take steps to prevent or reduce flooding. However, local authorities do not have a statutory duty to prevent properties from flooding. The powers are largely “permissive” – i.e. local authorities can undertake works in the general public interest but are not obliged to act.

5.1.1 Management of Flooding Events

The City Council has a Corporate Emergency Plan that specifies how the City Council will respond to any incident. This is prepared, maintained and activated by the Resilience Team. In addition to this there is the Multi-Agency Flood Plan for Birmingham which specifically outlines how multi-agency partners will work together to respond to and manage significant flooding incidents. As part of its contingency plans, the City Council maintains a number of duty officers which ensures that a range of Council services can respond to emergencies 24 hours a day every day.

5.1.2 Triggers for Deploying Resources

There is currently no reliable rainfall warning service that can be used to place resources on standby or to proactively deploy resources. To do so, given levels of confidence, would result in costs being incurred for significant levels of false alarm. The City Council will not deploy resources on the sole basis of weather forecasting. Weather forecasting and modelling has not yet reached a sufficient resolution for the purpose of initiating proactive flood response measures, but enhancements in technology in the future may make this possible.

An escalating series of triggers will be used to identify when resources should be deployed in a flooding emergency. These will draw from pre-existing knowledge, history and conditions, weather forecasting, the Met Office, Environment Agency (EA), Flood Forecasting Centre and liaison with local EA contacts, a range of council departments, FLAGs and other community resources. The aim is to ensure resources are deployed cost effectively responding to reliable assessment of risk rather than waiting for reports and eliminating so far as is practicable false alarm responses.

5.1.3 Provision of Sandbags

Sandbags are considered to be one of the first lines of defence in the event of flooding or potential flooding despite significant evidence of their limitations. In the event of widespread flooding there are insufficient resources available to despatch sandbags to individual properties that request them. This leads to false hope and flood defence teams being tied up serving a limited number of properties.

Deployment of sandbags

The City Council will provide sandbags in bulk deliveries to approved and informed stakeholder groups such as FLAGs at specified locations in order that they may form part of a community

flood action plan. The community group will take charge of the distribution in accordance with their local plan.

The City Council will **not** deliver sandbags to individual properties instead using available resources to attend strategic infrastructure and to deliver bulk sandbag drops to community FLAGS.

Storage of sandbags

The City Council will make formal and robust contractual provision with its suppliers (subject to proper approval) for the storage and provision of sandbags to support this policy in the event of a flooding emergency.

5.1.4 Role of Flood Action Groups

One of the best ways a neighbourhood can prepare for flooding is to set up a FLAG. These are community groups, led by volunteers that help residents in the flood watch area prepare and cope with incidents of flooding. FLAGS have designated Flood Wardens who monitor local conditions and facilitate two way communication with the Council and EA. Volunteer's support the warning of residents, identification of vulnerable people and ensure property level flood protection products (where available) are deployed in an emergency. All FLAGS in Birmingham have identified locations for bulk sand bag drops, and coordinate the distribution to the community.

Whilst the City Council encourages the development of FLAGS, not all residents at risk of flooding are involved in a FLAG. The response from the community varies in different areas across the city; generally engagement is driven by a previous history or experience of flooding. It is increasingly recognised that communities developing emergency response arrangements are likely to be more sustainable where the role of the FLAG is undertaken by residents drawn from existing neighbourhood groups.

5.1.5 Role of Individual Property Owners

Individual property owners can help the Council to respond to and investigate flooding by:

- Reporting flooding to the appropriate organisation;
- Providing detailed information on the nature of the flood and its impact;
- Completing flood survey returns thoroughly and returning them as soon as possible; and
- Reporting flooding incidents at reservoirs to the EA.

5.2 Recording Flooding Incidents

Surface Water, Ordinary Watercourses and Groundwater Flooding

All incidents of property flooding from surface water, ordinary watercourses or groundwater should be reported to the City Council at lfa@birmingham.gov.uk or on 0121 303 7235 or logged using the Birmingham City Council website. Urgent reports of internal property flooding out of hours should be reported to the out of hours service on 0121 303 4149.

During a severe weather event reports of flooding will reach the City Council through a number of routes including; direct reports from the community or external responding agencies, Customer Relationship Management process or through its Highways 24hr Control Room, some reports may come via other internal council services. Urgent flooding reports will be received by the Flood Risk Management Team or Drainage Out of Hours Officer and a triage approach applied to make best use of available resources. Each report will be recorded on a 'Flooded Sites Action Tracker' for later analysis.

Following the event the 'Flooded Sites Action Tracker', is used by the Birmingham Water Group to ensure that all flooding reports are dealt with by the responsible organisation. Where there is a report of internal flooding a flood survey will be sent to the properties at that location.

Sewer Flooding

All incidents of sewer flooding should be reported to Severn Trent Water on 0800 783 4444. The line is open 24 hours a day, seven days a week. The caller is advised when they can expect a visit. During the visit contractors will investigate the problem and if possible resolve the problem. If they find a problem with the public sewerage system such as a blockage, they'll arrange for it to be cleared. If it isn't immediately clear why your property or garden has flooded, they'll look into it further. In some cases the investigation can be complicated and take some time. Further information can be found at www.stwater.co.uk/my-supplies/waste-water-and-sewers/during-flooding/sewer-flooding/

All sewerage undertakers maintain a register of properties and external areas (such as gardens, highways, and open spaces) which have suffered rainfall related flooding from public sewers. This register is called the Sewer Flood Risk Register. It does not include flooding caused by blockages.

