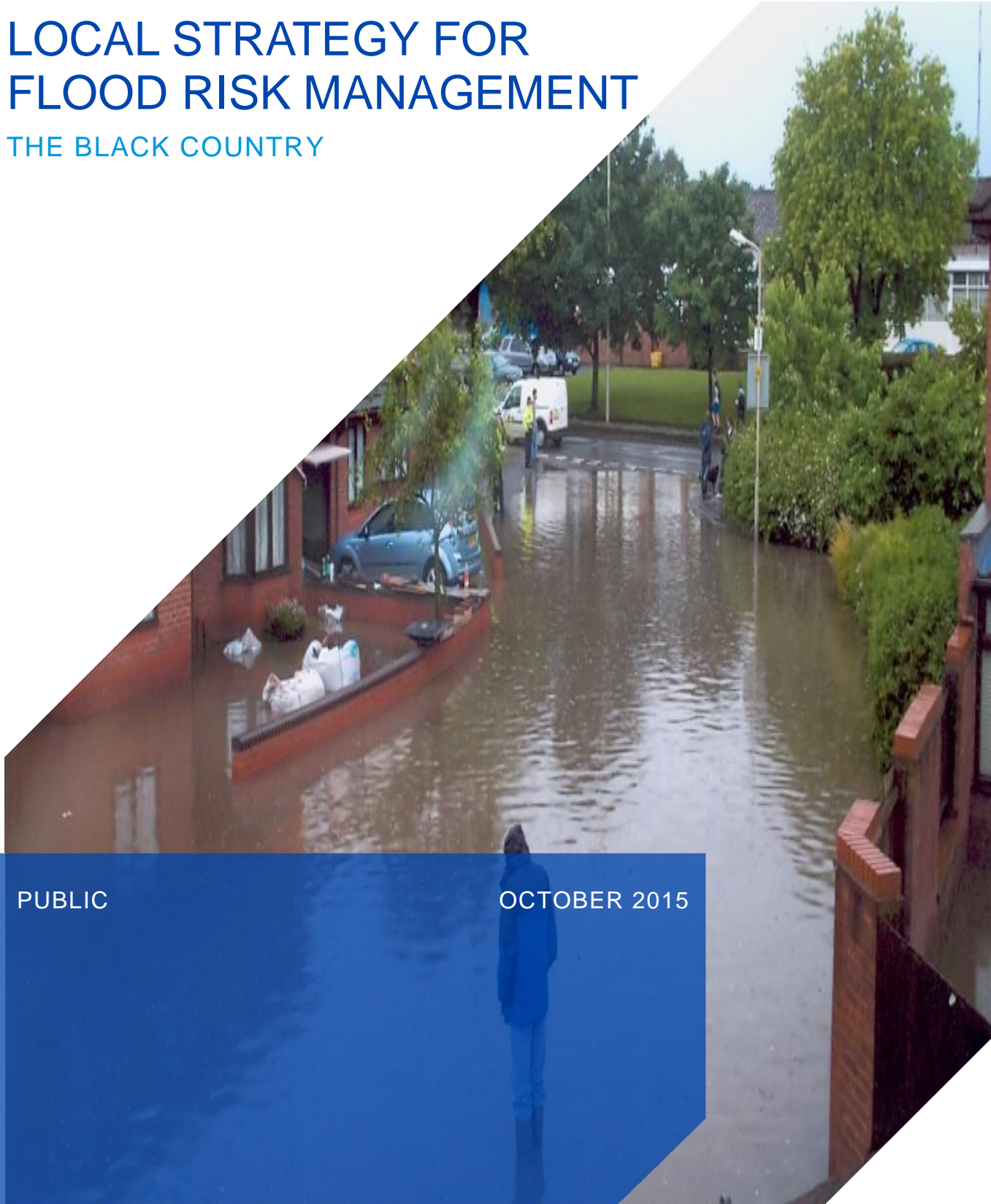


# LOCAL STRATEGY FOR FLOOD RISK MANAGEMENT

THE BLACK COUNTRY



PUBLIC

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# LOCAL STRATEGY FOR FLOOD RISK MANAGEMENT

**The Black Country**

## **Public**

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Cover photo: Example of recent surface water flooding within the Black Country (2010)

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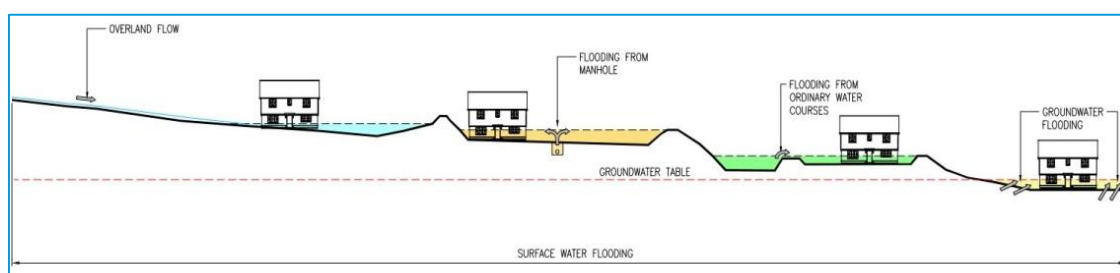
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# TERMINOLOGY

## KEY DEFINITIONS

TERM	MEANING
Surface water flooding	In this context, surface water flooding describes flooding from sewers, drains and runoff from land, small water courses and ditches that occurs as a result of heavy rainfall.
Groundwater flooding	Caused by raised groundwater levels, typically following prolonged rain. High groundwater levels may result in increased overland flow flooding.
Overland Flow / Surface Water Run-off / Pluvial Flooding	Water flowing over the ground surface that has not reached a natural or artificial drainage channel.
Fluvial flooding	Fluvial flooding occurs when rivers overflow and burst their banks, due to high or intense rainfall which flows into them.
Main river	Main rivers are usually larger streams and rivers which have been designated as such by Defra and the Environment Agency. The Environment Agency has powers to undertake works on any stretch of main river and is responsible for flood risk management activities.
Ordinary watercourse	Ordinary watercourse is a statutory designation which includes every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows and which does not form part of a Main River.





# GLOSSARY

TERM	MEANING
<b>Area Action Plans (AAP)</b>	A type of Development Plan Document focussed on a specific location or area subject to conservation or significant change (e.g. major regeneration).
<b>The Black Country</b>	A term loosely describing the area between Birmingham and Wolverhampton. In planning and local authority terms it includes Dudley Metropolitan Borough Council, Sandwell Metropolitan Borough Council, Walsall Council and Wolverhampton City Council.
<b>Catchment Flood Management Plan (CFMP)</b>	A strategic planning tool through which the Environment Agency works with other key decision-makers within a river catchment to identify and agree policies for sustainable flood risk management.
<b>Chance of flooding</b>	The chance of flooding is used to describe the frequency of a flood event occurring in any given year, e.g. there is a 1 in 100 chance of flooding in this location in any given year. This can also be described as an annual probability, e.g. a 1% annual probability of flooding in any given year. The guidance uses the chance of flooding with the annual probability of a flood incident occurring in brackets. The use of return periods should be avoided.
<b>Communities and Local Government (CLG)</b>	Communities and Local Government is the Government department which sets policy on local government, housing, urban regeneration, planning and fire and rescue. They have responsibility for all race equality and community cohesion related issues in England and for building regulations, fire safety and some housing issues in England and Wales. The rest of their work applies only to England. Provides funding to and agrees expenditure plans for Local Authorities.
<b>Core Strategy</b>	A Development Plan Document setting out the spatial vision and strategic objectives of the planning framework for an area, having regard to the Community Strategy.
<b>Community Infrastructure Levy (CIL)</b>	A locally agreed sum levied upon developers to be used as funding for strategic infrastructure needed to support the development. This can include flood risk management infrastructure.
<b>Critical infrastructure</b>	Infrastructure which is considered vital or indispensable to society, the economy, public health or the environment, and where the failure or destruction would have large impact. This would include emergency services such as hospitals, communications, electricity sub-stations, water treatment works, transport infrastructure and reservoirs.
<b>Department for Environment, Food and Rural Affairs (Defra)</b>	Department that brings together the interests of farmers and the countryside; the environment and the rural economy; the food we eat, the air we breathe and the water we drink.
<b>DG5 Register</b>	A Water and Sewerage Company (WaSC) held register of properties which have experienced sewer flooding (either internal or external flooding) due to hydraulic overload, or properties which are 'at risk' of sewer flooding more frequently than once in 20 years.
<b>Environment Agency (EA)</b>	Established by the Environment Act 1995, and is a Non-Departmental Public Body of Defra. The Environment Agency is the leading public body for protecting and improving the environment in England and Wales today and for future generations. The organisation is responsible for wide-ranging matters, including the management of all forms of flood risk, water resources, water quality, waste regulation, pollution control, inland fisheries, recreation, conservation and navigation of inland waterways. It will also have a new strategic overview for all forms of inland flooding.
<b>Environment Agency Flood Zones</b>	Flood zones on the maps produced by Environment Agency providing an indication of the probability of flooding (from rivers and the coast) within all areas of England and Wales.
<b>Exceedance flows</b>	Excess flow that appears on the surface once the capacity of the underground drainage system is exceeded
<b>FCERM policy</b>	Sets out the principles that should guide decision making on the sustainable management of flood and coastal erosion risk in England

<b>Flood Defence Grant in Aid (FDGIA)</b>	Central government funding to Flood Risk Management Authorities in order to manage flood and coastal erosion risk in England
<b>Flood Risk Assessment (FRA)</b>	An assessment of the flood risk to and from a proposed new development to demonstrate how flood risk from all sources of flooding to the development itself and flood risk to others will be managed now and taking climate change into account (see PPS25 paragraph E8 to E10 and paragraphs 3.98 to 3.94 of the PPS25 Practice Guide).
<b>Flood Risk Management Plan</b>	A plan for the management of a significant flood risk. The plan must include details of: a) objectives set by the person preparing the plan for the purpose of managing the flood risk, and b) the proposed measures for achieving those objectives (including measures required by any provision of an Act of subordinate legislation).
<b>Flood Risk Regulations 2009</b>	Legislation that transposed the Floods Directive in England and Wales.
<b>Flood (Risk Management) Strategy</b>	An Environment Agency output which provides a detailed assessment of flood risks (from rivers and the sea) at a location or for a whole catchment and the preferred management measures.
<b>Flood Map for Surface Water (FMfSW)</b>	The Flood Map for Surface Water shows areas where surface water would be expected to flow or pond, as a result of two different chances of rainfall event. The areas at risk of flooding are displayed in two bands showing a) surface water flooding and b) areas of deeper surface water flooding. The map better represents the mechanisms that cause surface water flooding than the current 2009 Areas Susceptible to Surface Water Flooding map as it takes account of more localised datasets and maps two storm likelihoods (1 in 30 and 1 in 200 year events). This map has now been superseded by the Risk of Flooding from Surface Water map.
<b>Floods and Water Management Act (2010)</b>	The Flood and Water Management Act (FWMA) came into effect on Monday 12th April 2010. The Act takes forward a number of recommendations from the Pitt Review into the 2007 floods and places new responsibilities on the Environment Agency, local authorities and property developers (among others) to manage the risk of flooding.
<b>Floods Directive</b>	The EU Floods Directive came into force in November 2007 and is designed to help Member States prevent and limit the impact of floods on people, property and the environment. It was transposed into English law in December 2009 by the Flood Risk Regulations.
<b>Grant in Aid</b>	Grant in Aid funding is provided by Defra to the Environment Agency to invest in flood risk management schemes. Funding from the Environment Agency which can be provided to local authorities to invest in flood risk schemes is called Capital Grant. Capital Grant is approved through the Project Appraisal Review (PAR) process.
<b>Greenfield runoff rate</b>	The rate of runoff which would occur from a site that was undeveloped and undisturbed.
<b>Highways England</b>	The national body responsible for managing, maintaining and improving England's motorways and trunk roads.
<b>Hotspot</b>	A hotspot is an area perceived and identified locally as being at greatest risk of surface water flooding
<b>LiDAR</b>	Light Detection and Ranging - high accuracy, high resolution elevation data derived from airborne sources.
<b>Local Development Framework (LDF)</b>	A non-statutory term used to describe a folder of documents which includes all the local planning authority's Local Development Documents (LDDs). The local development framework will also comprise the statement of community involvement, the local development scheme and the annual monitoring report.
<b>Local Planning Authority (LPA)</b>	The local planning authority (LPA) is empowered by law to exercise planning functions. Often the local borough or district council. National parks and the Broads authority are also considered to be local planning authorities. County councils are the authority for waste and minerals matters.
<b>Local Resilience Forums (LRF)</b>	LRFs are multi-agency forums, bringing together all organisations that have a duty to co-operate under the Civil Contingencies Act, and those involved in responding to emergencies. They prepare emergency plans in a co-

	ordinated manner.
<b>Main River</b>	Main Rivers are watercourses marked as such on a main river map. Generally main rivers are larger streams or rivers, but can be smaller watercourses. Main Rivers are determined by Defra in England, and the Environment Agency has legal responsibility for them.
<b>National Planning Policy Framework (NPPF)</b>	The National Planning Policy Framework was published in March 2012. It sets out the government's strategy for planning, aiming to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. Further information as to how this should be applied is detailed in Planning Practise Guidance.
<b>Net Present Value (NPV)</b>	The discounted value of a range of costs and benefits. NPV is used to describe the difference between the present value of costs and benefits in future years.
<b>Ordinary watercourse</b>	An ordinary watercourse is any other river, stream, ditch, cut, sluice, dyke or non-public sewer which is not a Main River. The local authority or Internal Drainage Board have powers for such watercourses.
<b>Partner</b>	Defined as someone with responsibility for decisions or actions. They share joint responsibility for these decisions/actions.
<b>Pitt Review</b>	An independent review of the 2007 summer floods by Sir Michael Pitt, which provided recommendations to improve flood risk management in England.
<b>Pluvial flooding</b>	'Pluvial' flooding (or surface runoff flooding) is caused by rainfall and is that flooding which occurs due to water ponding on or flowing over the surface before it reaches a drain or watercourse.
<b>Rate Support Grant</b>	Funding mechanism from CLG to Local Authorities, which provides funding for all Local Authority responsibilities.
<b>Resistance measures</b>	Resistance measures are designed to keep flood water out of properties and businesses, and could include flood guards for example.
<b>Regional Flood and Coastal Committee (RFCC)</b>	The Regional Flood and Coastal Committee (RFCC) is a committee established by the Environment Agency under the Flood and Water Management Act 2010 that brings together members appointed by Lead Local Flood Authorities (LLFAs) and independent members with relevant experience for three purposes:
<b>Riparian owners</b>	A riparian owner is someone who owns land or property adjacent to a watercourse. A riparian owner has a duty to maintain the watercourse and allow flow to pass through freely.
<b>Risk</b>	In flood risk management risk is defined as the probability of a flood occurring x consequence of the flood.
<b>River Basin Management Plans (RBMP)</b>	A management plan for all river basins required by the Water Framework Directive. These documents will establish a strategic plan for the long-term management of the River Basin District, set out objectives for waterbodies and, in broad terms, what measures are planned to meet these objectives, and act as the main reporting mechanism to the European Commission.
<b>Sequential Test</b>	A planning principle that seeks to identify, allocate or develop certain types or locations of land before others. The test is designed to guide development away from areas at high risk from flooding.
<b>Severn Trent Water</b>	One of the ten water authorities in England formed under the Water Act 1973, to supply fresh water and treat sewage for around 8 million people living in the Midlands region of England and also certain regions of Wales.
<b>Sewerage Management Plan (SMP)</b>	A Sewerage Management Plan is the output from the SRM process.
<b>Strategic Flood Risk Assessment (SFRA)</b>	A SFRA provides information on areas at risk from all sources of flooding. The SFRA should form the basis for flood risk management decisions, and provides the basis from which to apply the Sequential Test and Exception Test (as defined in PPS25) in the development allocation and development control process (see paragraph E5 to E7 of PPS25 and paragraphs 3.39 to 3.79 of the PPS25 Practice Guide).
<b>Supplementary Planning Document (SPD)</b>	A Supplementary Planning Document is a Local Development Document that may cover a range of issues, thematic or site specific, and provides further detail of policies and proposals in a 'parent' Development Plan Document.

<b>Surface water flooding</b>	In this context, surface water flooding describes flooding from sewers, drains, groundwater, and runoff from land, small water courses and ditches that occurs as a result of heavy rainfall.
<b>Sustainable Drainage Systems (SuDS)</b>	Sustainable drainage systems: a sequence of management practices and control measures designed to mimic natural drainage processes by allowing rainfall to infiltrate and by attenuating and conveying surface water runoff slowly compared to conventional drainage. SuDS can operate at different levels; ideally in a hierarchy of source control, local control and regional control, and can be used in both rural and urban areas.
<b>The Black Country</b>	The administrative areas of Dudley, Sandwell, Walsall and Wolverhampton.
<b>The Black Country authorities</b>	Dudley Metropolitan Borough Council (MBC), Sandwell, Metropolitan Borough Council (MBC), Walsall Council and Wolverhampton City Council.
<b>Risk of Flooding from Surface Water map</b>	The Risk of Flooding from Surface Water map was published publicly on the Environment Agency's website in December 2013. It improves upon the Flood Map for Surface Water (2010), and the Areas Susceptible to Surface Water Flooding maps (2009) through incorporating improvements in modelling techniques, understanding and data; combining appropriate local mapping from LLFAs with national mapping to provide an improved and consistent picture of surface water flood risk; and providing velocity and depth information for a range of flood probabilities.
<b>Water and sewerage company (WaSC)</b>	Set up under the Water Industry Act 1991. Ten regional water and sewerage operators provide sewerage services in England and Wales. They are South West Water, Wessex Water, Southern Water, Thames Water, Anglian Water, Severn Trent Water, Yorkshire Water, United Utilities, Northumbrian Water and Welsh Water.
<b>Water Framework Directive (WFD)</b>	A European Community Directive (2000/60/EC) of the European Parliament and Council designed to integrate the way water bodies are managed across Europe. It requires all inland and coastal waters to reach "good status" by 2015 through a catchment-based system of River Basin Management Plans, incorporating a programme of measures to improve the status of all natural water bodies.