5.3 Duty to Investigate Flooding

The FWMA provides that Local Authorities will have a duty to investigate flooding. Section 19 of The Act states that:-

(1) On becoming aware of a flood in its area a LLFA must, to the extent that it considers it necessary or appropriate investigate –

which risk management authorities have relevant flood risk management functions , and

Whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood

(2) Where an authority carries out an investigation under subsection (1) it must –

(a) publish the results of its investigation, and

(b) notify any relevant risk management authorities

It follows that not all flooding will require a formal investigation and report. In order for Birmingham City Council to determine what extent it considers is 'necessary or appropriate' for investigation it must determine what constitutes a significant event and what metrics should be used to determine that significance.

Procedure

A three stage process is required to identify when a S19 investigation is required. Stage 1 is an initial assessment of a flooding report sufficient to ascertain with some confidence the extent of the flooding consequences. The second stage would be to carry out a detailed investigation of the sites where it has been deemed necessary and appropriate. Reporting and publishing would be the third stage. These stages may be described as: -

- Stage 1: Initial assessment
- Stage 2: S19 Investigation
- Stage 3: S19 Report and publish

It follows that there will be requirements for coordination and cooperation between risk management authorities at each stage and indeed following the outcome of a S19 Investigation. This will be via day to day officer communication and through the LLFA's governance process for flood risk management.

Stage 1: Initial Assessment

Following a flooding event the reports will be collated, assessed and flood surveys will be despatched to any locations where internal property flooding has been reported.

Stage 1 will be administered by the Flood Risk Management Team.

Stage 2: S19 Investigation

In the event that one or more of the following criteria is met a Stage 2 Investigation will be undertaken.

- Where one property has been flooded internally on more than one occasion
- Where five or more properties have been flooded internally on one occasion
- Where there has been a fatality or imminent risk to life, particularly in relation to flood hazards such as high velocity flows or deep water where it would not be expected to be found.
- Where there is an overwhelming political driver to publish a report into an incident/s
- Where there has been two or more near misses or a trend established that suggests a potential for future flooding
- Where there is ambiguity surrounding the source or responsibility of/for a flood incident that satisfies these requirements
- Where one or more flood risk management partner requests a S19 Investigation be carried out which can then be endorsed by the Birmingham Water Group.
- Where the effects of flooding result in unacceptable loss of productivity and disruption to a community
- Where failure of critical infrastructure occurs

The Stage 2 Investigation will return to Stage 1 and signed off as a Stage 1 Assessment if: -

- If the problem is already known and understood or works are proposed
- It becomes immediately clear that the problem was initially over reported
- It becomes immediately clear that the flooding risk or actual flooding is readily attributed to the failure or inadequacy of one asset
- It becomes clear that the flooding risk or actual flooding is readily attributed to an act of omission (operating procedures, maintenance etc.)

Stage 2 will be administered by the Birmingham Water Group (or a Project Group set up under its governance). An extraordinary meeting of the Birmingham Water Group may be convened by the LLFA to consider these matters or at the request of a partner.

A Stage 2 Investigation that determines that a RMA has a relevant management function and whether that function has been or is being exercised will proceed to Stage 3: Report and Publishing.

Stage 3: Report and Publish

Any S19 Investigation that progresses to a Stage 2 investigation will be reported to the Strategic Flood Risk Management Board for consideration before being published on the Council's website. The Board may recommend that: -

- Further investigatory work is undertaken (and advise on funding)
- Further work is undertaken on the text of the report prior to publication
- The report be published

The Board will consider the implications of the reported flooding issue for the flood risk management partners who will take back recommendations to their flood risk management bodies to identify how, as responsible bodies, they will exercise their functions to remedy any issues in their power. This response will be coordinated through the Birmingham Water Group and

progress reported to the Strategic Flood Risk Management Board. The Board will agree financial arrangements.

An extraordinary meeting of the Strategic Flood Risk Management Board may be convened to consider these matters at the request of any partner.

Stage 3 will be administered by the Strategic Flood Risk Management Board.

Policies

The following policies have been developed in response to this objective:

Policy 9:

The City Council **will** ensure that there is appropriately qualified and experienced staff available to respond to flooding emergencies 24 hours a day every day.

Policy 10:

The City Council **will not** deploy resources on the sole basis of weather forecasting, an escalating series of triggers will be used to identify when resources should be deployed.

Policy 11:

The City Council **will** provide sandbags in bulk deliveries to approved Flood Action Groups during a flooding event, sandbags **will not** be provided to individual properties.

Policy 12:

The City Council in liaison with the Environment Agency **will** support the establishment and maintenance of Flood Action Groups and other relevant community groups with guidance and advice in setting up flood plans and liaising with emergency services.

Policy 13:

The City Council **will** record all reports of flooding that it receives and will investigate those incidents that are considered significant.

6. Managing Flood Risk

‘Define the criteria for how and when flood risk management measures will be promoted to ensure that they provide value for money whilst minimising the long-term revenue costs and maximise external funding contributions’

6.1 Understanding flood risk

6.1.1 Community Awareness

Birmingham City Council will endeavour to raise awareness of flood risk, both historic and predicted, with affected communities. It is essential that communities understand their level of risk in order to set realistic expectations and achievable outcomes for local flood risk management.

6.2 Potential Flood Risk Management Actions

Potential Flood Risk Management Actions can be divided into the following five categories.

6.2.1 Maintenance

Ongoing maintenance is necessary to maintain assets that provide a level of resilience to the community. This is particularly important in locations where historic schemes have been implemented, to maintain the level of protection provided by those assets. Generally the owner of the asset is responsible for its maintenance.

Maintenance Programmes

As outlined in Section 4, the City Council’s Flood Risk Management Team undertake maintenance of watercourses and culverts, other departments of the City Council also undertake maintenance of their assets, Severn Trent Water has a maintenance programme in place for public sewers and the Environment Agency undertakes maintenance work on Main River.

Riparian Responsibilities

Owners of land adjoining, above or with a watercourse running through it, have certain rights and responsibilities. In legal terms they are a ‘riparian owners’.

- They must let water flow through their land without any obstruction, pollution or diversion which affects the rights of others.
- They should keep the banks clear of anything that could cause an obstruction and increase flood risk, either on their land or downstream if it is washed away. They should maintain the bed and banks of the watercourse and the trees and shrubs growing on the banks. They should also clear any litter from the channel and banks, even if they did not come from their land.
- They should always leave a development-free edge on the banks next to a watercourse. This allows for easy access to the watercourse in case any maintenance or inspection is required.
- They must keep any structures, such as culverts, trash screens, weirs and mill gates, clear of debris and must not culvert or alter the channel of a watercourse without consent.

6.2.2 Investigation

Where flooding has been reported or modelling suggests that an area may be at predicted risk of flooding further investigation may be necessary to improve the understanding of the flooding mechanism prior to determining the most appropriate action required to manage the flood risk.

For historic flooding further investigation will be undertaken in line with the flooding investigation protocol outlined in Section 5.

Where the risk is predicted from modelling, then it may be appropriate to carry out further investigation to fully understand the risk. This can be through site visits, gathering data or further modelling studies.

6.2.3 Mitigation

Mitigation measures may be appropriate to provide resilience/alleviation against flooding. Mitigation measures can take on various forms depending on the nature and extent of the problem and the funding available. In some areas issues may be easily solved through Property Level Resilience or small mitigation schemes that can generally be delivered in 2 to 6 years and in some areas long term strategies/programmes of work will need to be put in place which can take up to 25 years. The benefits of the work should outweigh any harmful consequences to: human health; the social and economic welfare of individuals and communities; infrastructure, and the environment (including cultural heritage). These provisions are important to ensure a proper balance between sustaining and enhancing the environment and reducing the risks to people, homes and businesses.

Sewer Flooding Schemes

Severn Trent Waters target is to reduce incidents of internal sewer flooding by 13% and external sewer flooding by 6%. They intend to do this by adopting a more risk based approach in line with EA/OFWAT Drainage Strategy Framework and the Sewerage Risk Management 5 (SRM5) methodology. They will be focussing on managing low severity sewer flooding through property level protection, whilst also increasing investment in schemes to increase the capacity of the network. They will continue to invest in repairing, replacing and rehabilitating their assets, as well as undertaking proactive and reactive maintenance of networks. They will have an increased emphasis on changing customer behaviours to reduce sewer blockages which can lead to flooding. They will deliver more sustainable solutions to flooding and work in partnership with other RMAs to deliver integrated flood risk management schemes. Finally, they will be significantly increasing the amount of real time monitoring and telemetry they have on their network to better understand and manage flood risk. Full details of their objectives can be found at <http://www.stwater.co.uk/2020-plan>

Riparian Rights

Riparian owners must accept flood flows from upstream and pass them uninterrupted through their land to lower land, even if these are caused by inadequate capacity downstream. A landowner has no duty in common law to improve the drainage capacity of a watercourse he/she owns. However they have the right to protect their property from flooding, and their land from erosion. If they propose to undertake any work, they must get their plans agreed with the RMA before they start work in order to ensure they do not have an adverse effect on adjacent land.

6.2.4 Policy

Some forms of flood risk are best managed through the implementation of flood risk management policies, this is particularly relevant to new development to ensure that flood risk to both the development and surrounding community is mitigated. The City Council has a number of existing policies that are outlined in Section 7 and will continue to develop new policies in response to changing legislation.

6.2.5 Communication

It is important when managing flood risk to take opportunities to raise awareness and communicate the risk to householders, communities and stakeholders so that they can understand the risks and decide whether to put their own plans in place to mitigate against these

risks. In some instances targeted awareness campaigns will be used to aid behavioural change, which in turn can lead to flood risk reductions.

6.3 Resources

6.3.1 Funding

The level of funding available for flood risk management is a real concern for the City Council. The following sources of funding are currently available to carry out works in relation to flood risk management.

Flood Defence Grant in Aid - Partnership Funding

In the past, flood risk management schemes were generally funded by central government through the Flood Defence Grant in Aid (FDGIA) process which allocated funding to projects nationally based on cost/benefit prioritisation. This led to only schemes that scored highly in terms of benefits outweighing costs being taken forward.

The Pitt Review suggested that central government should develop a scheme that allows and encourages local communities to invest in flood risk management. From 2012 a revised approach has been undertaken. Funding levels for each scheme, paid by central government as FDGIA, relate directly to the benefits the scheme delivers, including number of households protected, damages prevented, deprivation, environmental benefits and amenity improvement. If the FDGIA does not cover the cost of the scheme, in order to proceed the scheme cost can be reduced and/or local contributions would need to be found. This approach is outline in Figure 6.1 below.