# NON-TECHNICAL EXECUTIVE SUMMARY

## WHAT IS THE LOCAL STRATEGY FOR FLOOD RISK MANAGEMENT?

Flooding from surface water, groundwater and ordinary watercourses is known as “local” flooding. This includes sources of flooding such as runoff from land, raised water levels in the ground together with flooding from smaller rivers, streams and ditches.

To manage the risk from these three sources of flooding the Government has created Lead Local Flood Authorities (LLFA), which are usually Unitary Authorities or County Councils.

The area between Birmingham and Wolverhampton is known as the Black Country. In planning and local authority terms it includes Dudley Metropolitan Borough Council (MBC), Sandwell Metropolitan Borough Council (MBC), Walsall Metropolitan Borough Council (MBC) and Wolverhampton City Council (CC).

The Local Strategy for Flood Risk Management provides an overview and assessment of local flood risk in the Black Country, setting out objectives and measures for how the LLFAs will manage and reduce local flood risk. It is the document that sets out how flood risk associated with surface water, groundwater and ordinary watercourses in an area will be managed by the relevant Councils and their partners.

It is a statutory duty of the local authorities within the Black Country to produce and maintain a Local Strategy for Flood Risk Management.

A Strategic Environmental Assessment has also been produced to ensure that environmental issues are integrated and assessed at the earliest opportunity in the decision-making process, and that sustainable development is at the heart of the plan-making process.

## WHAT IS THE VISION FOR FLOOD RISK?

The vision is that “*flood risk will be managed so as to reduce the risk to all across the Black Country*”. The vision will be delivered following a clear and transparent approach ensuring that the priority is centred upon the areas of highest risk, historical frequency and resulting in the greatest benefits.

The Local Strategy also complies with and complements a number of other planning policies, legislative requirements and flood risk strategies. These include the National Planning Policy Framework, the Flood and Water Management Act 2010, the Black Country Core Strategy, the Black Country Strategic Flood Risk Assessment and the Preliminary Flood Risk Assessments for each local authority.

## WHO IS INVOLVED?

Partnership between different bodies is critical to manage local flood risk appropriately and effectively. In particular, the Environment Agency, Severn Trent Water and Highways England are special partners called Risk Management Authorities (RMA) with their own statutory responsibilities.

Each of the authorities currently have a different organisation structure to manage flood risk, with the day to day management the responsibility of the Flood Manager. In broad terms to ensure that a partnership approach to local flood risk management is adopted between all the RMA's there is a combination of Strategic and Operational Boards to provide a discussion forum in each LLFA. The makeup of the boards is dependent upon the risk and need within each LLFA and in addition to Council Officers the board for this discussion forum can include, the Environment Agency and Severn Trent Water, the Canals and River Trust, Natural England, English Heritage and Local Flood Groups.

## IS THE BLACK COUNTRY AT A HIGH RISK OF FLOODING?

A number of historical flood events have occurred across the Black Country. These events tend to be a result of combinations of surface water runoff, inadequate drainage infrastructure, maintenance or debris issues, and interactions between different sources of flooding in the urban environment.

The Environment Agency's Risk of Flooding from Surface Water<sup>1</sup> mapping is considered the best source of information on surface water flood risk in the Black Country, except for the areas that form part of the Sandwell Surface Water Management Plan. This shows that there are 129,957 properties at risk from surface water flooding (i.e. have a 0.1% chance of flooding in any given year).

## WHAT ARE THE OBJECTIVES OF THE LOCAL STRATEGY?

The following objectives have been developed for the Local Strategy:

- Objective 1 – Understanding and communicating flood risk in the Black Country
- Objective 2 – Managing the likelihood and impacts of flooding
- Objective 3 – Helping the Black Country's citizens to manage their own risk
- Objective 4 – Ensuring appropriate development in the Black Country
- Objective 5 – Improving flood prediction, warning and post flood recovery
- Objective 6 – Work in partnership with others to deliver the Local Strategy

The most important part of the Local Strategy is the Action Plan, which demonstrates what has been completed/is on-going by the Black Country authorities and other partners, and explains what future works are hoped to be carried out. This allows for transparency and accountability between partners and for the general public.

Funding sources at national, regional and local scales have been identified in the Local Strategy, which have already been made use of to undertake and support certain flood risk management activities and schemes.

## HOW DOES THIS IMPACT ME?

The Local Strategy enables citizens of the Black Country to understand how the local authorities and their partners expect to manage and reduce flood risk from surface water, groundwater and ordinary watercourses.

In addition the Local Strategy should encourage individuals to:

- Sign up to Environment Agency flood warning services where available and appropriate<sup>2</sup>.
- Take proportionate and appropriate steps to make their properties more resilient to flooding<sup>3</sup>.

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<sup>1</sup> [http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=en&topic=floodmap&utm\\_source=Poster&utm\\_medium=FloodRisk&utm\\_campaign=FloodMonth13](http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=en&topic=floodmap&utm_source=Poster&utm_medium=FloodRisk&utm_campaign=FloodMonth13)

<sup>2</sup> <https://www.gov.uk/sign-up-for-flood-warnings>

<sup>3</sup> <https://www.gov.uk/prepare-for-a-flood/improve-your-property-flood-protection>

- Consider whether they are able to help any existing Local Flood Forums or setup their own<sup>4</sup>.

Furthermore, developers are advised to take the Local Strategy into account when making decisions about land acquisitions and masterplanning, particularly with regards surface water flooding and the use of sustainable drainage systems in developments.

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<sup>4</sup> <http://www.nationalfloodforum.org.uk/flood-risk-community-groups/>



# 1 INTRODUCTION

- 1.1.1 Under the Flood and Water Management Act 2010 (FWMA10) the Black Country local authorities (Dudley MBC, Sandwell MBC, Walsall MBC, Wolverhampton CC) became the Lead Local Flood Authorities (LLFA). As the LLFAs the Black Country authorities are responsible for leading and coordinating local flood risk management, with responsibility for overseeing flood risk from ordinary watercourses, surface water, rainfall and groundwater. Other risk management authorities are responsible for other sources of flood risk, in particular the Environment Agency and Seven Trent Water (the local water company). These two key partners' roles and responsibilities with regards local flood risk management are set out later in this document. However, neighbouring LLFA's, private individuals and other stakeholders will find this document of interest.
- 1.1.2 This Local Strategy will provide an overview and assessment of local flood risk, and set out objectives on how to manage and reduce risk. To achieve this it has been developed to provide an overview and assessment of local flood risk, and set out objectives and processes as to how the Black Country authorities will manage and reduce flood risk. In some instances individuals, communities and businesses will be best placed to reduce the impacts of flooding, the local strategy will help them to understand flood risk and what action they can take.
- 1.1.3 To ensure that the Local Strategy remains the key source for all elements of flood risk management it will be monitored and reviewed on a regular basis to ensure that the objectives set are being delivered and still relevant.
- 1.1.4 A Strategic Environmental Assessment has also been produced by WSP on behalf of the Black Country authorities. The SEA is a systemic process for evaluating the environmental effects of plans and programmes to ensure that environmental issues are integrated and assessed at the earliest opportunity in the decision-making process, and that sustainable development is at the heart of the plan-making process.
- 1.1.5 The Action Plan developed (Appendix A) will be updated on an annual basis so that new actions that may have been identified are included earlier than otherwise.



## 2 VISION AND AIMS

### 2.1 VISION

- 2.1.1 The aims and aspirations of the Black Country authorities with respect to the management of local flood risk within the area are embodied in the following vision statement.

**Flood risk will be managed so as to reduce the risk to all across the Black Country.**  
 This will be undertaken following a clear and transparent approach ensuring that the priority is centred upon the areas of highest risk, historical frequency and resulting in the greatest benefits.

### 2.2 AIMS

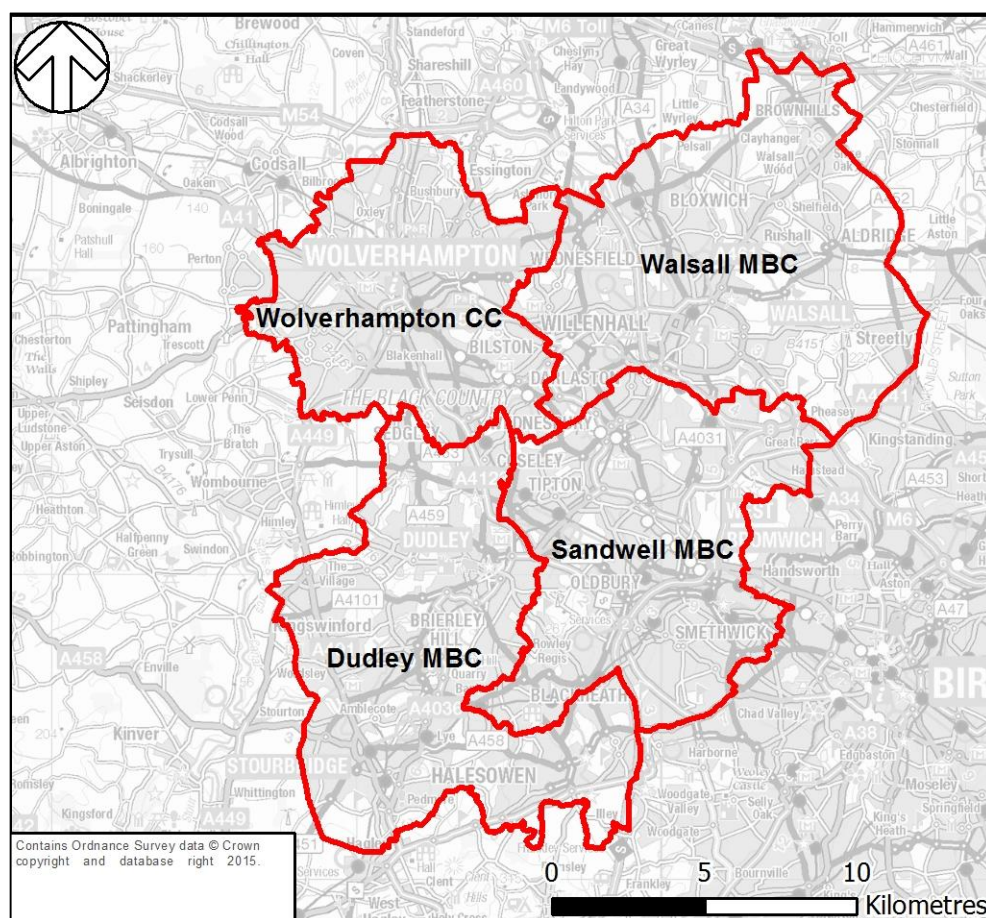
- 2.2.1 In delivering the Local Flood Risk Management Strategy vision a number of aims have been formulated, namely:

- **Alleviation** – Develop plans to reduce existing flood risk taking account of people, communities and the environment;
- **Business** – Ensure that the area remains an attractive place for business;
- **Communication** – Ensure that flood risk is clearly communicated to the public to increase public awareness;
- **Development** – Ensure that planning decisions take full account of flood risk;
- **Emergency** – Ensure that emergency plans are effective and that individuals and communities understand the risks along with their role in an emergency;
- **Fuller comprehension**– Develop a clear understanding of flood risk within the borough;
- **Grants** – Identify national, regional and local funding mechanisms to deliver flood risk management solutions;
- **Holistic** – Provide a clear explanation of the roles and responsibilities of the flood management authorities and how the Black Country authorities will coordinate and drive partnership approaches to manage and reduce this risk; and
- **Environment** – Ensure that the natural and historic environment is considered in all flood risk management activities, and where possible enhanced through flood risk management schemes.

## 3 CONTEXT

- 3.1.1 This Strategy covers the Black Country including the administrative areas of Dudley, Sandwell, Walsall and Wolverhampton. Map 1 shows the Black Country and the extent of the four local authorities' administrative areas. The following sections give an overview of the strategy area, the legislation which is relevant to the LFRMS and relevant previous plans, strategies and studies.
- 3.1.2 Across the Black Country there are 129,957 properties at risk from surface water flooding (i.e. have a 0.1% chance of flooding in any given year).

**Map 1** Local Authority boundaries for the Black Country



### 3.2 DUDLEY BOROUGH

- 3.2.1 The Metropolitan Borough of Dudley has an area of 98 km<sup>2</sup> and is heavily urbanised with only 30% of the land made up of green spaces. It has a population of over 300,000 with the main urban areas being Dudley, Stourbridge, Halesowen, Brierley Hill, Kingswinford, Coseley and Sedgley.
- 3.2.2 A series of high points running from Dudley to Sedgley in the northern part of the borough act as a major watershed for surface waters. Watercourses to the north and east of this line flow via the River Tame and eventually into the River Trent and then on

to the Humber, and watercourses to the south and west of the watershed joining the River Severn, eventually flowing into the Bristol Channel. The vast majority of the borough is in this latter catchment. There is an extensive canal network throughout the Dudley area including culverts and feeder streams.

- 3.2.3 Predominantly the area is underlain by Carboniferous rocks which contain a number of mudstones and sandstones with coal measures inter-bedded. In addition around Stourbridge and north to the Kingswinford the bedrock is made up of Triassic sandstones and gravels which act as a Principal Aquifer (Environment Agency/British Geological Survey designation).

### **3.3 SANDWELL BOROUGH**

- 3.3.1 The Metropolitan Borough of has an area of 86 km<sup>2</sup> and is heavily urbanised with the main urban areas being Oldbury, Rowley Regis, Smethwick, Tipton, Wednesbury and West Bromwich with a population of over 300,000.
- 3.3.2 The topography of the area is relatively flat with a variation of approximately 200 m from the highest point to the lowest point within the boundary, although there are locations within the borough with relatively steep slopes. The most significant green space in the borough is Sandwell Valley Country Park, located in the north eastern part of Sandwell.
- 3.3.3 Watercourses within the borough are predominantly culverted, with two significant exceptions to this; the River Tame which drains most of the borough, and the River Stour located in the south west. The borough is located in the upper reaches of these river systems, which eventually flow into the River Trent and River Avon (Warwickshire, a tributary of the River Severn) respectively. There is an extensive canal network throughout the Sandwell area including culverts and feeder streams.
- 3.3.4 The geology of Sandwell MBC comprises a wide variety of bedrock and superficial deposits. Due to the legacy of industrial and mining operations there are also significant areas of artificial Made and Worked Ground.
- 3.3.5 The solid bedrock geology includes Permo-Triassic Sandstones and Carboniferous Coal Measures which are a cyclical sequence of siltstone, mudstones, sandstone coal ironstone and claystone as well as some volcanics. The superficial deposits which overlie these deposits are predominantly till, silt and sand and gravel. These have resulted from glacial action and river deposition.

### **3.4 WALSALL BOROUGH**

- 3.4.1 The Metropolitan Borough of Walsall has an area of 103 km<sup>2</sup> and is heavily urbanised. It has a population of approximately 270,000 with the main urban areas being Walsall, Aldridge, Bloxwich, Brownhills and Willenhall.
- 3.4.2 The largest and most important watercourse in the borough is the River Tame and its two primary tributaries, the Ford Brook and Sneyd Brook. These watercourses flow (eventually) into the River Trent and then on to the Humber.
- 3.4.3 In addition there are several canals within Walsall which include the Walsall Canal, the Rushall Canal, the Wyrley and Essington Canal and the Daw End Canal. These watercourses are managed by the Canals and Rivers Trust.

- 3.4.4 Predominantly the area is underlain by Carboniferous rocks which contain a number of mudstones and sandstones with coal measures inter-bedded. In addition around Aldridge the bedrock is made up of interbedded limestone and sandstone which act as a Principal Aquifer (Environment Agency/British Geological Survey designation).

## 3.5 WOLVERHAMPTON CITY

- 3.5.1 The City of Wolverhampton is characterised by heavily urbanised areas served by drainage and flood alleviation infrastructure that was predominantly built between 1960 and 1970.
- 3.5.2 The main watercourses in the city are the Waterhead Brook (ordinary watercourse) in the north of the city and the Smestow Brook (main river) that flows south westwards out of the city into Staffordshire. The Waterhead Brook is a tributary of the River Penk and is part of the River Trent Catchment. The Smestow Brook is a tributary of the River Stour and is part of the River Severn Catchment.
- 3.5.3 In addition there are several canals within Wolverhampton including the Birmingham Canal, the Wyrley and Essington Canal and the Staffordshire and Worcestershire Canal. These watercourses are managed by the Canals and Rivers Trust.