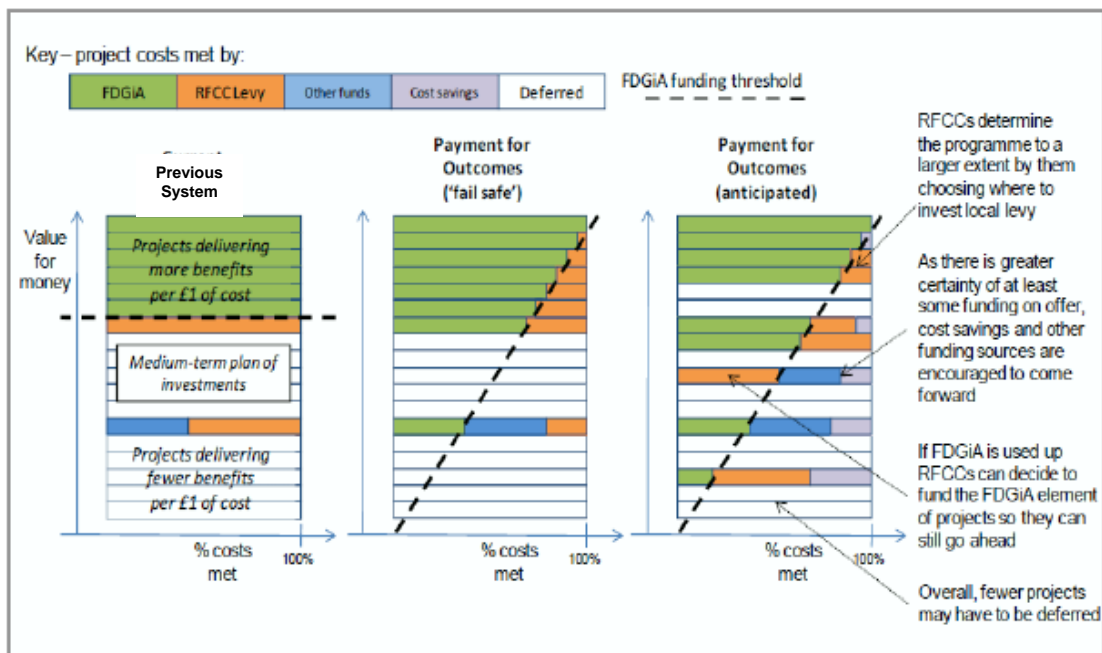


Figure 6.1 – Partnership Funding Approach

Between April 2015 and March 2021, the government has committed to invest £2.5 billion to reduce the risks of flooding and coastal erosion.

Local authorities, internal drainage boards and the Environment Agency are working together with local communities to develop 1,500 schemes.

These schemes will reduce flood risk to more than 300,000 households by March 2021.

The Environment Agency regularly review the [investment programme](#) to ensure it can respond appropriately to changes such as serious flooding, local partnership funding contributions and new flood risk information.

The on-going nature of the programme means it will be updated throughout the 6 years (April 2015 to April 2021).

The six year programme finishes in March 2021. Data on some projects are included beyond 2021 as work on these schemes commences during the current programme. The full programme after 2021 is still to be agreed.

Local Levy

The City Council pays levies to the Environment Agency as Local Levy. The Local Levy is raised by the Regional Flood and Coastal Committee (Birmingham sits within the Trent RFCC) and is used as a locally-raised source of income to fund projects within the Trent region. It can be used to fund projects that might not be eligible for national funding or as a regional contribution to scheme costs under the partnership funding approach.

The Trent RFCC has an agreed programme of projects and new projects proposals can be submitted every 3 months, although currently the programme is over committed.

Funding for Lead Local Flood Authority

Funding for LLFAs to meet the duties under the FWMA is provided to Birmingham City Council as part of its annual settlement. The money is not ring fenced so individual authorities must decide how much of the grant to spend and where.

Revenue Budget

The Flood risk Management Team also receive a small budget to support flood management responsibilities, these include land drainage and the maintenance of ordinary watercourses. This budget has reduced over recent years in line with City Council budget cuts.

Water Company Funding

Severn Trent Water invests money in flood alleviation as outlined in 6.2.3.

In some cases sewer flooding may combine with surface water or ordinary watercourse flooding thus making it beneficial to work with the LLFA to deliver partnership schemes.

Natural Environment Funding

Through engagement with wider natural environmental partnerships as outlined in 2.2.5 there may be opportunities to seek funding for projects which do not necessarily have flood risk management as their primary objective, but nevertheless include activities which help reduce flood risk.

Community Projects

Local Community and FLAGs have an important role to play in the implementation of flood risk management projects and environmental improvements. Strong local community involvement is important to build community ownership of the projects, build local pride in an area and to ensure that the improvements persist over the longer term rather than being one off improvements which soon deteriorate.

These groups also have the ability to tap into a range of resources and funding streams including Section 106 funds, EA and Severn Trent environmental protection expenditure, greenspace management, community chest and District resources and additional competitive grant funding from sources such as Natural England and Heritage Lottery.

6.3.2 Staffing

It is important that LLFAs increase their flood risk management capacity and skills in order to deliver the new responsibilities under the FWMA.

Current LLFA Capacity

Until 2000, Birmingham City Council had a large team of drainage engineers who improved and maintained the sewer network under an agency agreement for Severn Trent Water. Following termination of the agency, skilled staff were retained to operate as a multi-functional team with expertise in land drainage, flood risk management, infrastructure, reservoirs, operations and maintenance. The team consists of a Flood Risk Manager, three Drainage Engineers and a Senior Technical Officer. The team has experience in managing projects using a range of resources including Consultants for specialist advice.

Recruitment, Retention and Skill Enhancement

Defra, the Environment Agency and local authorities are working in partnership to build skills and knowledge and to help LLFAs carry out their duties under the FWMA.

Existing skills are enhanced by capacity building workshops, conferences and appropriate industry training as well as engagement with other partner organisations and through a LLFA forum.

Birmingham City Council is committed to supporting, retaining and developing the knowledge and skills of its staff. Staff are supported through personal appraisals and learning and development plans. Due to the enormous budget pressures on local government, it is important that learning and development is managed in the most cost effective way, using a full range of learning resources and approaches to meet these needs.

Where there is a shortage of skills within the team this will be filled by recruitment or consultant support in areas of identified shortfall subject to available budget provision.

6.4 Managing Expectations

With large parts of the City at historic or predicted risk of flooding, it is impossible for Birmingham City Council to undertake flood alleviation works to protect all of these locations due to limited budgets and resources. Therefore we need to spend the money where it will have the greatest benefit and will prioritise the receptors to flooding in the following order:

1. People (Risk to Life)
2. Critical Infrastructure
3. Homes
4. Business
5. Other Infrastructure
6. Amenities

6.5 Prioritising Works

When it comes to prioritising actions for capital works we will need to consider the following:

- Can a practical solution be developed?
- Is the solution cost beneficial?
- What is affordable and is there potential for funding?
- What will reduce the risk most to the highest risk receptors?
- What level of protection can be provided?
- Is there a legal requirement to undertake the work?
- Are there multiple sources of flooding and the opportunity to invest with other Risk Management Authorities?

- What is the design life of the protection measures?
- Can a solution be developed that mitigates flooding to more than one location or provides multiple benefits?
- Is it a local priority for the Regional Flood and Coastal Committee?
- Can arrangements be put in place for long term ownership and maintenance?
- Is there community support for the scheme?

Following a Section 19 investigation or other strategic study, the Flood Risk Management Team will look to put forward bids for FDGiA to undertake works where a viable scheme has been identified. Where the cost benefit of these schemes is such that the scheme cannot be fully funded by FDGiA alternative sources of funding will be explored including Local Levy and private contributions.

6.6 Proposed Flood Risk Management Mitigation

Birmingham City Council is committed to securing funding to undertake flood risk management mitigation measures to reduce the impact of flooding in Birmingham. Appendix B outlines the current locations where Birmingham City Council or its flood risk management partners are undertaking work or have bids in place for future funding; this may be in the form of:

- Feasibility Studies
- Detailed Design
- Bids for Partnership Funding and/or Local Levy
- Flood Mitigation Projects (where funding has been secured)

The Appendix B will be updated on an annual basis on the Birmingham City Council website.

Policies

The following policies have been developed in response to this objective:

Policy 14:

The City Council **will** seek funding opportunities, both public and private, to deliver flood risk management improvements.

Policy 15:

The City Council **will** seek to maintain and where possible increase its flood risk management skills and capacity

7. Flood Risk and Development

“Minimise the impact of development on flood risk by developing guidance, policies and standards that manage flood risk and reduce the flood risk to existing communities”

The risk of flooding is a key consideration in new development. The impact of flooding needs to be assessed and managed both in respect of the risk of flooding to a particular proposed development and any increased risk of flooding to surrounding and downstream areas from a proposed development.

The City Council will achieve this objective by ensuring that flood risk management is embedded into its development policies, broadly these aim to:

- Avoid new development in high risk flood areas;
- Promote the use of sustainable drainage and source control;
- Promote the adoption of flood risk reduction in land-use planning;
- Reduce runoff to greenfield rates for both greenfield and brownfield developments;
- Ensure that residual flood risk in new development is managed;
- Ensure that the impacts on flood risk upstream and downstream of a development site are managed;
- Promote de-culverting and naturalisation of watercourses; and
- Avoid the culverting of watercourses.

7.1 Planning Policies and Supporting Documents

The following planning policies and supporting documents contain policies and guidance to ensure that flood risk from new development is appropriately managed.

7.1.1 Birmingham Development Plan

The Birmingham Development Plan (BDP) 2031 sets out a spatial vision and strategy for the sustainable growth of Birmingham for the period 2011 to 2031, and will be used to guide decisions on planning, development and regeneration.. The Plan contains policies on flood risk, water quality and climate change to ensure that flood risk from new development is appropriately managed. Most notable is Policy TP6 Management of flood risk and water resources, which sets out planning requirements in terms of flood risk assessments and sustainable drainage.

7.1.2 Area Action Plans and Supplementary Planning Documents

Where appropriate, the City Council develops Area Action Plans and Supplementary Planning Documents to support the regeneration of areas of the City. Policies and guidance on flood risk, climate change and water quality are incorporated into these documents to ensure that these are fully taken account of in any development proposals.

7.1.3 Strategic Flood Risk Assessment

The SFRA for Birmingham reinforces the policies in the BDP. The purpose of the SFRA is to assess and map all known sources of flood risk, including fluvial, surface water, sewer, groundwater and impounded water bodies, taking into account future climate change predictions, to allow the Council to use this as an evidence base to locate future development primarily in low flood risk areas. While flooding cannot be prevented, its impacts can be mitigated and reduced

through integrated planning and management. The SFRA aims to ensure that flood risk is a key planning considerations to help deliver sustainable development.

The SFRA is a tool which will inform the Council of the nature and extent of flood risk in the area and highlights the opportunities for the Council to assist in the reduction of flood risk by applying the sequential test and exception test if applicable and outlining the requirements for developer Flood Risk Assessments and promotes the use of SuDS.

7.1.4 Green Living Spaces Plan

The Green Living Spaces Plan aims to secure, enhance and ensure the effective long term maintenance of the city's natural green and water spaces. This Plan is also about changing the way we do things; joining up agendas, agencies, services, users and funding; and re-positioning the importance of Parks. This Plan adopts seven principles to help shape all future development in the city as they will be enacted through the draft Your Green and Healthy City SPD.

Principle 2, The City's Blue Network is the most relevant to this strategy, it builds on the FWMA and the WFD to develop integrated SuDS, flood and water management solutions and develop a blue corridor/network policy with the Canal and River Trust.

7.2 Sustainable Drainage Systems

Conventional surface water drainage systems have traditionally used underground pipe networks to efficiently convey water away from sites. In the past this has led to problems of downstream flooding, reductions in groundwater recharge, wrong connections and waste pollution incidents associated with surface water overwhelming combined sewers.