## 3.6 BACKGROUND LEGISLATION

- 3.6.1 Following the summer floods of 2007, the Government commenced a number of initiatives to assess the management of flood risk and reduce the associated impacts. One of the most prominent of these was that Sir Michael Pitt was asked to conduct a review into all aspects of flooding in the UK called “The Pitt Review” (Cabinet Office, 2008).
- 3.6.2 His report was the basis for the Flood and Water Management Act 2010 (FMWA10), which created Lead Local Flood Authorities for England and Wales. The Black Country authorities have taken on this role for their respective boroughs which involves a number of responsibilities for ‘local flooding’.
- 3.6.3 In particular the FMWA10 states that a “*lead local flood authority for an area in England must develop, maintain, apply and monitor a strategy for local flood risk management in its area*”.
- 3.6.4 The Local Strategy presented here will be used to allow the Black Country authorities to fulfill their role in providing leadership and co-ordination on local flood risk management as set out in the Act. To ensure consistency from national to local level the Local Strategy uses the guiding principles found within the Environment Agency’s National Flood Management Strategy (Environment Agency, 2011).
- 3.6.5 The following sections give details of the key flood risk management legislation and details of wider legislation that is also relevant to the LFRMS is contained within Appendix B.

### NATIONAL PLANNING POLICY FRAMEWORK (DEPARTMENT FOR COMMUNITIES AND LOCAL GOVERNMENT, 2012)

- 3.6.6 The National Planning Policy Framework (NPPF) is the Government’s strategy for planning in England. It states that “*inappropriate development in areas at risk of*

*flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere”.*

- 3.6.7 The NPPF puts a strong emphasis on Local Plans and localism and therefore the Local Strategy presented here helps to underpin this central framework by providing a strong steer on flood risk management within a borough wide (i.e. local) setting.

### FLOOD AND WATER MANAGEMENT ACT (2010)

- 3.6.8 The FMWA10 was initiated and implemented following Sir Michael Pitt’s review of the 2007 floods. His report examined how to reduce both the risk and impact of flooding, and the effectiveness of the emergency response.

- 3.6.9 The Act sets out a more comprehensive way of managing flood risk for people, homes and businesses. It helps to safeguard community groups from unaffordable rises in surface water drainage charges and protects water supplies to the consumer.

- 3.6.10 The Act specifies a number of ‘risk management authorities’, which for the Black Country are as follows:

- The Lead Local Flood Authority, the Black Country authorities respectively
- The Environment Agency
- The local water company, Severn Trent Water
- The highway authorities, Black Country authorities and Highways England

- 3.6.11 Under the Act all authorities have the following new responsibilities:

- A duty to cooperate with and provide information to other risk management authorities
- Ability to take on flood functions from another risk management authority when agreed by both sides

- 3.6.12 In addition each risk management authority have specific roles and responsibilities, which are fully detailed in Appendix B. Roles and responsibilities for the LLFA’s include:

- Development, maintenance, application and monitoring of a strategy for local flood risk management in the jurisdiction of the lead local flood authority
- Strategic leadership of local risk management authorities. It is recommended that this is done through the formation of a local flood partnership between LLFA’s and other risk management authorities
- Powers to request information from any person in connection with the authority’s flood risk management functions
- A duty to investigate and publish reports on flooding incidents in its area (where appropriate or necessary) to identify which authorities have relevant flood risk management functions and what they have done or intend to do
- A duty to maintain a register of structures or features which have a significant effect on flood risk in their area, in the view of the lead local flood authority
- Power to do works to manage flood risk from surface runoff or groundwater
- Power to designate structures and features that could affect flooding and are considered to be significant when assessing local flood risk
- Decision-making responsibility for whether works on ordinary watercourses by third parties that may affect water flow can take place.



- A duty to exercise flood management functions in a manner consistent with the national strategy
- A duty to aim to contribute towards the achievement of sustainable development in the exercise of flood or coastal erosion risk management functions and to have regard to any Ministerial guidance on this topic

### FLOOD RISK REGULATIONS (2009)

3.6.13 The Flood Risk Regulations 2009 came in to force on 10 December 2009. They transpose the EU Floods Directive into UK law. The key provisions of the Regulations are the preparation of:

- Preliminary Flood Risk Assessment (PFRA) – this involved collecting information on past and future floods from surface water, groundwater and ordinary watercourses, and identifying where significant numbers of people are at risk (these are termed Indicative Flood Risk Areas). This was required to be produced by 22<sup>nd</sup> December 2011.
- Flood Hazard and Flood Risk Maps – Where areas were identified within the PFRA as being an indicative flood risk area hazard and risk maps were required to be produced by 22<sup>nd</sup> December 2013.
- Flood Risk Management Plans – The final stage was for the production of a Flood Risk Management Plan for the indicative Flood Risk Areas by 22<sup>nd</sup> December 2015.
- The flood risk regulations gave responsibility for the production of these to:
  - The Environment Agency for floods from main rivers and reservoirs
  - Lead local flood authorities for all other forms of flooding (excluding sewer flooding which is not caused by precipitation)
- The cycle is to be repeated every six years, therefore the PFRA is to be reviewed in 2017.

## 3.7 PREVIOUS STUDIES AND EXISTING STRATEGIES/PLANS

3.7.1 The LFRMS builds upon numerous previous studies and existing strategies, the following sections gives a summary of the most relevant previous studies that have informed its development. Details of other studies, strategies and plans that are also relevant to the LFRMS are contained within Appendix C.

### BLACK COUNTRY CORE STRATEGY 2011

3.7.2 The Local Planning Authorities of Walsall, Sandwell, Dudley and Wolverhampton have worked in partnership to produce a Black Country Core Strategy (Dudley MBC, Sandwell MBC, Walsall Council & Wolverhampton Council, 2011). This sets out the strategy for future development within the region up to 2026 and is the basis for each of the Local Authorities' Local Development Frameworks. The Core Strategy was adopted in 2011.

### THE BLACK COUNTRY STRATEGIC FLOOD RISK ASSESSMENT (JACOBS, 2009)

- 3.7.3 The Black Country Strategic Flood Risk Assessment (SFRA) was prepared in 2009 as a supplementary planning document forming part of the evidence base for the Black Country Core Strategy.

### BLACK COUNTRY WATER CYCLE STUDY AND SCOPING SURFACE WATER MANAGEMENT PLAN (SCOTT WILSON, 2009)

- 3.7.4 The four Black Country Local Authorities commissioned a joint Water Cycle Study (WCS) and Surface Water Management Plan in 2009. The WCS was completed to an Outline Level and the SWMP a Scoping Level, and this document formed part of the evidence base for the Black Country Core Strategy.

## 4 PARTNERSHIP

### 4.1 FLOOD RISK MANAGEMENT AUTHORITIES

4.1.1 There are many complexities associated with the causes and management of flooding, therefore, the responsibility frequently falls across many organisations consequently a partnership approach is crucial for effective risk management. The key partners are described by The Act as 'risk management authorities' who have specific roles and responsibilities. These key partners are:

- The Lead Local Flood Authority and the Highway Authority (Dudley MBC, Sandwell MBC, Walsall MBC and Wolverhampton CC)
- The Environment Agency
- Severn Trent Water as the Water and Sewerage Company for all four Black Country local authorities
- Highways England

### 4.2 OTHER PARTNERS AND STAKEHOLDERS

4.2.1 There are a number of other partners and stakeholders with an interest in, or who could make a contribution to local flood risk management.

4.2.2 This includes the following key functions of the Black Country authorities:

- Local Planning Authority
- Highways Authority
- Emergency Planning

4.2.3 In addition there are a number of external bodies including:

- Developers who will have a vital role in delivering some of the objectives of the Local Strategy.
- The Regional Flood and Coastal Committees (The Trent RFCC and The English Severn and Wye RFCC), which have been set up by the Environment Agency to approve programmes of work for their areas and raising local levies to provide additional funding.
- Local residents groups
- Network Rail
- Emergency services
- Canal and River Trust
- Natural England
- Wildlife Trusts
- Royal Society of the Protection of Birds
- National Flood Forum
- Flood Action Groups
- Significant landowners/employers
- Riparian landowners



### 4.3 ROLES AND RESPONSIBILITIES

4.3.1 A summary of the lead responsibilities for planning flood risk management are as follows (with a full list provided in Appendix B):

#### THE LEAD LOCAL FLOOD AUTHORITIES

4.3.2 As Lead Local Flood Authorities Dudley MBC, Sandwell MBC, Walsall MBC and Wolverhampton CC have the following powers:

- Powers to do works to manage flood risk from surface water runoff, groundwater and ordinary watercourses;
- Powers to designate structures and features that affect flooding;
- Powers to request information from any person in connection with the authority's flood risk management functions.

4.3.3 New responsibilities have also been placed upon Lead Local Flood Authorities as specified in Table 1 below.

**Table 1 – Lead Local Flood Authorities' responsibilities with regards local flood risk management**

Responsibility	Description
<b>Recording flood incidents</b>	<p>Responsible under Section 19 of the Act to investigate and record flood incidents. The decision as to whether to investigate an incident lies with the LLFA. The criteria for when a flooding incident will be investigated are set out in Appendix D for each authority.</p> <p>The aim of a Flood Investigation Report is to bring together all useful information together in one place, providing an understanding of why the incident occurred as it did and outline potential long-term solutions and flood risk management actions. Investigations will involve consultation with the relevant risk management authorities, landowners and private organisations involved.</p>
<b>Asset register</b>	<p>Flood risk assets are structures or features which are considered to have a significant effect on flood risk.</p> <p>LLFAs are required to keep both an asset record (for use by risk management authorities) and an asset register (available for inspection by the public at all reasonable times).</p>
<b>Planning applications</b>	<p>LLFA's are statutory consultees on major development with surface water drainage.</p> <p>Major development means development involving any one or more of the following:</p> <ol style="list-style-type: none"> <li>a) the winning and working of minerals or the use of land for mineral-working deposits;</li> <li>b) waste development;</li> <li>c) the provision of dwellinghouses where— <ol style="list-style-type: none"> <li>i. the number of dwellinghouses to be provided is 10 or more; or</li> <li>ii. the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);</li> </ol> </li> <li>d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or</li> <li>e) development carried out on a site having an area of 1 hectare or</li> </ol>

Responsibility	Description
	more;
<b>Designation of assets</b>	<p>The Flood and Water Management Act has designated the LLFA and the Environment Agency as 'designating authorities'. This allows them to 'designate' features or structures where the following four conditions are met:</p> <ul style="list-style-type: none"> <li>→ The designating authority thinks the existence or location of the structure or feature affects a flood risk;</li> <li>→ The designating authority has flood risk management functions in respect of the risk which is affected;</li> <li>→ The structure or feature is not designated by another authority; and</li> <li>→ The owner of the structure or feature is not a designating authority.</li> </ul> <p>If an asset becomes 'designated' its owner cannot alter or remove it without first consulting the designating risk management authority.</p> <p>The aim of designating flood risk assets is to safeguard them against unchecked works which could increase flood risk in the area. Designating of features is not something that should be done regularly but only when there are concerns about the asset.</p> <p>An individual may appeal against a designation notice, refusal of consent, conditions placed on consent or an enforcement notice.</p>
<b>Regulation of Ordinary Watercourses</b>	<p>In April 2012, the regulation of ordinary watercourses passed from the Environment Agency to the LLFAs to ensure that flood risk is managed appropriately.</p> <p>The regulation consists of two elements:</p> <p>Issuing of Consents for any changes to ordinary watercourses that might obstruct or alter the flow of an ordinary watercourse;</p> <p>Enforcement action to rectify unlawful and potentially damaging work to a watercourse.</p> <p>Riparian owners have to apply to the LLFA for consent for works which may affect the flow of water within an ordinary watercourse, which include ditches or streams that are not designated as Main River.</p>

## THE ENVIRONMENT AGENCY

- 4.3.4 The Environment Agency has national and local roles with regards flood risk management. At a national scale the FWMA10 required the Environment Agency to publish a national strategy for flood risk management in England and Wales. This strategy has been used by LLFAs to help set their own Local Strategies to ensure consistency in flood risk management.
- 4.3.5 The Environment Agency's national strategy sets out the following actions:
- Use Strategic Plans such as the Catchment Flood Management Plan (CFMP) and the Shoreline Management Plan to set the direction of Flood Risk Management;
  - Support the creation of Flood Risk Regulation by collating and reviewing the assessments, plans and maps that Lead Local Flood Authorities produce;

- Provide data, information and tools to inform government policy and aid risk management authorities in delivering their responsibilities;
- Support collaboration, knowledge-building and sharing of good practice including provision of capacity-building schemes;
- Manage the Regional Flood and Coastal Committees (RFCCs) and support their decisions in allocating funding for flood defence and flood resilience;
- Report and monitor on flood and coastal erosion risk management; and
- Provide grants to risk management authorities to support the implementation of their incidental flooding or environmental powers.

4.3.6 The Environment Agency also have responsibilities at a local scale which includes emergency planning, advising on planning applications where appropriate and managing flood risk from Main Rivers and reservoirs. These responsibilities are set out in Table 2.

**Table 2 – The Environment Agency's responsibilities with regards local flood risk management**

<b>Responsibility</b>	<b>Description</b>
<b>Emergency planning</b>	<p>Contribute to the development of multi-agency flood plans. These are developed by local resilience forums to help the organisations involved with responding to a flood work efficiently together.</p> <p>To help provide better warnings, the Environment Agency also works with the Met Office jointly in the Flood Forecasting Centre.</p>
<b>Planning applications</b>	<p>The Environment Agency are statutory consultees on development other than minor development which is carried out on land:</p> <ol style="list-style-type: none"> <li>i. In an area within Flood Zone 2 or Flood Zone 3</li> <li>ii. In an area within Flood Zone 1 which has critical drainage problems and which has been notified for the purpose of this provision to the local planning authority by the Environment Agency.</li> </ol> <p>They are also statutory consultees on any application involving the carrying out of works within 20 metres of the top of the bank of a main river.</p> <p>Following the LLFA's role as a statutory consultee on major development with surface water drainage. The Environment Agency typically no longer comments on the provision of sustainable drainage for new development.</p>
<b>Main Rivers</b>	<p>The Environment Agency has permissive powers to carry out works of maintenance and improvement on Main Rivers. This can include any structure or appliance for controlling or regulating flow of water into or out of the channel. However, the overall responsibility for maintenance of Main Rivers lies with the riparian owner.</p> <p>The Environment Agency can bring flood defence schemes forward through the RFCCs, and it will work with LLFAs and local communities to shape schemes which respond to local priorities.</p> <p>The Environment Agency are also the regulating authority with regards to consenting works carried out by others, in, under, over or within 8 metres of a Main River (or Ordinary Watercourse where the scheme promoters are the LLFA).</p>
<b>Reservoirs</b>	<p>The Environment Agency enforces the Reservoirs Act 1975, which is the safety legislation for reservoirs in the United Kingdom. The Environment Agency is the Enforcement Authority in England and Wales for reservoirs that are greater than 25,000m<sup>3</sup>.</p>

	As the Enforcement Authority the Environment Agency must ensure flood plans are produced for specified reservoirs. However the responsibility for carrying out work to manage reservoir safety lies with the reservoir owner/operator.
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## THE LOCAL AUTHORITIES AS HIGHWAY AUTHORITIES

- 4.3.7 As unitary authorities Dudley MBC, Sandwell MBC, Walsall MBC and Wolverhampton CC are the Highway Authorities for the Black Country and have the following responsibilities under other legislation:
- Responsibility to maintain highways, including ensuring that highway drainage systems are clear and that blockages affecting the highway are cleared, this is a duty under the Highways Act 1980.
  - Powers to deliver works that they consider necessary to protect the highway from flooding. These works can either be on the highway itself or on land which has been acquired by the Highway Authority in the exercise of highway acquisition powers.
  - The Highway Authority may divert parts of watercourses or carry out any other works on any form of watercourse if it is necessary for the construction, improvement or alteration of the highway or provides a new means of access to any premises from the highway.

## THE BLACK COUNTRY'S WATER AND SEWERAGE COMPANY – SEVERN TRENT WATER

- 4.3.8 The main water and sewerage company for the Black Country is Severn Trent Water who deals with all of the surface water sewer and foul water management in the region.
- 4.3.9 Water and sewerage companies (WaSCs) are responsible for managing the risks of flooding from water supply and foul, combined or surface water sewer systems. This is formally defined as a duty to provide, maintain and operate systems of public sewers and works for the purpose of effectually draining their area of responsibility. This is formally specified in Section 94 of the Water Industry Act 1991 (WIA 1991).
- 4.3.10 This may need to be carried out in partnership with others, for example, working with developers and landowners to reduce the input of rainfall into sewers through attenuation, storage and sustainable drainage.
- 4.3.11 WaSCs have no duties relating to highway drainage, land drainage and watercourses, however they do accept highway drainage by agreement with the Highway Authority under Section 115 of the WIA 1991. Their 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. Whilst for surface water this relates to the removal from roofs and yards / land appurtenant to the premises.
- 4.3.12 Public sewers are designed to protect properties from the risk of flooding in normal wet weather conditions. However, in extreme weather conditions there is a risk that sewer systems can become overwhelmed and result in sewer flooding.

## HIGHWAYS ENGLAND

- 4.3.13 Highways England (formerly the Highways Agency) is the managing authority for the strategic road network, which is designated as Critical Infrastructure. They have a duty

to manage and maintain those sections of the motorway and trunk road network within the Black Country and therefore within the context of flood risk, are a Risk Management Authority under the FWMA.