SuDS is a term used to describe a sequence of management practices and control structures designed to drain surface water in a more sustainable manner than some conventional techniques. SuDS aims to mimic the natural drainage processes by reducing the quantity and improving the quality of surface water before it enters a watercourse; and may also be used to provide opportunities to improve local biodiversity and amenity. SuDS are not a new concept but they do require a different way of thinking about how drainage is managed.

7.2.1 Delivering Sustainable Drainage Systems

Following the Pitt Review, proposals to increase the uptake of SuDS in new developments were included in the Schedule 3 of the FWMA. The government has now implemented an alternative approach to the one envisaged in FWMA.

Local planning policy and decisions on major developments (10 dwellings or more; or equivalent non-residential or mixed development) are expected to ensure that SuDS for the management of runoff are put in place unless demonstrated to be inappropriate and that the sustainable drainage system should be designed to ensure that the maintenance and operation requirements are economically proportionate.

In addition to this there is an expectation in national planning policy that all developments in areas at risk of flooding should give priority to the use of SuDS. The Government also laid a statutory instrument making the LLFA a statutory consultee.

7.2.2 SuDS Guidance

The Sustainable Drainage: Guide to Design, Adoption and Maintenance has been drafted to provide detailed guidance to support the implementation of SuDS in future development in Birmingham, with particular emphasis on the local requirements for SuDS on all major development.

The specific objectives of the draft guidance are to:

- Enhance understanding of national and local requirements of SuDS

- Explain the principles and benefits of SuDS and the role these play in Birmingham
- Provide detailed guidance on the local requirements placed on developers
- Provide technical guidance with regard to specific SuDS features and associated landscaping, planting and ecology
- Provide guidance on the operation and maintenance requirements and adoption process

The guidance has been written to support developers within Birmingham following the recent changes to national policy regarding SuDS. This guidance is a living document and is subject to future revisions.

These general principles that should be followed, based on the guidance are:

- The LLFA require that all development (greenfield & brownfield) should limit surface water discharge to the equivalent site-specific greenfield runoff rate for all return periods up to the 1 in 100 year plus climate change event, unless it can be demonstrated to be unviable. Application of a climate change allowance of 30% is required.
- With regard to attenuation storage, evidence of exploring the potential of accommodating the required attenuation above ground in green/traditional SuDS features should be submitted with all applications. Underground attenuation structures should only be considered if above ground attenuation is proven to be unviable.
- Proposed finished floor levels should be designed to mitigate risk of flooding to people and property. The LLFA recommend that all property FFLs should be set to a minimum of 150mm above surrounding ground levels. A plan showing proposed FFLs and surrounding ground levels should be submitted with all applications.
- Consideration should be given to exceedance flows (greater than 1 in 100 year plus climate change rainfall events). Evidence (layout/flow plans, calculations and/or simulation results) should be provided, with all applications, to ensure that the surface water flood risk associated with exceedance events has been mitigated on- and off-site.
- Consideration should be given to the Operation and Maintenance of all proposed surface water features, including details of party responsible for the maintenance of each feature, specifications for inspection and maintenance actions and details of proposed contingency plans for failure of any part of the drainage systems that could present a hazard to people. This information should be submitted with all applications.

7.3 Assessment of risk from Ordinary Watercourses

There is no specific local ordinary watercourse flood risk information for Birmingham. Where a development is taking place adjacent to an ordinary watercourse or the surface water flow from a development discharge into a nearby ordinary watercourse, the LLFA require an appropriate assessment of the potential flood risk of the ordinary watercourses and the potential for interaction with surface water flood risk to be undertaken. This assessment may include analysis of the upstream catchment, appropriate boundary conditions and flow paths to enable identification of the ordinary watercourse flood extent, including flood depth and water level, in the 1 in 100yr, 1 in 100yr plus climate change and 1 in 1000yr events, and should be used to demonstrate that surface water management systems remain operational in all events up to the 1 in 100yr plus climate change events.

In accordance with the Birmingham Development Plan, an easement should be provided between the development and ordinary watercourse to provide access for maintenance, reduced flood risk and enable opportunities for amenity and biodiversity improvements.

7.4 De-Culverting and Naturalisation of Watercourses

In order to enhance the environment, improve water quality and meet WFD Targets the City Council will promote the de-culverting and naturalisation of watercourses.

The de-culverting of ordinary watercourses as part of any development proposals will be sought where feasible. The benefit of this is to increase the channel conveyance, reduce the risk of blockage, minimise the need for trash screens and most importantly to lead to an environmental enhancement of the area.

Open or closed culverts should only be used where no alternative exists. There is strong resistance to culverting of watercourses and other options (such as bridge crossings or diversions) should be explored and implemented where possible.

Many of Birmingham's watercourses flow within engineering channels, where appropriate, these should be removed and returned to a natural channel to provide environmental and water quality improvements.

Policies

The following policies have been developed in response to this objective:

Policy 16:

The City Council **will** establish and imbed flood risk management into its development policies to manage flood risk to new and existing communities.

Policy 17:

The City Council **will** implement the Sustainable Drainage Guidance on all developments in accordance with the Birmingham Development Plan.

Policy 18:

The City Council **will** require an assessment of flood risk as part of any development proposals adjacent to an ordinary watercourse.

Policy 19:

The City Council **will not** support the culverting of watercourses and **will** seek opportunities for the de-culverting and naturalisation of watercourses.

8. Environmental Implications

“Environmental Implications - adopt a sustainable approach to managing local flood risk by ensuring actions deliver wider environmental benefits”

It is important that the actions adopted to manage flood risk achieve wider environmental benefits. The implementation of flood risk management plans and measures provides an opportunity to improve the natural and built environment across Birmingham.