- 4.3.14 One recommendations of the Pitt Review was that the Highways England should consider the vulnerability of its network to flooding and prepare suitable measures to reduce the effects on road users.

The recommendations have been divided into the following project objectives.

- Identify locations on the network most sensitive to flooding.
- Produce maps showing the location of recent flood events.
- Compare flood events with the weather conditions to assess the risk of repeat events.
- Identify quick-win options for reducing the effects of flooding to road users.

- 4.3.15 Highways England has been engaging with its service providers to identify the extent of existing flooding problems and the way in which they are currently being recorded.

- 4.3.16 Where motorways or trunk roads are identified as being at risk from flooding, contingency plans are being prepared to warn road users and, where necessary, divert them away from the problem. Where possible, weather data from the Met Office will be analysed and, if intense rainfall events are forecast in sensitive flood areas, suitable warnings will be posted using the variable message signs.

## CANAL AND RIVER TRUST

- 4.3.17 The Canal and River Trust is a charitable trust that manages 2,000 miles of waterways in England and Wales. In the Black Country they are responsible for management of numerous canals including the following;

- Birmingham Canal
- Wyrley and Essington Canal
- Staffordshire and Worcestershire Canal
- Daw End Canal
- Rushall Canal
- Walsall Canal
- Stourbridge Canal
- Dudley Canal
- New Main Line Canal
- Old Main Line Canal

- 4.3.18 The Trust are therefore are key partners in managing water in the Black Country and their activities have the potential to influence local flood risk in the vicinity of their waterways.

## 4.4 WORKING IN PARTNERSHIP

- 4.4.1 The Black Country authorities have set up a range of partnership arrangements to improve the management of local flood risk. These are outlined in the following sections.

- 4.4.2 The Black Country Authorities, the Environment Agency and Severn Trent Water have been working in partnership for a number of years with regards local flood risk management.
- 4.4.3 Each of the authorities currently have a different organisation structure to manage flood risk, with the day to day management the responsibility of the Flood Manager. In broad terms to ensure that a partnership approach to local flood risk management is adopted between all the RMA's there is a combination of Strategic and Operational Boards to provide a discussion forum in each LLFA. The makeup of the boards is dependent upon the risk and need within each LLFA and in addition to Council Officers the board for this discussion forum can include, the Environment Agency and Severn Trent Water, the Canals and River Trust, Natural England, English Heritage and Local Flood Groups.

## 5 ASSESSMENT OF LOCAL FLOOD RISK IN THE BLACK COUNTRY

### 5.1 HISTORICAL FLOODING

- 5.1.1 The Environment Agency's Risk of Flooding from Surface Water<sup>5</sup> mapping is considered the best source of information on surface water flood risk in the Black Country, except for the areas that form part of the Sandwell Surface Water Management Plan. The Environment Agency's Risk of Flooding from Surface Water mapping shows that there are 129,957 properties at risk from surface water flooding (i.e. have a 0.1% chance of flooding in any given year).
- 5.1.2 The Black Country is susceptible to flash flooding resulting from localised intense rainfall. In July 2007 there was widespread flash flooding across the West Midlands conurbation due to intense thunderstorms.

#### DUDLEY MBC

- 5.1.3 Given the borough's position as being located relatively high in both the Trent and Severn catchments fluvial flood risk is perceived as generally quite limited although some fluvial flooding has previously occurred on the river Stour in Halesowen and Stourbridge. Flooding in the borough tends to be (like the other Black Country authorities) due to combinations of surface water runoff, blockage of Dudley Council, highway and local water company drainage infrastructure, maintenance or debris issues, and interactions between different sources of flooding in the urban environment.
- 5.1.4 The PFRA (Dudley MBC, 2011) undertook an analysis of past flooding as set out in set out in Appendix E.
- 5.1.5 The large events in 2007 and 2008 caused on average £50,000 of damage to properties that were internally flooded, and often led to people being out of their homes for between 3 and 6 months.

#### SANDWELL MBC

- 5.1.6 Given the borough's position as being located relatively high in the Trent/Severn catchments fluvial flood risk is perceived as generally quite limited. Rather flooding in the borough tends to be (like the other Black Country authorities) due to combinations of surface water runoff, blockage of drainage infrastructure, maintenance or debris issues, and interactions between different sources of flooding in the urban environment.
- 5.1.7 The PFRA (WSP, 2011) undertook an analysis of past flooding as set out in Section 3.3 and the full information is set out in Appendix E.

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<sup>5</sup> [http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=en&topic=floodmap&utm\\_source=Poster&utm\\_medium=FloodRisk&utm\\_campaign=FloodMonth13](http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=en&topic=floodmap&utm_source=Poster&utm_medium=FloodRisk&utm_campaign=FloodMonth13)



- 5.1.8 The large events in 2007 and 2008 caused damage to properties that were internally flooded, and often led to people being out of their homes for up to 3 months.
- 5.1.9 The most serious flood recorded on the Brandhall Brook occurred in September 1998 when 25 properties were affected by flooding in the Brook Road area - 10 properties experienced internal flooding. The flood risk has been mitigated by creating upstream flood storage on the golf course as part of the conditions placed on a nearby development.
- 5.1.10 The Hockley Brook and Thimblemill Brook are classified as an 'ordinary watercourses' - meaning that they are not part of a main river. These brooks are maintained by Sandwell Metropolitan Borough Council. Significant flooding (200mm to 250mm deep) was reported from the Thimblemill Brook in 2012. The areas affected were Firs Lane, Watery Lane and Rosefield Road, however there were no reports of internal property flooding during this event.
- 5.1.11 There were also large floods on the Oldbury Arm of the River Tame (between Tividale and Whiteheath Gate) in August 1987, August 1999 and June 2007.

### WALSALL MBC

- 5.1.12 Historically Walsall has not suffered from significant flooding events. The Walsall PFRA identified Darlaston Road including Station Street and Kendricks Road as an area that has suffered repeated flooding from surface water. The flood events at this location in 2009 and 2010 were deemed to have had significant harmful consequences on health and economic activity. The PFRA does not identify any other significant flood events from local flood risk sources in Walsall.
- 5.1.13 According to the Environment Agency (2014), in 2012 there was widespread flash flooding as a result of intense thunderstorms. This was particularly focused on Brickyard Road in Walsall.

### WOLVERHAMPTON MBC

- 5.1.14 Historically, Wolverhampton has not suffered from major flooding. Although much of the country was affected during the summer floods of 2007, Wolverhampton was not substantially affected due to its history of drainage infrastructure development, the topography of the land and its location upstream of the country's primary river basins.
- 5.1.15 However, the city's river network is mainly culverted therefore the main flood risk is from localised incidents caused by extreme surface water runoff and blocked gullies.
- 5.1.16 Groundwater flooding can be a problem because of a reduction in groundwater abstraction in recent years. Several historical groundwater flooding issues have been reported, especially in the northeast of Wolverhampton (Environment Agency, 2014).
- 5.1.17 The flood event on the Pendeford Brook, an ordinary watercourse, in 1998 is the largest on record and affected approximately 40-50 residential properties.
- 5.1.18 Localised surface water and sewer flooding was widely reported following heavy rainfall in June 2012 and September 2012. Locations affected in June 2012 in Wolverhampton include Amanda Avenue, Ashmore Park, Low Hill, Hobnock Road, New Cross Hospital, and the Wolverhampton ring road.



## 5.2 PRESENT DAY FLOOD RISK

- 5.2.1 As LLFAs, the Black Country authorities are responsible for managing flood risk associated with 'local' sources – namely surface water, groundwater and ordinary watercourses.
- 5.2.2 The flood risk associated with Main Rivers is managed by the Environment Agency and the best source of information for this is on their website, which can be found at <http://www.environment-agency.gov.uk>. There are limited Flood Alert/Warning Areas within the Borough but individuals within these or Flood Alert Areas are recommended to sign up to the free Floodline Warnings Direct offered by the Environment Agency.
- 5.2.3 Flood risk associated with the sewer network is the responsibility of the water and sewage company, Severn Trent Water. This is formally defined as a duty to provide, maintain and operate systems of public sewers and works for the purpose of effectually draining their area of responsibility. This is formally specified in Section 94 of the Water Industry Act 1991 (WIA 1991).
- 5.2.4 The following sections set out information with regards to local flood risk in the Black Country.

### SURFACE WATER FLOOD RISK

- 5.2.5 The Black Country is a highly urbanised area and as such surface water flooding is an issue across the area covered by this Strategy.
- 5.2.6 The Preliminary Flood Risk Assessments published in 2011 set out the locally agreed surface water information. The locally agreed surface water information for each of the four authorities is set out below:
  - Dudley MBC selected the Environment Agency's Flood Maps for Surface Water, 1 in 200 annual probability event flood risk areas;
  - Sandwell MBC was selected the Environment Agency's Flood Maps for Surface Water, 1 in 200 annual probability event flood risk areas;
  - Walsall Council does not have locally agreed surface water information. As such the PFRA stated that assessment of flood risk would primarily rely on a technical review of Environment Agency's Flood Maps for Surface Water
  - Wolverhampton City Council selected Environment Agency's Flood Map for Surface Water
- 5.2.7 Following the publication of the PFRAs more detailed mapping of surface water flood risk was produced by the Environment Agency which superseded the Flood Map for Surface Water, the Risk of Flooding from Surface Water map.
- 5.2.8 Sandwell MBC has produced a Surface Water Management Plan which undertook detailed assessments of surface water flood risk at key locations across the borough. Detailed hydraulic models of key hotspot locations were produced for, Thimblemill Brook and Upper St Mary's Road, Tipton Brook, Yew Tree estate, Elm Terrace and Tower Road Brook.
- 5.2.9 In all areas apart from those covered by the Sandwell SWMP, all LLFA's have adopted the Environment Agency's Risk of Flooding from Surface Water mapping and the best source of information on local flood risk. This is the third generation national surface water flood risk map produced by the Environment Agency in 2013. It assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year;

1 in 30, 1 in 100 and 1 in 1000. For each scenario the extent, maximum depth and maximum velocity of surface water flooding is available.

## GROUNDWATER FLOOD RISK

- 5.2.10 In general groundwater flood risk in the Black Country is relatively low, although high water tables have been experienced along the Sandwell/Walsall border (Jacobs, 2009) and parts of the Wolverhampton and Sandwell boroughs may be susceptible to groundwater recharge following the discontinuing of industrial abstractions (Scott Wilson, 2009).
- 5.2.11 The Wolverhampton PFRA noted that localised groundwater flooding has occurred across eastern Wolverhampton where it has mostly affected gardens and allotments. The general areas of reported groundwater flooding include Newbolds, Scotlands, Wood Hayes, Merry Hill, Bradmore and Blakenhall.

## FLOOD RISK FROM ORDINARY WATERCOURSES

- 5.2.12 The Environment Agency's Risk of Flooding from Rivers and the Sea is the best source of information for fluvial flooding. As mentioned above most of the flood risk areas shown online are associated with Main Rivers, but a number of ordinary watercourses have been mapped to show areas at risk.
- 5.2.13 Given the frequent updates of the online mapping the Local Strategy does not replicate this information as it can easily be found on the Environment Agency's website – <http://www.environment-agency.gov.uk>.
- 5.2.14 In the Black Country flood events from ordinary watercourses historically have often been associated with poor maintenance of culverts and/or trash screens leading to blockages and subsequent flooding. This has led to the formation of pre-flood action plans to ensure critical assets are assessed / cleared prior to a predicted significant storm.

## 5.3 CHANGES TO FLOOD RISK IN THE FUTURE FROM CLIMATE CHANGE

- 5.3.1 It is now well recognised that global climate change is occurring but the difference to regional or local climates is less well understood. In particular, the effect on local flood risk is not well understood, with very approximate figures for increases in rainfall, river flows, wind speed and wave heights provided as guidance in the Technical Guidance to the NPPF (Department for Communities and Local Government, 2012). This is shown in Table 3.

**Table 3 – National precautionary sensitivity ranges as taken from Table 5 in the Technical Guidance to the NPPF.**

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
<b>Peak rainfall intensity</b>	+5%	+10%	+20%	+30%
<b>Peak river flow</b>	+10%	+20%		

5.3.2 The UK Government's most recent Climate Change Risk Assessment, or CCRA (Defra, 2012) gave a national picture of expected risks and opportunities arising from the changing climate. A summary of impacts to the West Midlands was also released to give a local assessment (West Midlands Climate Adaptation Partnership, 2012), and some of the relevant key findings include:

- Projected increases in precipitation are likely to increase the frequency and severity of river flooding events in the region with over 21,000 residential and commercial properties at significant risk. There are also 1,700 sensitive infrastructure sites in flood risk zones including one hospital, over 300 power and gas stations, 43 care homes and 35 emergency response centres.
- Existing urban drainage systems will be put under pressure as projected increases in winter precipitation, compounded by population growth and development within the region, may lead to surface water flooding.
- Flooding is likely to cause extensive disruption to the regions transport network, power supplies and telecommunications as occurred during extensive flooding in the region during 2007. Such disruption could potentially have national consequences.
- Flooding is one of the major risks to agricultural land. In 2007, over 10,923 hectares of agricultural and farm land in the West Midlands (Severn and Avon affected) was flooded causing £15.5 million in damage and costing on average £96,596 per farm. This was an exceptional event, but climate change predictions suggest that extreme events such as this are likely to occur more frequently.
- Increased incidences of flooding are likely to be associated with psychological stress for victims as a result of property damage and disruption, and may be associated with fatalities.

- 5.3.3 The quantification of climate change on 'local' flood risk is difficult and currently little work which is publically available has been done on modelling the impacts to surface water, groundwater and ordinary watercourse flooding. As this Strategy evolves and is reviewed it is hoped future work will add to the understanding of how climate change is likely to impact the Black Country in a quantifiable way, which will then be communicated through future updates to this document.
- 5.3.4 The increase in peak rainfall and river flows associated with climate change in the Black Country are expected to increase flood risk. Without continued investment in flood risk management and surface water drainage networks this will lead to more people and properties being at risk.
- 5.3.5 Climate change will be incorporated in the assessment of flood risk for all capital schemes in the Black Country using the allowances set out by the Environment Agency's guidance; Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities.
- 5.3.6 It is a requirement of the NPPF that the design of drainage systems for new development takes account of the impacts of climate change over the anticipated lifetime of the development. For this purpose the allowances set out in Table 3 should be applied.

## **5.4 CHANGES TO FLOOD RISK IN THE FUTURE FROM URBAN CREEP**

- 5.4.1 Not all development is subject to planning procedures or the development control process, and therefore its impact on flooding is less likely to be controlled. Urban creep such as property extensions is an example of this.
- 5.4.2 Urban Creep increases the amount of hard surfaces in towns, reducing the ability of water to filter into the ground and increasing the volume of water that has to run off into drains. In addition, it increases the peak flows within the surface water drainage system. This can increase the risk of surface water flooding in urban areas as drainage systems are unable to cope with the increased demand.
- 5.4.3 Retrofitting Sustainable Drainage Systems (SuDS) into existing urban environments is a potential approach to combatting this increase in local flood risk. These measures can manage the rate of surface water runoff from the urban environment, reducing the risk of flooding.

## 6 OBJECTIVES

- 6.1.1 To support the strategic vision for the management of local flood risk in the Black Country, the following six objectives have been developed to support the delivery of the Strategy. They have been developed to be consistent with the objectives of the national FCERM strategy and to drive local flood risk management in the Black Country. They are set out in Table 4 and discussed in detail in the following sections.

**Table 4 – Black Country LFRMS Objectives**

Objective	
O1	Understanding and communicating flood risk in the Black Country.
O2	Managing the likelihood and impacts of flooding.
O3	Helping the Black Country's citizens to manage their own risk.
O4	Ensuring appropriate development in the Black Country.
O5	Improving flood prediction, warning and post flood recovery.
O6	Work in partnership with others to deliver the local strategy.

### 6.2 OBJECTIVE 1 – UNDERSTANDING AND COMMUNICATING FLOOD RISK IN THE BLACK COUNTRY

- 6.2.1 Understanding the causes and mechanisms of local flood risk is essential to enable efficient and effective management of the risk. Recent flooding in the Black Country has highlighted that often the causes are not simple and can be from multiple sources. Therefore understanding flood risk solely from high level strategic work (such as the surface water flood maps) may not accurately portray a site's true risk from flooding.
- 6.2.2 Gaining a better understanding of risk in the study area will be an ongoing process but it is acknowledged that some issues – such as groundwater flood risk – are not well understood.
- 6.2.3 With flood risks expected to increase due to climate change, greater understanding will enable the local authorities within The Black Country to better mitigate against potential future problems and advise strategic planners for allocated development.
- 6.2.4 The Action Plan (Appendix A) demonstrates how this objective has and will be achieved for the Black Country.

### 6.3 OBJECTIVE 2 – MANAGING THE LIKELIHOOD AND IMPACTS OF FLOODING

- 6.3.1 Flooding is a natural process and stopping it altogether is impossible. However, it is possible to reduce the frequency of flooding and to lessen its impacts on The Black Country's population.
- 6.3.2 Understanding, identifying and quantifying flood risk is the first step to manage and reduce the likelihood and impacts of flooding. Where possible management schemes and funding opportunities will be explored to actively improve the flood risk. These will

be prioritised to ensure that the most beneficial measures are implemented first. This is especially important where budgetary constraints mean that not all viable measures can be implemented.

- 6.3.3 Where local flood risk issues are identified, all available funding sources will be explored to progress potential solutions. In developing measures to tackle local flood risk, it is important to involve all relevant partners, both risk management authorities and others, including members of the public.
- 6.3.4 Another important aspect of local flood risk management is actions that are taken when flooding is happening. Ensuring an efficient response from the relevant authorities and providing information to the public can significantly reduce the impact of flooding and reduce the recovery period.
- 6.3.5 The Action Plan (Appendix A) demonstrates how this objective has and will be achieved for the Black Country.

## **6.4 OBJECTIVE 3 – HELPING THE BLACK COUNTRY’S CITIZENS TO MANAGE THEIR OWN RISK**

- 6.4.1 It is recognised that local flood risk management is most successful when the community are included in decision making and feel ownership of the issues and solutions.
- 6.4.2 Increased community engagement also helps to mitigate the impacts of flooding as people at risk are more aware and are more likely to plan for any issues that arise. The Black Country authorities are committed to improving the public’s awareness of flooding and consulting them on local flood risk management issues.
- 6.4.3 It is also very important to ensure that the public is aware of and can comment on flood risk management schemes that are proposed for the Black Country.
- 6.4.4 The Action Plan (Appendix A) demonstrates how this objective has and will be achieved for the Black Country.

## **6.5 OBJECTIVE 4 – ENSURING APPROPRIATE DEVELOPMENT IN THE BLACK COUNTRY**

- 6.5.1 The FWMA10 increases the ability of the local councils as LLFA’s and LPA’s to positively affect development to make it more sustainable and reduce risks of flooding both on and off site.
- 6.5.2 Each of the Black Country authorities are committed to working with developers to produce places to live where flood risk is minimal and there is a positive impact on the wider area.
- 6.5.3 One of the key ways of doing this is through planning policy, with ENV5 of the Black Country Core Strategy (see Appendix C) being the most important local document, and additional reference provided through the NPPF and SFRA.
- 6.5.4 Following consultation on the implementation of Schedule 3 of the Flood and Water Management Act 2010 regarding the provision for ensuring SuDS in new development, amendments have been made to the planning system. Non statutory technical standards for sustainable drainage systems were published by Defra in March 2015

alongside changes to the statutory consultees for major planning applications with regards to surface water drainage.

- 6.5.5 The changes to statutory consultees were implemented on 15<sup>th</sup> April 2015. The Town and Country Planning (Development Management Procedure)(England) Order 2015 – Schedule 4 - Consultations before the grant of permission has made LLFAs statutory consultees for major development planning applications with surface water drainage. Assessment of surface water drainage provision for all other types of development (not considered to be major development) is the responsibility of local planning authorities.
- 6.5.6 The Action Plan (Appendix A) demonstrates how this objective has and will be achieved for the Black Country.

## **6.6 OBJECTIVE 5 – IMPROVING FLOOD PREDICTION, WARNING AND POST FLOOD RECOVERY**

- 6.6.1 The impacts of flooding can also be minimised through improved prediction and warning. The two most important aspects of this are to better understand flood mechanisms and ‘trigger’ levels; and improving communication with local communities to convey flood warnings. If those at risk are forewarned they can take appropriate actions to minimise the danger to themselves and their properties.
- 6.6.2 After flooding occurs the speedy recovery of businesses and individuals is important for the health and wellbeing of those affected and the economic output in the Black Country. Returning people to their homes also has the effect of minimising the Council’s long term expenditure on disaster management allowing funds to be directed to reducing risk.
- 6.6.3 The Action Plan (Appendix A) demonstrates how this objective has and will be achieved for the Black Country.

## **6.7 OBJECTIVE 6 – WORK IN PARTNERSHIP WITH OTHERS TO DELIVER THE LOCAL STRATEGY**

- 6.7.1 Working in partnership both internally and externally with the stakeholders and partners identified in Section 4 will be critical to managing flood risk appropriately.
- 6.7.2 To ensure that this occurs effectively the Black Country Authorities have developed partnership working arrangement involving the local authority key officers and representatives from other risk management organisations, principally the Environment Agency and Severn Trent Water. These arrangements enable sharing of information and knowledge between organisations to ensure the efficient use of resources for flood risk management. In addition opportunities for flood risk management schemes that deliver outcomes that are beneficial to multiple organisations can be identified.
- 6.7.3 The Action Plan (Appendix A) demonstrates how this objective has and will be achieved for the Black Country.

## **6.8 MEASURES**

- 6.8.1 To enable the objectives of this strategy to be delivered, this section sets out a range of measures that will be undertaken by the Black Country authorities. These include a



range of short and long term measures that will be undertaken by the LLFAs in combination with their partners. These are set out below for each objective and further detail of how these measures will be delivered is given in the LFRMS Action Plan (Appendix A).

#### **Objective 1: Understanding and communicating flood risk in the Black Country**

Measure 1A: Develop a Flood Risk Management Plan for the West Midlands Cluster

Measure 1B: Investigate locally significant incidents of flooding identifying sources and remedial actions with partners

Measure 1C: Review and update the Preliminary Flood Risk Assessments for the Black Country

Measure 1D: Develop and continue to maintain a register of flood risk management assets

Measure 1E: Engage with local communities to gain information of flood risk issues

Measure 1F: Share knowledge and information on local flood risk with the residents of the Black Country

Measure 1G: Ensure latest information is used in assessing local flood risk

#### **Objective 2: Managing the likelihood and impacts of flooding**

Measure 2A: Work with partners to reduce the impacts of flooding by targeting and prioritising maintenance at high risk locations and assets, enabling an efficient response to, and recovery from, flooding incidents.

Measure 2B: Develop flood risk management schemes led by the Black Country authorities, seeking to make best use of available funding

Measure 2C: Work with partners to develop flood risk management schemes led by third parties, riparian landowners and stakeholders

Measure 2D: Work to ensure ongoing management of existing flood risk and drainage assets

Measure 2E: Work to ensure compliance of all Local Authority owned assets with the Reservoirs Act

#### **Objective 3: Helping the Black Country's citizens to manage their own risk**

Measure 3A: Continue to work with community flood groups and other local stakeholders

Measure 3B: Work with residents to communicate the risks of flooding

Measure 3C: Work with residents and landowners to educate them with regards to their responsibilities for watercourse management

Measure 3D: Encourage local involvement in the development of flood risk management schemes

Measure 3E: Encourage residents to share information on flooding incidents

Measure 3F: Share knowledge and information with communities and residents

#### **Objective 4: Ensuring appropriate development in the Black Country**

Measure 4A: Develop a planning process to create clear advice and direction to developers on flood risk, drainage and SuDS.

Measure 4B: Undertake consenting activities for ordinary watercourses

Measure 4C: Promote the use of Sustainable Drainage Systems in new development



Measure 4D: Ensure compliance with Black Country Core Strategy (ENV5 Flood Risk) principals and objectives

**Objective 5: Improving flood prediction, warning and post flood recovery**

Measure 5A: Work with partners to minimise the recovery time for residents and businesses from flooding events

Measure 5B: Establish a co-ordinated approach to the provision of temporary flood risk management measures.

Measure 5C: Work with partners to improve communications and advice given during flooding events.

Measure 5D: Work with partners to understand trigger levels for local flooding events and develop local flood warning systems

**Objective 6: Work in partnership with others to deliver the local strategy**

Measure 6A: Engage in regional networks for sharing of knowledge and best practice

Measure 6B: Improve the mechanisms of sharing of data and information between partners

Measure 6C: Engage with neighbouring LLFAs to facilitate a catchment based approach

Measure 6D: Continue to engage with flood action groups and other community groups in the delivery of local flood risk management

## 7 FUNDING OPPORTUNITIES

- 7.1.1 This Strategy has set out a range of measures to help achieve its objectives. These include LLFA processes and systems, partnership working with others, working with communities to improve their resilience to flooding and promotion of capital local flood risk management schemes. Delivery of these measures depends on sufficient funding being available, either from ongoing revenue funding or project based support for capital schemes.
- 7.1.2 The funding available for any measure will be linked to the outcomes it will provide. Measures that deliver benefits beyond flood risk management, such as enhanced ecosystems, public amenity, economic growth or cultural heritage, are likely to attract funding from alternative sources beyond those typically used to support flood risk management. Funding is therefore based on the economic viability of schemes; not all potential flood alleviation schemes will be viable and not all will achieve funding.
- 7.1.3 The following sections describe the available sources of funding that could be used to support the measures outlined in this Strategy. The Black Country authorities and their partners have already achieved funding for flood alleviation schemes in the Black Country from various sources, including Local Levy, Grant in Aid and contributions from both developers and landowners.

### 7.2 NATIONAL FUNDING

#### FLOOD AND COASTAL EROSION RISK MANAGEMENT GRANT IN AID FUNDING

- 7.2.1 Defra has the national policy responsibility for Flood and Coastal Erosion Risk Management (FCERM) and provides funding through Grant in Aid (GiA) to the Environment Agency, who then administers grants for capital projects; Local Authorities are one partner able to request such grants.
- 7.2.2 A contribution to flood risk management schemes from the Flood Defence Grant in Aid (FDGiA) funding will be provided whenever there is a positive ratio of benefit to cost. However, a positive ratio does not necessitate full funding and the formula determines the amount of Central Government funds based on the calculated ratio.
- 7.2.3 Funding levels for each scheme are linked to the number of households protected, the damages prevented, environmental benefits, amenity improvements, agricultural productivity and economic benefits. The payment rates for household protection will vary depending on the index of multiple deprivation; with more deprived households receiving higher payment rates. This ensures that schemes identified within poorer areas are more likely to receive full funding from Central Government.

7.2.4 The calculation of funds to be provided by FDGiA is as follows<sup>6</sup>:

$$\begin{array}{rcl} \text{Share of} & & \text{Household benefits} \\ \text{costs funded} & = & + \text{other whole-life benefits} \quad \times \quad \text{Fixed payment rates} \\ \text{by Defra} & & + \text{environmental outcomes} \\ & & \hline & & \text{Amount of funding required} \end{array}$$

7.2.5 The benefit of this approach is that more schemes will be eligible for some national funding including minor schemes and those not solely related to fluvial and/or coastal flooding. However, it will be more difficult to obtain 100% funding from national sources and therefore cost saving measures and other sources of funding are likely to be required to fill the gap.

## 7.3 REGIONAL FUNDING

### LOCAL LEVY

7.3.1 Local Levy funding is an additional locally-raised source of income, gathered by way of a levy on Local Authorities and collected via the council tax. The levy is used to support (with the approval of the Regional Flood and Coastal Committee) flood risk management projects that are not considered to be national priorities and hence do not attract national funding through FCERM GiA. Alternatively, local levy funding can be applied to FCERM GiA projects, at the discretion of the Regional Flood and Coastal Committee (RFCC), to meet the partnership funding requirements.

7.3.2 The Black Country is covered by two RFCCs; the English Severn and Wye Regional Flood, and the Trent. Both RFCCs collect local levy funds from Local Authorities in the Black Country, which are used to contribute towards locally important flood risk management schemes across their areas of responsibility.

7.3.3 To obtain these funds it is important to engage with the RFCC early in the allocation process once possible schemes have been identified. To facilitate this officers from all the Black Country Authorities attend/are part of the RFCC.

## 7.4 LOCAL FUNDING

7.4.1 Depending on the shortfall from FDGiA and the number of schemes competing for the RFCC's allocation, it is possible that the Local Levy will not solely provide all the required funding for a scheme and therefore other measures could be explored in the future if necessary.

### SECTION 106 AGREEMENTS

7.4.2 This is a contribution from developers, linked to specific developments and the infrastructure required to make them acceptable in planning terms. Its use can be very specific to the issue being addressed and is negotiated separately for each

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<sup>6</sup> Taken from the Framework to assist the development of the Local Strategy for Flood Risk Management, 2nd Edition (Local Government Association, 2011)

development. It can be used to pay for flood defences that specific developments need in order to be safe and so acceptable in planning terms.

- 7.4.3 One of the recommendations of 'Making Space for Water' was that local planning authorities should make more use of Section 106 agreements to ensure that there is a strong planning policy to manage flood risk. This means that any flood risk which is caused by, or increased by, new development should be resolved and funded by the developer.
- 7.4.4 Where possible the Black Country authorities will seek to use Section 106 planning obligation agreements to obtain funding to deliver flood risk management schemes that are required to facilitate new development.

### COMMUNITY INFRASTRUCTURE LEVY

- 7.4.5 This is a locally agreed sum levied upon developers and large sums could potentially be raised over time. It is flexible in its approach as local authorities can adjust spending plans to meet priorities. Local authorities are required to use this funding for infrastructure needed to support the development. It can be used to construct new schemes, increase the capacity of existing infrastructure or repair failing existing assets including flood defences.

### BUSINESS RATE INCREASES

- 7.4.6 Local business rates could be increased with the express purpose of using the money for flood risk management. However, this is not being considered at this time in the Black Country.

### COUNCIL TAX INCREASES

- 7.4.7 Certain LLFAs are known to have increased council tax across their localities with the express purpose of spending on local flood risk management. However, this is not being considered at this time in the Black Country.

### WATER FRAMEWORK DIRECTIVE (WFD) FUNDING

- 7.4.8 There are some flood risk management activities which assist in meeting WFD targets. An example of this is weir removal, where the weir poses a blockage to fish migration. In such cases, it is possible to apply for 100% funding for weir removal and realise the associated flood risk management benefits. Weir removal should be preceded by an investigation into the potential impact on flood risk downstream and upstream of the weir (that there are no negative consequences) and a geomorphological study into the potential impact on sediment transport and equilibrium. It is important that the main driver for the project must be to meet the requirements of the WFD with the flood risk benefits being secondary.

### LOCAL AUTHORITY FUNDING

- 7.4.9 At present local authority funding is used solely to deliver essential maintenance of existing flood risk management and drainage assets across the Black Country. No additional funding is available for capital flood risk management schemes.

## 7.5 COMBINATION OF FUNDING SOURCES

7.5.1 The preferred approach for funding schemes is to use a variety of funding sources as few schemes in the Black Country are likely to have sufficient benefits to be 100% funded through the FCERM GiA system. This is shown in the Figure 1<sup>7</sup> below as “Payment for Outcomes (anticipated)”.

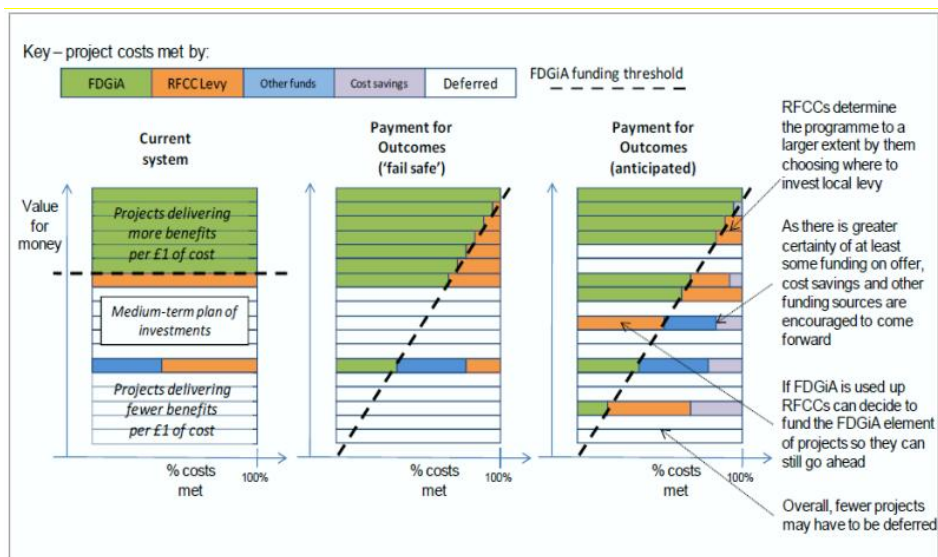


Figure 1 - Combination of possible different funding sources to cover costs of flood risk management schemes

## 7.6 SUCCESSFUL APPLICATIONS

7.6.1 Funding has been obtained for a number of schemes including:

- Surface water cut-off trenches installed at Metfield Croft, Kingswinford in 2010.
- Improvements to highway drainage and surface water sewers at Hinsford Close, Kingswinford in 2011, in partnership with Severn Trent Water.
- Oversized culvert installed at Rushall Close, Wordsley in 2011 (Figure 2).
- Defence bund and wall installed adjacent to River Stour at Grange Crescent, Halesowen in 2012, in partnership with the Environment Agency (Figure 3).
- Construction of a new surface water culvert through the rear gardens of 25 residential properties to replace a collapsed and undersized culverted watercourse and construction of a flood water detention pool on adjacent land to substantially reduce the risk of flooding to more than 45 properties.

<sup>7</sup> Taken from the Framework to assist the development of the Local Strategy for Flood Risk Management, 2nd Edition (Local Government Association, 2011)

7.6.2 The following schemes are being delivered in partnership with the relevant LLFA's by the Environment Agency<sup>8</sup>:

- West Bromich, Sandwell Borough – there is an existing flood risk management scheme in place in the upper catchment of the River Tame, including embankments, flood water storage areas and flood walls. There is also ongoing work to improve and replace some of the existing flood defences.
- Kolverley Grove, Sandwell Borough – works to repair and improve the flood defences are ongoing and due to be completed in 2015/16.
- Collins Road, Sandwell Borough – it has been proposed that the existing sheet pile defences be refurbished to reduce flood risk to 62 properties from the River Tame.
- Upper Tame, Holloway Bank, Sandwell Borough – replacement of a poor condition culvert to reduce flood risk to 5 properties.
- Mushroom Green Dam, Dudley, Mousesweet Brook, Dudley Borough – scheme in progress to reduce sudden failure of a culvert that runs through a 10m high embankment by replacing it with a new one. The scheme is due to be completed in 2015/16 and will reduce flood risk to 42 residential properties.
- Bescot, Walsall Borough – a flood warning service is provided for the Ford Brook and the River Tame at Bescot and Wednesbury.