The strategy will contribute to the achievement of wider environmental objectives in the following ways:

- Encourage the use of Sustainable Drainage, to reduce runoff, diffuse pollution and improve water quality
- Encourage infiltration techniques where appropriate to improve aquifer recharge
- Encourage the de-culverting of watercourses
- Look to enhance biodiversity and habitat creation as part of any proposed flood alleviation schemes
- Encourage the provision of amenity green spaces as part of development proposals
- Promote WFD targets and work with the Environment Agency, Severn Trent Water and other partners to deliver improvements
- Undertake a Strategic Environmental Assessment (SEA) and Habitats Regulation Assessment (HRA) alongside the Strategy

8.1 Strategic Environmental Assessment and Habitats Regulation Assessment

Given the scope and content of this local strategy, DEFRA has determined that a statutory SEA and HRA is required to be undertaken to support the local strategy.

SEA is a statutory requirement for plans and programmes that could have significant environmental effects. The SEA process identifies, describes and evaluates potential effects, proposing where appropriate, mitigation and/or enhancement measures.

A SEA Study has been undertaken, this identifies, describes and evaluates the likely significant effects on the environment of implementing the Strategy. This has been undertaken by considering the potential effects of the Strategy on the following different aspects of the environment:

- Biodiversity
- Population
- Human health
- Soil and ground conditions
- Water resources
- Material assets
- Cultural heritage
- Landscape

The assessment concludes that the Strategy is unlikely to give rise to any significant adverse effects on the environment and is likely to result in beneficial effects in terms of human health, material assets and water resources.

A HRA has also been undertaken as an interactive process alongside the development of the strategy, in order to ensure that the proposals or options are assessed for their possible effects on European sites and modified or abandoned (as necessary) to ensure that the subsequently adopted plan is not likely to result in significant or adverse effects on any European sites, either alone or in combination with other plans. The Assessment has determined that policies contained within the Local Flood Risk Management Strategy for Birmingham will have no significant adverse effects on any European sites, either alone, or in combination with the effects of other schemes and developments. Having given due consideration to all aspects of the Strategy, including the nature, scale, timing, duration and location of all Policies within it, it is concluded that there will be no significant adverse effects on the integrity of any European sites within the zone of influence as a result of implementation of the Strategy. The existing policies contained within the Strategy are expected to have beneficial effects on ecology and wildlife both within the area of implementation as well as downstream. The Strategy has therefore been eliminated from further assessment in the HRA process.

8.2 Water Framework Directive

The WFD establishes a legal framework for the protection, improvement and sustainable use of water bodies, including rivers, streams, brooks, lakes and groundwater. It sets challenging targets for all surface and groundwater bodies to reach 'good status' by 2015. However, it is recognised that some water bodies are 'artificial' or 'heavily modified' and sets lower targets of reaching 'good ecological potential' by 2027.

The Environment Agency is the competent authority for the Directive in England and Wales and is responsible for producing River Basin Management Plans which set out actions or measures required to meet the WFD objectives. Actions are set out for a wide range of organisations, including water companies and local authorities who are co-deliverers with the Environment Agency.

This strategy and the plans and policies referred to in it contribute to the WFD targets by:

- Incorporating water quality targets into strategic and local planning policies, including the BDP, Area Action Plans and Supplementary Planning Documents.
- Integrating water environment and WFD issues into drainage and flood risk management functions, including the promotion of SuDS..
- Engaging with businesses and the public to raise awareness and stimulate behaviour change in relation to fly-tipping and littering of watercourses and drainage misconnections.
- Working with partners and others (including residents, community groups, voluntary sector organisations, businesses and landowners), to protect and enhance the water environment.

Policies

The following policy has been developed in response to this objective:

Policy 20:

The City Council **will** ensure that where feasible flood risk management actions deliver wider environmental benefits.

9. Strategy Monitoring and Review

Continued monitoring, review and development of this strategy is essential to ensure that the strategy remains relevant. It should be considered a living document and should be subject to rolling review, to ensure that new guidance and data is incorporated into the strategy. Issues which could trigger a review include changes to legislation, the development of the understanding of local flood risk, occurrence of a major flood event, revised planning policies and the development of Flood Risk Management Plans. These issues will be discussed at the regular meetings of the Birmingham Water Group and Strategic Flood Risk Management Board and where the group feels there is a significant need, the document will be updated.

Where other documents or strategies are referred to in this document the reference should be taken to refer to all subsequent updates and revisions. Such documents are not included in great detail in this strategy for this reason.

Appendix A – Criteria for Determining Critical Assets

Criteria for inclusion in Asset Record

Only assets in the Asset Record deemed to be significant in terms of flood risk should be published to the public website. The following criteria were applied to determine whether an asset was significant in terms of flood risk:

| Asset Layers | Criteria for inclusion on register | Further justification |
|-----------------------|--|--|
| Culverts and channels | <p>Any culvert or channel on Main River or ordinary watercourse that:</p> <ul style="list-style-type: none"> has an inlet grill; Was constructed as part of a flood alleviation scheme; Has been modified to increase its capacity as part of a flood alleviation scheme. | <p>Grills will have been placed on those culverts where blockage would have significant flood risk consequences.</p> <p>Any feature constructed as part of a flood alleviation scheme would have been put in place to protect the local population against flooding and therefore should be considered as significant.</p> |
| Flood defence walls | <p>Any flood defence wall (including flood gates and bunds) protecting more than one property constructed as part of a flood alleviation scheme.</p> | <p>Any feature constructed as part of a flood alleviation scheme would have been put in place to protect the local population against flooding and therefore should be considered as significant.</p> |
| Drainage | <p>Any ACO channel or Beany Block type drainage asset or swale constructed as part of a flood alleviation scheme</p> <p>Any manhole, hydrobrake, overflow, non-return valve or flap valve constructed as part of a flood alleviation scheme</p> <p>Any feature adopted by the SAB</p> | <p>Any feature constructed as part of a flood alleviation scheme would have been put in place to protect the local population against flooding and therefore should be considered as significant.</p> <p>The Flood and Water Management Act states that we have to include all assets that we adopt.</p> |
| Grills | <p>All grills (EA and BCC)</p> | <p>All inlet grills are in place to protect culverts for blockage and therefore should be considered significant.</p> <p>All grills are vulnerable to blockage and therefore may cause flooding as a result of backing up.</p> |
| Gullies | <p>Any gully within an area at risk of surface water flooding in a 1 in 30 year event (shallow) as defined by the FMfSW</p> | <p>This mapping effectively defines low-spots where water will naturally pond. It is the gullies in the low spots which would have the most significant effect on flood risk were they not to function effectively.</p> <p>As sewers are designed to a 1 in 30 year event this return period would seem appropriate.</p> |
| Reservoirs | <p>Any reservoir under the Reservoir Act</p> | <p>Any reservoir that falls under the Act would</p> |

| Asset Layers | Criteria for inclusion on register | Further justification |
|------------------------------|--|--|
| | <p data-bbox="480 233 613 264">(>25,000 m³)</p> <p data-bbox="480 310 886 436">Any reservoir over 10,000m³ which impounds water above ground level and would pose a risk to people and property should it fail.</p> | <p data-bbox="963 233 1365 296">have significant flood risk consequences should it fail.</p> <p data-bbox="963 310 1422 436">Any reservoir which meets this criteria is likely to come under the Act in the future due to the level of risk and therefore these assets should be considered as significant.</p> |
| Storage | Any flood storage area constructed as part of a flood alleviation scheme or adopted by the SAB | <p data-bbox="963 453 1403 621">Any feature constructed as part of a flood alleviation scheme would have been put in place to protect the local population against flooding and therefore should be considered as significant.</p> <p data-bbox="963 632 1419 726">The Flood and Water Management Act states that we have to include all assets that we adopt.</p> |
| EA Main River Assets (NFCDD) | Any asset identified as a raised defence in NFCDD | NFCDD inspections have identified these assets as raised defences and hence they should be considered as protecting the local population against flooding. |
| Severn Trent Water Assets | Assets related to combined or surface water drainage. Pending STW approval | |
| Canals | Any elevated section of canal | Any elevated section of canal has the potential to cause flooding to the local population if it were to breach and hence should be considered as significant. |

Appendix B – Proposed Flood Risk Management Mitigation

| Location | Action | Source of Flooding | Timeframe (*) | No. Properties to be at Reduced Flood Risk | Source of Funding | Third Party Contributions Required for Action to Proceed (**) | Lead Organisation |
|---------------------------|----------------------------|-----------------------|---------------|--|----------------------|---|-------------------------|
| Lodge Hill | Flood Alleviation | Sewer & Surface Water | By 2019 | 30 | FDGiA/Local Levy/STW | Yes - secured from STW | Birmingham City Council |
| Slade Road, Erdington | Property Level Resilience | Surface Water | By 2019 | 15 | FDGiA | No | Birmingham City Council |
| Selly Park North | Flood Alleviation Scheme | Bourn Brook | By 2019 | 125 | FDGiA | Yes - secured | Environment Agency |
| Selly Park South | Flood Alleviation Scheme | River Rea | By 2019 | 245 | FDGiA | Yes - secured | Environment Agency |
| Perry Barr and Witton | Flood Alleviation Scheme | River Tame | By 2019 | 715 | FDGiA | Yes - Secured from Local Levy & BCC | Environment Agency |
| Bromford | Flood Alleviation Scheme | River Tame | By 2021 | 840 | FDGiA | No | Environment Agency |
| Fisher Close, Frankley | Community Flood Protection | Surface Water | By 2021 | 7 | FDGiA | Yes | Birmingham City Council |
| Calthorpe | Flood Alleviation Scheme | River Rea | Post 2021 | 294 | FDGiA | Yes | Environment Agency |
| Kings Norton | Flood Alleviation Scheme | River Rea | Post 2021 | 48 | FDGiA | Yes | Environment Agency |
| Northfield | Flood Alleviation Scheme | River Rea | Post 2021 | 81 | FDGiA | Yes | Environment Agency |
| The Bourn | Flood Alleviation Scheme | The Bourn | Post 2021 | 229 | FDGiA | Yes | Environment Agency |
| Grasmere Road, Handsworth | Property Level Protection | Surface Water | Post 2021 | 6 | FDGiA | Yes | Birmingham City Council |
| Digbeth | Flood Alleviation Scheme | River Rea | Post 2021 | 234 | FDGiA | Yes | Environment Agency |
| Factory Road, Gib Heath | Property Level Protection | Surface Water | Post 2021 | 6 | FDGiA | Yes | Birmingham City Council |
| Stonehouse Brook | Flood Alleviation Scheme | Stonehouse Brook | Post 2021 | 69 | FDGiA | Yes | Environment Agency |

Note:

* Timeframe is an indication of the likely phasing of the action, however this is subject to annual review and depends on the number of schemes coming forward through the Partnership Funding process, therefore some schemes may move forward or backward in programme.

** Securing third party contributions can mean that schemes may be moderated into the programme

Key

FDGiA - Flood Defence Grant in Aid

STW - Severn Trent Water

BCC - Birmingham City Council