Figure 2 - Oversized culvert installed at Rushall Close, Wordsley in 2011



Figure 3 - Defence bund and wall installed adjacent to River Stour at Grange Crescent, Halesowen in 2012, in partnership with the Environment Agency

<sup>8</sup> Environment Agency, 2014.



## 8 STRATEGY IMPACTS

### 8.1 IMPACTS ON THE BLACK COUNTRY AUTHORITIES

- 8.1.1 The Local Strategy sets out the Black Country authorities' vision, aims and objectives for managing and reducing local flood risk. The actions that will be undertaken to deliver the strategy are described in full in Appendix A.

### 8.2 IMPACTS ON PARTNERS

- 8.2.1 The Local Strategy sets out the roles and responsibilities listed in the FWMA10 for the Environment Agency and Severn Trent Water in Section 4.3.

### 8.3 IMPACTS ON THE BLACK COUNTRY'S CITIZENS

- 8.3.1 The Local Strategy enables the Black Country's citizens to understand how the Councils and their partners expect to manage and reduce flood risk from surface water, groundwater and ordinary watercourses.
- 8.3.2 In addition the Local Strategy should encourage individuals to:
- Sign up to Environment Agency flood warning services where available and appropriate.
  - Take proportionate and appropriate steps to make their properties more resilient to flooding.
  - Consider whether they are able to help any existing Local Flood Forums (e.g. Illey Brook) or setup their own.

### 8.4 IMPACTS ON DEVELOPERS

- 8.4.1 Developers are advised to take the Local Strategy into account when making decisions about land acquisitions and masterplanning, particularly with regards surface water flooding and the use of SuDS in developments.



## 9 NEXT STEPS

### 9.1 LOCAL STRATEGY EVOLUTION

- 9.1.1 The Local Strategy should be seen as a living document which is evolving rather than being fixed. Therefore the Local Strategy sets out the Black Country authorities' current vision for local flood risk management but this can be adapted and adjusted through time as required.
- 9.1.2 A key aspect of this evolution will be the Strategy Action Plan (Appendix A) which will need to adapt and change as actions are completed and new priorities become obvious. This may be due to a flood event which highlights a new risk, an opportunity for managing risk becomes available or the legislative framework changes.

### 9.2 WORKING IN PARTNERSHIP

- 9.2.1 Moving forward in partnership with the other risk management authorities will be crucial to achieving the objectives and actions set out in this document.
- 9.2.2 This will be achieved through regular partnership meetings to improve communication, cooperation and accountability. For example the Black Country authorities are working with the Environment Agency and Severn Trent Water to explore potential schemes and included in their medium and long term financial planning.
- 9.2.3 Additional meetings and consultation will be undertaken with the long list of partners and stakeholders listed in Section 4 where necessary.

### 9.3 ACTION PLAN REVIEW

- 9.3.1 It is expected that the Action Plan (Appendix A) will be formally reviewed each year to ensure that it remains up-to-date and reflects the priorities and activities undertaken by the Black Country authorities to achieve the objectives.

### 9.4 LOCAL STRATEGY REVIEW

- 9.4.1 As mentioned above the Local Strategy is expected to be a 'live' document with updates as necessary. However, the strategy will be formally reviewed on a cycle to be decided by the Black Country authorities.

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# Appendix A

**THE BLACK COUNTRY LFRMS ACTION PLAN**

The most important part of the local strategy is the Action Plan, which demonstrates what has been completed or is ongoing by the LLFA and other partners, and explains what future works are hoped to be carried out. This allows for more transparency and accountability between partners and for the general public. The action plan is presented below.

Black Country Local Flood Risk Management Strategy  
Action Plan

Aim		Timescale	Potential Funding Source	Partners
Measure(s)	Action(s)			
Objective 1 - Understanding and communicating flood risk in the Black Country				
1A Develop a Flood Risk Management Plan for the West Midlands Cluster	<ul style="list-style-type: none"><li>■ Align aims, objectives and outcomes of the Humber and Severn FRMP with the Local Flood Risk Management Strategy and other relevant policies, strategies and procedures.</li><li>■ Undertake further assessment of local flood risk with detailed hydraulic modelling where appropriate.</li><li>■ Identification of flood hotspot areas where flood risk management solutions could be developed.</li><li>■ Ensure that local authority planning and development strategies, development plans, Area Action Plans and Supplementary Planning Polices are aligned with the Black Country LFRMS</li></ul>	Complete  To commence  Ongoing  Ongoing	Defra LAs EA	EA
1B Investigate locally significant incidents of flooding identifying sources and remedial actions with partners	<ul style="list-style-type: none"><li>■ Undertake flood investigations in line with Flood Investigation procedures.</li><li>■ Publish the results of flood investigations on local authority websites.</li><li>■ Incorporate all locally significant and other flood risk incidents into a GIS database.</li></ul>	Ongoing	Defra LAs EA	
1C Review and update the Preliminary Flood Risk Assessments for the Black Country	<ul style="list-style-type: none"><li>■ Black Country LLFA's to complete review of the Dudley PFRA</li><li>■ Black Country LLFA's to complete review of the Sandwell PFRA</li><li>■ Black Country LLFA's to complete review of the Walsall PFRA</li><li>■ Black Country LLFA's to complete review of the Wolverhampton PFRA</li></ul>	2017	Defra LAs	
1D Develop and continue to maintain a register of flood risk management assets	<ul style="list-style-type: none"><li>■ Develop a GIS based register of structures, with details of ownership, state of repair, and the designation of such structures or features which</li></ul>	Ongoing	Defra LAs	

Abbreviations: LA – Local Authority, EA – Environment Agency, ST – Severn Trent Water

Black Country Local Flood Risk Management Strategy  
Action Plan

Aim		Timescale	Potential Funding Source	Partners
Measure(s)	Action(s)			
	<p>may affect flood risk.</p> <ul style="list-style-type: none"> <li>■ Develop a procedure for review and update of the asset register.</li> </ul>			
1E Engage with local communities to gain information of flood risk issues	<ul style="list-style-type: none"> <li>■ Key stakeholder workshops</li> </ul>			EA/ST
1F Share knowledge and information on local flood risk with the residents of the Black Country	<ul style="list-style-type: none"> <li>■ Develop the relevant sections of the local authorities' websites to provide clear advice and guidance on flood risk and associated issues.</li> </ul>	Ongoing	LAs	
1G Ensure latest information is used in assessing local flood risk.	<ul style="list-style-type: none"> <li>■ Adopt the latest version of the Environment Agency's Risk of Flooding from Surface Water mapping as the locally agreed surface water flood risk information.</li> </ul>	Complete	LAs	EA

Abbreviations: LA – Local Authority, EA – Environment Agency, ST – Severn Trent Water

Black Country Local Flood Risk Management Strategy  
Action Plan

Aim		Timescale	Potential Funding Source	Partners
Measure(s)	Action(s)			
Objective 2 - Managing the likelihood and impacts of flooding.				
2A Work with partners to reduce the impacts of flooding by targeting and prioritising maintenance at high risk locations and assets, enabling an efficient response to, and recovery from, flooding incidents.	<ul style="list-style-type: none"><li>■ Formalise relationships with the EA and Severn Trent Water, and take opportunities for collaborative and partnership working.</li><li>■ Develop a multi-agency preparedness plan to respond to flood events under the West Midlands Conurbation Local Resilience Forum</li><li>■ Prepare a Pre Flood Action Plan activated by Met Office weather warning alerts. Once activated officers to inspect high risk assets and arrange emergency works if possible in time available.</li></ul>	Complete  Complete  Ongoing	Defra EA LAs ST	Met Office
2B Develop flood risk management schemes led by the Black Country authorities, seeking to make best use of available funding	<ul style="list-style-type: none"><li>■ Develop a programme of flood mitigation schemes and initiatives which are likely to be funded through the National Programme or Local Levy</li><li>■ Identify and maximise all other funding sources including CIL, Council, partners and other external organisations, and maximise match-funding</li></ul>	Ongoing	Defra EA LAs	
2C Work with partners to develop flood risk management schemes led by third parties, riparian landowners and stakeholders.	<ul style="list-style-type: none"><li>■ Make available council funds and services where appropriate to provide partnership contributions to flood risk management schemes.</li></ul>	Ongoing	Defra EA LAs Landowners	
2D Work to ensure ongoing management of existing flood risk and drainage assets.	<ul style="list-style-type: none"><li>■ Develop an affordable and suitable flood asset maintenance regime based on risk. Target and prioritise inspections and maintenance to high flood risk locations.</li><li>■ Preparation of a pre flood action plan identifying inspections and works required at critical locations</li></ul>	Ongoing	Defra LAs	
2E Work to ensure compliance of all Local Authority owned assets with the Reservoirs Act	<ul style="list-style-type: none"><li>■ Produce on-site and off-site reservoir safety plans for reservoirs owned by local authorities.</li></ul>	To commence: on-site plans Complete: Offsite plans	Defra LAs	

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Black Country Local Flood Risk Management Strategy  
Action Plan

Aim		Timescale	Potential Funding Source	Partners
Measure(s)	Action(s)			
Objective 3 - Helping the Black Country's citizens to manage their own risk.				
3A Continue to work with community flood groups and other local stakeholders	<ul style="list-style-type: none"><li>■ Support and attend local flood forums.</li><li>■ Support and work with community volunteer groups wherever possible.</li><li>■ Support community groups in developing local flood risk plans.</li></ul>	Ongoing	Defra LAs	
3B Work with residents to communicate the risks of flooding	<ul style="list-style-type: none"><li>■ Raising public awareness of and encouraging sign up to Floodline Warnings.</li><li>■ Provide information about how citizens can minimise flood risk and protect themselves during flooding</li><li>■ Issue guidance to help local communities to protect their home and valuables and understand what to do before a flood, during flooding and afterwards</li><li>■ Provide guidance and assistance to the public on Flood risk insurance matters</li></ul>	Ongoing	Defra LAs	
3C Work with residents and landowners to educate them with regards to their responsibilities for watercourse management	<ul style="list-style-type: none"><li>■ Provide guidance and information to those living near watercourses that have a responsibility for on-going maintenance (Riparian Owners).</li><li>■ Enforce riparian responsibilities where appropriate</li></ul>	Ongoing	LAs	
3D Encourage local involvement in the development of flood risk management schemes	<ul style="list-style-type: none"><li>■ Give local communities a greater stake in project design and delivery at an early stage of flood risk management schemes</li></ul>	Ongoing	LAs	
3E Encourage residents to share information on flooding incidents	<ul style="list-style-type: none"><li>■ Develop a web-based flood incident reporting tool to allow efficient notification of the relevant LLFA to incidents of flooding</li></ul>	Ongoing	LAs	
3F Share knowledge and information with communities and residents	<ul style="list-style-type: none"><li>■ Develop a flood risk knowledge and information section on the council's website providing links to key advisors including the EA, the National Flood Forum and LLFA officer contacts.</li></ul>	Complete	LAs	

Abbreviations: LA – Local Authority, EA – Environment Agency, ST – Severn Trent Water

Black Country Local Flood Risk Management Strategy  
Action Plan

Aim		Timescale	Potential Funding Source	Partners
Measure(s)	Action(s)			
Objective 4 - Ensuring appropriate development in the Black Country.				
4A Develop a planning process to create clear advice and direction to developers on flood risk, drainage and SuDS.	<ul style="list-style-type: none"><li>■ Work with Local Planning Authorities to ensure flood risk and SuDS are properly considered during the planning application process.</li><li>■ LLFA's to provide statutory consultee response on surface water drainage for major planning applications.</li><li>■ Produce developer guidance on the use of SuDS in the Black Country to be available on the local authorities' websites.</li><li>■ Develop a SuDS Handbook for the Black Country</li><li>■ Develop a policy on Urban Creep to ensure it is accounted for in new developments</li></ul>	Ongoing	LAx	LA
4B Undertake consenting activities for ordinary watercourses	<ul style="list-style-type: none"><li>■ Develop a consenting and approval process with accompanying guidance for work to ordinary watercourses.</li><li>■ Make ordinary watercourse consenting guidance available on local authorities' websites.</li></ul>	Ongoing	LAs	
4C Promote the use of Sustainable Drainage Systems in new development	<ul style="list-style-type: none"><li>■ Ensure that developers make necessary contributions to the cost of SuDS and flood risk management activities through Section 106 agreements and/or the Community Infrastructure Levy</li><li>■ Undertake the LLFA's statutory consultee role on new major developments</li><li>■ Develop SuDS handbook for the Black Country</li></ul>	Ongoing  Ongoing	LAs	LA
4D Ensure compliance with Black Country Core Strategy (ENV5 Flood Risk) principals and objectives	<ul style="list-style-type: none"><li>■ Include specific requirements in the SuDs developer guidance and SuDS Handbook.</li></ul>			

Abbreviations: LA – Local Authority, EA – Environment Agency, ST – Severn Trent Water

Black Country Local Flood Risk Management Strategy  
Action Plan

Aim		Timescale	Potential Funding Source	Partners
Measure(s)	Action(s)			
Objective 5 - Improving flood prediction, warning and post flood recovery.				
5A Work with partners to minimise the recovery time for residents and businesses from flooding events	<ul style="list-style-type: none"><li>■ Develop recovery contingency plans in case the local area is impacted by flooding (including business and economic recovery)</li></ul>	Ongoing	LAs	
5B Establish a co-ordinated approach to the provision of temporary flood risk management measures.	<ul style="list-style-type: none"><li>■ Develop a co-ordinated approach to the supply of sandbags across the Black Country</li><li>■ Explore the potential for the use of alternatives to sandbags for provision of temporary flood defences</li></ul>	Ongoing	LAs	
5C Work with partners to improve communications and advice given during flooding events.	<ul style="list-style-type: none"><li>■ Incorporate council emergency contact numbers in community flood plans.</li><li>■ Make appropriate use of social media to give advice during flood events.</li><li>■ Make use of alerts and news updates in the council's websites to give advice during flood events.</li></ul>	Ongoing	LAs	LA, EA, ST
5D Work with partners to understand trigger levels for local flooding events and develop local flood warning systems	<ul style="list-style-type: none"><li>■ Monitor rainfall and flow conditions in smaller catchments to enable flooding trigger levels to be established.</li><li>■ Work with local communities to establish local flood warning systems.</li></ul>	Ongoing	LAs	EA, ST

Abbreviations: LA – Local Authority, EA – Environment Agency, ST – Severn Trent Water

Black Country Local Flood Risk Management Strategy  
Action Plan

Aim		Timescale	Potential Funding Source	Partners
Measure(s)	Action(s)			
Objective 6 - Work in partnership with others to deliver the local strategy.				
6A Engage in regional networks for sharing of knowledge and best practice.	<ul style="list-style-type: none"><li>■ Learning best practice and sharing experiences through the EA Network Meetings</li><li>■ Continue with Black Country collaborative work</li></ul>	Ongoing	LAs	EA, ST
6B Improve the mechanisms of sharing of data and information between partners.	<ul style="list-style-type: none"><li>■ Develop strategy for flood risk data and information sharing for officers, partners, stakeholders and the public</li></ul>	Ongoing	LAs	
6C Engage with neighbouring LLFAs to facilitate a catchment based approach	<ul style="list-style-type: none"><li>■ Formalise engagement process with neighbouring LLFAs with quarterly meetings.</li></ul>	Ongoing	LAs	
6D Continue to engage with flood action groups and other community groups in the delivery of local flood risk management	<ul style="list-style-type: none"><li>■ Formalise engagement process with flood action groups through bi-annual meetings</li></ul>	Ongoing	LAs	

Abbreviations: LA – Local Authority, EA – Environment Agency, ST – Severn Trent Water

# Appendix B

**RELEVANT LEGISLATION**

## THE LAND DRAINAGE ACT 1991

The Land Drainage Act details the duties and powers to manage land drainage for a number of bodies and groups, including local authorities, the Environment Agency, Internal Drainage Boards and riparian owners. The Flood and Water Management Act updates a number of elements of this legislation.

The key powers and duties provided to the Black Country authorities by the Land Drainage Act are as follows.

- A general duty to the environment when exercising powers.
- Powers to maintain, improve and build new drainage related works.
- Consenting and enforcement powers for ordinary watercourses.
- Powers to create byelaws.
- General powers of entry onto land for water level management so that statutory authorities can exercise flood risk management for the common good.

## ENVIRONMENTAL PERMITTING (ENGLAND AND WALES) REGULATIONS 2010

The Environmental Permitting (England and Wales) Regulations 2010 replaced the Water Resources Act 1991 as the key legislation for water pollution in the UK. Under the Environmental Permitting Regulations it is an offence to cause or knowingly permit a water discharge activity, including the discharge of polluting materials to freshwater, coastal waters, relevant territorial waters or groundwater, unless complying with an exemption or an environmental permit. An environmental permit is obtained from the EA. The EA sets conditions which may control volumes and concentrations of particular substances or impose broader controls on the nature of the effluent, taking into account any relevant water quality standards from EC Directives.

## THE LOCALISM ACT (2011)

The Localism Act introduces a number of proposals to provide new freedoms and flexibilities for local government. With regards to flood risk management the Localism Act requires Lead Local Flood Authorities (LLFAs) to establish processes to enable overview and scrutiny committees to review and scrutinise risk management authorities in their area. Risk management authorities have a duty to comply with a request made by an overview and scrutiny committee for information or a response to a report in relation to its flood or coastal erosion risk management functions.

The Localism Act introduces the 'duty to cooperate', which requires all risk management authorities to work together. It is important these organisations work together across administrative boundaries when working in relation to flood and coastal erosion risk management.

## HIGHWAYS ACT 1980

The Highways Act provides powers to the Black Country authorities as the Highway Authority for the creation, improvement and maintenance of roads and for acquisition of land. Under the Act the Black Country authorities, as the Highway Authority, are able to enter into Section 38 and Section 278 agreements with developers, allowing the adoption of new roads (Section 38) and the provision of off-site highway works in conjunction with a development (Section 278). The Act also provides legislation on navigable rivers and watercourses, with regards to construction bridges over and tunnels under water bodies

and diverting watercourses. Section 100 of the Act gives Highways Authorities powers to undertake drainage works off the highway. Section 163 of the Act gives Highways Authorities powers of enforcement against water entering the highway from neighbouring land.

## CIVIL CONTINGENCIES ACT 2004

The Civil Contingencies Act details the framework for civil protection in the UK and sets out the actions required in a flood event. In order to provide protection in the event of a flood the Civil Contingencies Act is arranged in two sections: Part 1: local arrangements for civil protection; and Part 2: emergency powers.

The Black Country authorities have a number of responsibilities under Part 1:

- Undertaking risk assessments.
- Developing Emergency Plans.
- Developing Business Community Plans.
- Arranging to make information available to the public about civil protection matters and maintain arrangements to warn, inform and advise the public in the event of an emergency.
- Share information with other local responders to enable greater co-ordination.
- Co-operate with other local responders to enhance greater co-ordination and efficiency.
- Provide advice and assistance to businesses and voluntary organisations about business continuity management.

## RESERVOIRS ACT 1975

The Reservoirs Act is applicable to all reservoirs classified as 'large raised reservoirs', meaning all those which hold a volume of water greater than 25,000 cubic meters above the natural level of any part of the surrounding ground level, and regulates the responsibility for their management and supervision.

Under the changes provided by the Flood and Water Management Act all large raised reservoirs that are assessed as 'high risk' will be subject to full regulation and any large raised reservoirs not at 'high risk' will need to be registered. In addition, all incidents at reservoirs will need to be reported.

The Flood and Water Management Act defines a 'high risk' reservoir as any reservoir for which the Environment Agency considers that "in the event of an uncontrolled release of water from the reservoir, human life could be endangered, and the reservoir does not satisfy the conditions (if any) specified in regulations made by the Minister". These conditions may include conditions as to:

- The purpose for which the reservoir is used;
- The materials used to construct the reservoir;
- The way in which the reservoir is constructed; and
- The maintenance of the reservoir.

If a reservoir is subject to 'full regulation' a qualified (panel) civil engineer must be appointed to supervise the design and construction, the reservoir must be continually supervised once constructed, an inspection must be undertaken every ten years, and any measures recommended in the interests of safety must be supervised.



## HABITATS DIRECTIVE (THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS) 2010

These regulations transpose the European Habitat Directive into English and Welsh law. The regulations focus on the importance of conserving natural habitats in order to help maintain and enhance biodiversity. The primary tool within the regulations for achieving this is the establishment of a network of protected areas and strict protection measures for particularly rare and threatened species.

## THE STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) DIRECTIVE 2001

This legislation aims to increase the consideration of environmental issues during decision making related to strategic documents. It aims to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.

It sets out the requirement for preparation of an environmental report in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and geographical scope of the plan or programme, are identified, described and evaluated.

## WATER FRAMEWORK DIRECTIVE 2000

Introduced in December 2000 and transposed into UK law in 2003, this piece of EC water legislation is designed to improve and integrate the way waterbodies are managed throughout Europe. European Member States must aim for inland and coastal waters to be at 'good' chemical and ecological status by 2015.

The Environment Agency is the coordinating authority for the Water Framework Directive in England. In order to address the requirements of the Directive, the Environment Agency has produced river basin management plans, which develop new ways of protecting and improving the water environment.

# Appendix C

**RELEVANT POLICY AND PREVIOUS STUDIES**

## BLACK COUNTRY CORE STRATEGY (DUDLEY MBC, SANDWELL MBC, WALSALL COUNCIL & WOLVERHAMPTON COUNCIL, 2011)

The Local Authorities of Walsall, Sandwell, Dudley and Wolverhampton have worked in partnership to produce a Black Country Core Strategy. This sets out the strategy for future development within the region up to 2026 and is the basis for each of the Local Authorities' Local Development Frameworks. The Core Strategy was adopted in 2011.

The most relevant policy is ENV5, which states:

*"The Black Country Authorities will seek to minimize the probability and consequences of flood risk by adopting a strong risk-based approach in line with PPS25. Development will be steered to areas with a low probability of flooding first through the application of the sequential test... Proposals for development must demonstrate that the level of flood risk associated with the site is acceptable in terms of the Black Country Strategic Flood Risk Assessment and its planning and development management recommendations as well as PPS25 depending on which flood zone the site falls into and the type of development that is proposed (see PPS25, table D1: Flood Zones to explain appropriate uses in flood zones)..."*

*To assist in both reducing the extent and impact of flooding and also reducing potential urban heat island effects, all developments should:*

- a) Incorporate Sustainable Drainage Systems (SUDs), unless it would be impractical to do so, in order to significantly reduce surface water run-off and improve water quality. The type of SUDs used will be dependent on ground conditions;*
- b) Open up culverted watercourses where feasible and ensure development does not occur over existing culverts where there are deliverable strategies in place to implement this;*
- c) Take every opportunity, where appropriate development lies adjacent to the river corridors, or their tributaries or the functional floodplain, to benefit the river by reinstating a natural, sinuous river channel and restoring the functional floodplain within the valley where it has been lost previously;*
- d) On sites requiring a Flood Risk Assessment, reduce surface water flows back to equivalent Greenfield rates;*
- e) Create new green space, increase tree cover and/or provide green roofs;*

*No development will be permitted within a groundwater Source Protection Zone 1 which would physically disturb an aquifer, and no permission will be granted without a risk assessment demonstrating there would be no adverse effect on water resources."*

## THE BLACK COUNTRY STRATEGIC FLOOD RISK ASSESSMENT (JACOBS, 2009)

The Black Country Strategic Flood Risk Assessment (SFRA) was prepared in 2009 as a supplementary planning document forming part of the evidence base for the Black Country Core Strategy. Some of the key findings of the SFRA include:

### *Dudley*

- The borough generally includes mostly open channel watercourses which contain the headwaters of the River Stour and the River Tame catchments. They tend to have

well-defined floodplains which are narrow in nature and therefore only a small number of properties are expected to be affected by fluvial flooding.

- The Swan Brook however, is almost entirely culverted which is believed to be of a large enough size to accommodate extreme flows. The details of the culverted tributary of the River Stour to the southeast of Walsall were unknown for the SFRA analysis.
- The borough has a history of various localised flooding issues including excessive surface water runoff and culvert blockages. At the time of reporting maintenance of the culverts along the Main River was a concern.
- Flooding along the upper reaches of the River Stour and the Illey Brook in 2008 was attributed to culvert capacity problems.

#### *Sandwell*

- The SFRA mapped the fluvial flood risk and showed that the Main River Tame and the Oldbury Arm of the River Tame were the locations most at risk from fluvial flooding.
- Significant defence failure within the borough is deemed unlikely.
- Most minor watercourses within the borough are culverted and a basic analysis of their size versus expected flows showed varying degrees of suitability for containing extreme flows. From this analysis Tipton Brook, Hobnail Brook, Dudley Port Brook and White Heath Brook were showed to not contain a flow greater than a 1 in 2 year (50% AEP) event. Thimblemill Brook and Boundary Brook were calculated to have capacity for a 1 in 500 year (0.2%) event.
- Highway flooding is relatively common within Sandwell and this information has been shared with the Local Authority's team responsible for Emergency Planning;
- A historical analysis of fluvial flood events show that since more regular asset maintenance has been undertaken there has been no major recent flooding since the 1980s.
- There is a history of high groundwater tables at the Sandwell and Walsall boundary.

#### *Walsall*

- The Walsall Borough Council area incorporates some key watercourses such as Ford Brook and the River Tame (including the Wolverhampton Arm), which generate the main fluvial flood risk for the area.
- Ford Brook incorporates a major culvert that runs underneath the centre of Walsall, which is understood to provide some level of protection to the area. However culvert capacity is limited to a 5-year return period flood event.
- The Tame tunnel however, provides a significant level of flood protection to the Willenhall area, which is assessed to be much higher than that provided by the Ford Brook culvert.
- In recent history, apart from some garden flooding in November 2000, the Walsall Borough has not experienced any significant fluvial flooding.

## *Wolverhampton*

- The majority of the river network within Wolverhampton is culverted and therefore the main flood risk posed to properties tends to be generated by localised flood incidents, mainly due to blocked road gullies and extreme surface water runoff.
- Flood risk generated by groundwater appears to be a much more significant issue within the Wolverhampton City Council area compared to the other Black Country Councils. This reflects general rising water tables within the Black Country region, due to the significant reduction in industrial groundwater extraction over the last 20 years.
- Historically, several groundwater flooding issues have been reported, most notably within the North-eastern and South-western areas of Wolverhampton.

## **BLACK COUNTRY WATER CYCLE STUDY AND SCOPING SURFACE WATER MANAGEMENT PLAN (SCOTT WILSON, 2009)**

The four Black Country Local Authorities commissioned a joint Water Cycle Study (WCS) and Surface Water Management Plan in 2009. The WCS was completed to an Outline Level and the SWMP a Scoping Level, and this document formed part of the evidence base for the Black Country Core Strategy.

A number of the key findings from the WCS study include:

- At the time of reporting none of the Black Country watercourses were achieving a 'good ecological status' or 'good ecological potential' under the Water Framework Directive.
- There are currently over thirty Source Protection Zones within the Black Country area. The presence of a Major Aquifer, the Sherwood Sandstone Aquifer of the Staffordshire Basin, will be an important consideration when selecting which types of SUDS techniques are most appropriate for different development areas.

A number of the key findings from the Scoping SWMP study include:

- There is a high susceptibility to surface water flooding within the Black Country due to the (sometimes complex) interactions between impermeable surfaces, culverted watercourses, steep sided valleys and artificial water bodies such as canals;
- Stakeholder engagement is very important in the future planning and delivery of a co-ordinated strategy to combat surface water flood risk. British Waterways should be encouraged to be a formal partner within any future SWMP;
- Detailed surface water modelling should be undertaken for the area to improve the understanding of flood risk. The results from the modelling should (a) develop measures and recommendations to manage the sources and pathways of flooding; (b) prepare for emergencies; and (c) inform highways drainage and ordinary watercourse investment;
- There is little historical data on groundwater flooding but this may have been experienced in Walsall in the past and therefore infiltration SuDS measures may not be suitable at locations with shallow groundwater tables. Groundwater flood risk should be mapped within any future SWMP;
- A recommendation for including a 'drainage asset register' in any future SWMP.

The SWMP document is at an appropriate level for a Scoping Study and therefore lacks detail on surface water strategy. The report identifies the main flood mechanisms including culvert blockage, drainage system exceedance, fly-tipping etc. and lists historical flooding

within the study area with photos where available. The strategy does include some actions to improve flood risk management including undertaking a more detailed SWMP, better asset management and improving planning policies with regards surface water management.

## RIVER SEVERN CATCHMENT FLOOD MANAGEMENT PLAN (ENVIRONMENT AGENCY, 2009)

The large part of the Black Country drains into the River Severn catchment. The River Severn Catchment Flood Management Plan (CFMP), considers all types of inland flooding, from rivers, ground water, surface water and tidal flooding within the catchment. The document highlights the increasing flood risk to the Black Country area due to climate change and urbanisation.

The plan outlines a number of actions to help improve flood risk management. Dudley sits in sub area 5 (Telford, Black Country, Bromsgrove, Kidderminster and Coventry Cluster) which the Environment Agency have the following vision and policy for:

*“Areas of moderate to high flood risk where we can generally take further action to reduce flood risk.*

*This policy is about reducing the risk where the existing flood risk is too high. We need to take action in the short term to reduce this level of risk.”*

To implement the preferred policy a number of proposed actions have been developed with the most relevant of these with respect to Dudley as below<sup>9</sup>:

- Ensure floodplains are not inappropriately developed. Follow the ‘sequential approach’ of PPS 25 and consider land swapping opportunities;
- Encourage compatibility between urban open spaces and their ability to make space for rivers to expand as flood flows occur. One example of a flood-compatible use is playing fields. Develop strategies to create ‘blue corridors’ by developing/redeveloping to link these flood-compatible spaces;
- Raise awareness of flooding among the public and key partners, especially major operators of infrastructure, allowing them to be better prepared. Encourage them all to increase the resilience and resistance of vulnerable buildings, infrastructure and businesses;
- Develop better understanding of flooding from surface water, from drainage systems, and from ‘non-main’ watercourses. Produce a strategy for operation and investment, integrating all these with main rivers, particularly for Coventry and Leamington Spa. Local authorities to develop Surface Water Management Plans for the Bromsgrove, Droitwich and Kidderminster areas. Apply lessons from Integrated Urban Drainage pilot schemes, for example Telford & Wrekin.
- Review how effective and sustainable each flood defence is. Review maintenance operations to ensure they are proportionate to flood risk. Manage fly-tipping [on floodplains and in channels.] Avoid excessive silt- accumulation in artificial channels [Either by channel modifications or by de-silting.] Focus on bottlenecks. Watercourses in Coventry are covered by the Green Infrastructure & Green Space Strategy.

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<sup>9</sup> Taken from page 21, specific location actions not included.

## RIVER TRENT CATCHMENT FLOOD MANAGEMENT PLAN (ENVIRONMENT AGENCY 2010)

A large proportion of the Black Country authorities' areas drain into the upstream catchment of the River Trent. This includes parts of all four Black Country authority areas that mostly drain into the River Tame, which is a tributary of the River Trent.

The associated River Trent Catchment Flood Management Plan (CFMP) considers all types of inland flooding, from rivers, ground water, surface water and tidal flooding within the catchment. The document highlights the increasing flood risk to the Black Country area due to climate change and urbanisation.

The plan outlines a number of actions to help improve flood risk management. The part of the Black Country in the River Trent catchment sits in sub area 10 (Birmingham and Black Country) which the Environment Agency have the following vision and policy for:

*"Areas of moderate to high flood risk where we can generally take further action to reduce flood risk.*

*This policy is about reducing the risk where the existing flood risk is too high. We need to take action in the short term to reduce this level of risk."*

To implement the preferred policy a number of proposed actions have been developed with the most relevant of these with respect to the Black Country as below:

- Ensure floodplains are not inappropriately developed. Follow the 'sequential approach' of PPS 25 and consider land swapping opportunities;
- Provide a more accurate and community focused flood warning service.
- Conclude River Tame flood risk management strategy.
- Reduce the incidence of foul water flooding by involving Severn Trent Water Ltd more in flood risk management.
- Investigate and promote opportunities to create green corridors along watercourses through Birmingham and the Black Country.
- Produce and implement an integrated urban drainage strategy.
- Identify locations where flood storage ponds or wetland areas could be developed within the urban areas, with associated habitat creation.
- Produce an integrated flood defence asset management strategy.

## RIVER SEVERN BASIN DISTRICT: RIVER BASIN MANAGEMENT PLAN (ENVIRONMENT AGENCY, 2009)

Part of the Black Country sits within the Worcestershire Middle Severn sub-catchment, which is covered by the Severn River Basin District River Basin Management Plan.

Some of the key actions for the sub-catchment are:

- Improvement to discharges at a number of sewage treatment works;
- Investigations to assess the impacts of abstraction on the environment under the Restoring Sustainable Abstraction programme;
- Projects on Wildlife Trust owned reserves to improve wetland and riparian habitat;
- Wildlife Trust's 'Access to Nature' community involvement programme to improve habitat and raise awareness of Black Country rivers;
- Green Futures initiative to provide co-ordinated advice to farmers on complying with agricultural and environmental regulations across the West Midlands.



## RIVER HUMBER BASIN DISTRICT: RIVER BASIN MANAGEMENT PLAN (ENVIRONMENT AGENCY, 2009)

Part of the Black Country falls within the River Trent CFMP is designated as part of the Tame, Anker and Mease sub-catchment in the River Humber RBMP.

The key issues in the sub-catchment relate to the discharges from sewage treatment works and improving the quality of water being released back into the natural systems.

### DUDLEY PRELIMINARY FLOOD RISK ASSESSMENT

The Dudley Preliminary Flood Risk Assessment (PFRA) was produced in compliance with the Flood Risk Regulations 2009 to provide a high level screening on historic and potential future flooding from surface water, groundwater and ordinary watercourses. PFRAs were produced for every LLFA, based on existing information including historical flood records, the Flood Map for Surface Water (FMfSW) and the previous plans described above.

Analysis of historical flood records identified 52 locations with multiple records of internal property flooding including 226 residential and 2 non-residential properties<sup>10</sup>. 20 multiple flood incidents on category 'A' highways were identified.

Of these 7 property flooding records and 2 highway flooding records meet the 'Local Significant Harmful Consequence' criteria of:

- Flooding more than 15 people, or;
- Flooding more than 1 critical service, or;
- Marooning more than 1 critical service, or;
- Flooding more than 2 non-residential properties, or;
- Flooding a motorway or strategic road and closing it for over 2 hours

The 'Locally Agreed Surface Water Information' is based on the Environment Agency's FMfSW 1 in 200 annual probability 300 mm deep scenario. This dataset places 11 500 properties at risk from surface water flooding, which is 3% of the borough.

However, this mapping has now been superseded by the updated Flood Map for Surface Water (uFMfSW) map. No property counts have been undertaken at the time of reporting.

### SANDWELL PRELIMINARY FLOOD RISK ASSESSMENT (WSP, 2011)

The Sandwell Preliminary Flood Risk Assessment (PFRA) was produced in compliance with the Flood Risk Regulations 2009 to provide a high level screening on historic and potential future flooding from surface water, groundwater and ordinary watercourses. PFRAs were produced for every LLFA, based on existing information including historical flood records, the Flood Map for Surface Water (FMfSW) and the previous plans described above.

The PFRA sets out what level of flooding can be judged to be classed as having a 'Local Significant Harmful Consequence'. The criteria decided on was:

- Flooding 12 or more people, or;
- Flooding 5 or more properties, or:

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<sup>10</sup> Full details available online at <http://www.dudley.gov.uk/resident/environment/drainage-and-sewerage-/flooding/>

- Flooding 1 or more critical service, or;
- Flooding 2 or more non-residential properties, or;
- Flooding a nationally or internationally designated site or heritage site.

Historical flood records show that in Sandwell surface water flooding is the most common problem in the borough but that there are no flood records which meet the significance criteria set out above.

The 'Locally Agreed Surface Water Information' is based on the Environment Agency's FMfSW 1 in 200 annual probability map. The 300 mm deep scenario places 14 550 properties, 1483 non-residential properties and 47 critical services at risk from surface water flooding.

### WALSALL PRELIMINARY FLOOD RISK ASSESSMENT (WALSALL COUNCIL 2011)

The Walsall Preliminary Flood Risk Assessment (PFRA) was produced in compliance with the Flood Risk Regulations 2009 to provide a high level screening on historic and potential future flooding from surface water, groundwater and ordinary watercourses. PFRAs were produced for every LLFA, based on existing information including historical flood records, the Flood Map for Surface Water (FMfSW) and the previous plans described above.

Analysis of historical flood records identified over 500 locations with records of flooding however it is confirmed that "the vast majority did not have property flooding"

The 'Locally Agreed Surface Water Information' is based on the Environment Agency's FMfSW 1 in 200 annual probability 300 mm deep scenario. This dataset places 8,100 properties at risk from surface water flooding, which is 3% of the borough.

However, this mapping has now been superseded by the updated Flood Map for Surface Water (uFMfSW) map. No property counts have been undertaken at the time of reporting.

### WOLVERHAMPTON PRELIMINARY FLOOD RISK ASSESSMENT

The Wolverhampton Preliminary Flood Risk Assessment (PFRA) was produced in compliance with the Flood Risk Regulations 2009 to provide a high level screening on historic and potential future flooding from surface water, groundwater and ordinary watercourses. PFRAs were produced for every LLFA, based on existing information including historical flood records, the Flood Map for Surface Water (FMfSW) and the previous plans described above.

The PFRA concludes that, due to the coarse scale of the assessment of historic flooding, the lack of repeat events, and as a result of data limitations, insufficient data is available to draw definitive conclusions on the impacts and consequences of the majority of historic flood events on people, the economy and the environment. As a result no historic flood events can be definitively assessed as having had 'significant harmful consequences.

The PFRA shows that groundwater flooding has occurred in localised areas across eastern Wolverhampton where it has mostly affected gardens and allotments within Newbolds, Scotlands, Merry Hill, Bradmore and Blakenhall.

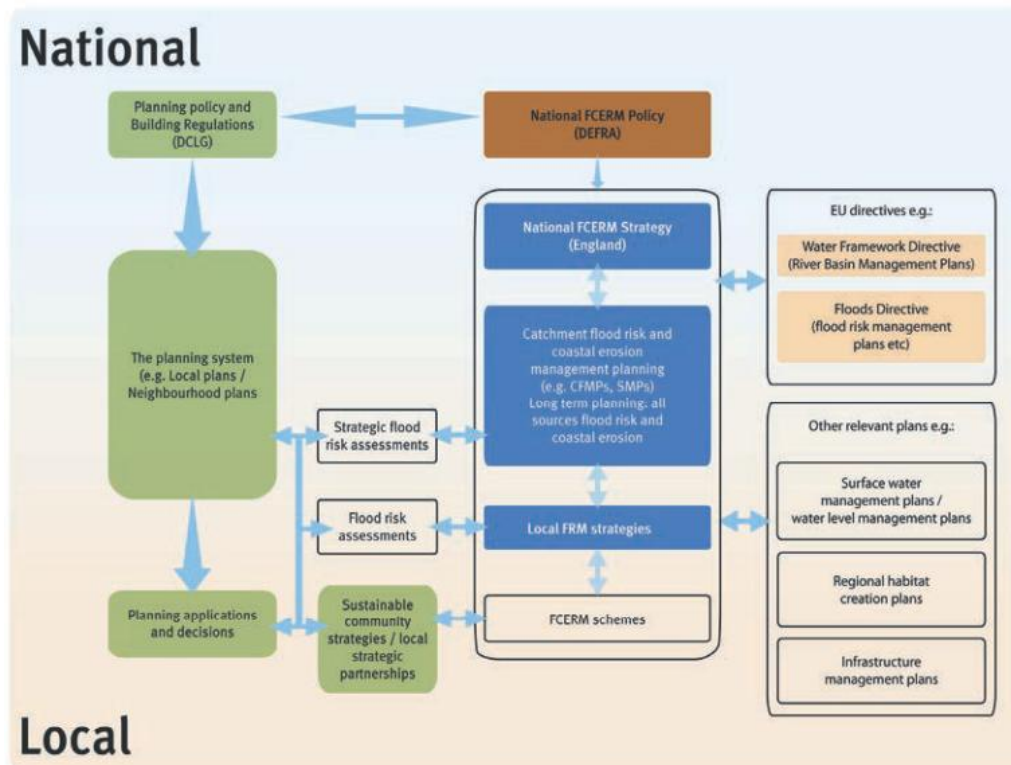
## NATIONAL FLOOD AND COASTAL EROSION RISK MANAGEMENT STRATEGY FOR ENGLAND (ENVIRONMENT AGENCY, 2011)

The National Flood and Coastal Erosion Risk Management Strategy for England (referred to from here as the National Strategy) sets out the government's plans to ensure that flooding and coastal erosion risks are well-managed and co-ordinated, so that their impacts are minimised.

The LFRMS is consistent with the National Strategy and adheres to the guiding principles found within the document:

- Community focus and partnership working – engaging the community so that there is a better understanding of the risks and working with other partners to achieve outcomes.
- A catchment based approach – thinking of the wider catchment and upstream/downstream impacts on neighbouring LLFAs.
- Sustainability – where possible schemes should enhance the natural environment and must take account of climate change.
- Proportionate, risk-based approaches – the Strategy should focus resources on where it will have the greatest effect.
- Multiple benefits – bringing improvements economically, environmentally and socially where possible.
- Beneficiaries should be allowed and encouraged to invest in local flood risk management – alternative sources than government funds should be investigated as part of the Strategy.
- The link between the LFRMS, the National Strategy and planning policies can be seen in Figure A4.

**Figure A4 - Summary of the relationship between national and local strategies and plans (taken from Figure Six in National Strategy (Environment Agency, 2011))**



## **ILLEY BROOK FLOOD ACTION PLAN (ILLEY BROOK FLOOD COMMITTEE, 2012)**

The Illey Brook is a tributary of the River Stour which runs through Halesowen and a debris blockage flooded multiple properties in 2008. A flood committee/forum/action group was set up by local residents following the flooding and a flood action plan has been formulated in consultation with the Environment Agency, Walsall MBC and the emergency services.

The plan sets out the trigger levels at three flood boards along the Illey Brook for actions to be undertaken, who does what if an event occurs and guidance for local residents. It is hoped that the plan will be reviewed and updated accordingly every year.

## **DUDLEY PRE FLOOD ACTION PLAN (DUDLEY MBC, 2012)**

To ensure that flooding has as few consequences as is reasonably possible, Dudley MBC has developed and adopted a pre-flood action plan for ensuring that critical assets which might be vulnerable to blockage or failure are in good order before a storm occurs. The checking and cleansing of these assets (other than regular maintenance) is triggered when certain activation criteria are met, namely an Environment Agency flood warning, a Met Office amber alert or a Flood Forecasting Centre amber alert. However the designated Council Officer has the final decision on the activation of the plan and will take into account local conditions.

Once activated the plan sets out a number of critical trash screens, highway gullies, bridges, culverts and open channel sections to be inspected to check for debris/blockages and cleansed where appropriate. In addition sandbags are to be deployed to Halesmere Way, Chadbury Way (both Halesowen) and Fitton Avenue (Kingswinford).

No Main River actions for the River Stour, Mousesweet Brook, Coalbourne Brook or Dawley Brook are identified as these fall under the responsibility of the Environment Agency.

### **DUDLEY MULTI AGENCY FLOOD RESPONSE PLAN (DUDLEY MBC, 2012)**

The multi-agency response plan sets out the roles, responsibilities and arrangements for different partners when a flood event occurs.

In particular the plan indicates the areas likely to be most at risk, the triggers for activating the plan, the responses to be undertaken by each agency, the responsibilities during recovery after an event, a media communication strategy, health and safety considerations, and relevant plans and drawings.

The document is owned and maintained by Dudley MBC's Emergency Planning Team and reviewed annually, or when necessary. Also recorded is training exercises undertaken in the borough such as at Illey Brook in November 2011 to test the Flood Action Plan (as detailed above).

### **SANDWELL SURFACE WATER MANAGEMENT PLAN (WSP, 2013)**

The Surface Water Management Plan (SWMP) for Sandwell follows central government funding to tackle locations with expected surface water flooding problems. The SWMP builds on the work completed in the PFRA (WSP, 2011) to better analyse the risk to properties and people within the borough.

This was first tackled through an intermediate assessment which used a more accurate hydraulic model to produce flood extents for the entire borough. This mapping was used to compare against –and where appropriate improve – the FMfSW.

The detailed assessment involved the construction of detailed hydraulic models of key hotspot locations (Thimblemill Brook and Upper St Mary's, Tipton Brook, Yew Tree estate, Elm Terrace and Tower Road Brook) to quantify risk at a range of return periods and map flood depth, velocity and hazard. Options for mitigating flood risk were assessed and promoted through the SWMP at each hotspot as appropriate.

### **WOLVERHAMPTON SURFACE WATER MANAGEMENT PLAN**

The Wolverhampton SWMP outlines the preferred strategies for the coordinated management of surface water flood risk in Wolverhampton. Detailed analysis undertaken for the SWMP demonstrated that 5,878 residential properties and 1,153 non-residential properties in Wolverhampton could be at risk of shallow surface water flooding during a rainfall event with a 1 in 30 year probability of occurrence in any given year.

Eight key flooding hot spots and eight associated CDAs were defined across Wolverhampton:

- Woodstock Road;
- Corve Gardens;
- Guy Avenue;
- Wychall Drive, Blackbrook Way and Primrose Avenue;
- Clark Road/Compton Road/Ross Avenue;
- Bramstead Avenue/Grove Lane;

- Marnell Drive/Gail Park; and
- Oxley Moor Road.

Specific flood risk management options were then appraised for the CDAs, and key recommendations have been made for local flood risk management across the whole of Wolverhampton. Options and actions range from quick wins to short and medium term strategic planning and policy development.

### **SANDWELL METROPOLITAN BOROUGH COUNCIL FLOOD PLAN 2012-15**

The Sandwell MBC Flood Plan sets out the framework for the Council's operational response during a flooding emergency. This plan supports the wider multi agency response to flooding.

In particular the plan sets out how the council will respond following notification of a flood event, including triggers for activating the plan. It also sets out the responsibilities of key officers at the council in implementing the flood plan.

### **WALSALL FLOOD PLAN 2012-15**

The Sandwell MBC Flood Plan aims to identify hazards and set out the roles, responsibilities and actions to be taken by the emergency services, the Local Authority and the Environment Agency in the event of flooding incidents in Walsall.

# Appendix D

**FLOOD INVESTIGATION PROCEDURE**



## FLOOD INVESTIGATION METHODOLOGY

The Black Country Authorities will undertake/coordinate a Flood Investigation in accordance with Section 19 of the Flood and Water Management Act (2010) when one or more of the following thresholds are exceeded.

Consequence	Black Country Flood Investigation Thresholds
Human Health	Flooding of 15 people, but no less than 5 properties
Economic Activity	Flooding of 2 businesses
Critical Services	Flooding 1 critical service or The marooning of one critical service, or
Road and Rail	The flooding of a motorway or strategic road where it is closed for over 2 hours
Environment	Harmful consequence to 1 nationally or internationally designated site or nationally or internationally recognised heritage site

# Appendix E

**HISTORIC FLOODING RECORDS**

## DUDLEY MBC

Location	Date	Description	Consequences
Grange Crescent, Halesowen	2007	High intensity rainfall following sustained wet period resulting in the river coming out of bank combining with surface runoff together and a culvert blockage.	12 residential properties with internal flooding up to 1.0 m deep. An additional 15 residential properties with external flooding. The estate road was closed.
	2008	As above.	16 residential properties with internal flooding up to 1.0 m deep. An additional 14 residential properties with external flooding. The estate road was closed.
Halesmere Way, Honeybourne Road Chadbury Road and Woodman Road, Halesowen	2007	High intensity rainfall following sustained wet period resulting in combined flooding from river and surface runoff plus culvert blockage.	5 residential properties with internal flooding. An additional 3 residential properties with external flooding.
	2008	As above.	40 residential properties with internal flooding up to 1.0 m deep. An additional 20 residential properties with external flooding.
Rushall Close, Wordsley	2008	Combined flooding from ordinary watercourse and culvert blockage plus excessive high runoff.	Limited internal flooding to several residential properties.
Manor Way, Halesowen	2007	Flooding mainly associated with excessive highway runoff to low area.	Major road network disruption for several hours resulting from flooding and clean up.
	2008	As above.	As above.
Hinsford Close, Kingswinford	2007	High intensity rainfall resulting in flooding caused by excessive runoff towards low area.	10 residential properties with internal flooding up to 0.75 m deep.
	2009	As above.	5 residential properties with internal flooding up to 0.75 m deep. Closure of residential access road.
Birmingham Street, Stourbridge	At least once a year	High surface and high ground runoff.	Blockage of local distributor road.
Fitton Avenue, Walsall	June 2007	Flooding associated with highway drainage and STW sewers exceeding capacity.	Highway and property flooding.

Location	Date	Description	Consequences
Metfield Croft, Kingswinford	June 2007	High intensity storms produced excessive runoff from school grounds to low residential area.	13 residential properties with internal flooding up to 0.3 m deep.
Mears Coppice, Brierley Hill	July 2007	Out of bank flooding associated with the River Stour	Highway and property flooding.
Bromley Lane, Kingswinford	June 2007	High intensity storm produced excessive runoff from adjacent land and highway.	13 residential properties with internal flooding.
	July 2009	As above.	2 residential properties with internal flooding.
Milking Bank, Gornal	2007	High intensity storm produced excessive runoff from large open space area towards residential properties.	Several residential properties with external flooding of gardens and garages.
Canal Street, Stourbridge	2008	High intensity storm resulting in river coming out of bank, canal overtopping combined with surface water runoff.	Flooding to non-residential, commercial buildings and local access road.
Hawbush Road, Bromford Primary School.	May 2009	High intensity storm resulting in runoff from adjacent land	Primary school affected by internal flooding.

## SANDWELL MBC

Location	Source	Description	Consequences
Biddleston Grove, Brakendale Drive and Spruce Road, Yew Tree	Ordinary watercourse (Yew Tree Brook) blockage	Blockage of grid at upstream end of culverted watercourse	Residential property flooding
Monksfield Avenue, Grove Vale	Waterbody (Red House Park pool)	Overtopping of pool/possible blockage of outfall grid	Residential property and A-road flooding
Manorford Avenue, West Bromwich	Main River (River Tame) and ordinary watercourse (Manorford Avenue brookcourse)	Fluvial flooding	Residential property flooding
Spouthouse Lane, Hamstead	Overland flow likely to be associated with groundwater	Flooding from the Gorse Farm Woods as overland flow. A culvert blockage also occurred.	Residential property flooding

Location	Source	Description	Consequences
Chatsworth Road, West Bromwich	Overland flow likely to be associated with groundwater	Overland surface water flows from higher land and groundwater flows.	Residential property flooding
Beaconsfield Street, West Bromwich	Ordinary watercourse (Hobnail Brook)	Blockage of grid	Residential property and highway flooding
Rosefield Road and Watery Lane, Smethwick	Ordinary watercourse (Thimblemill Brook) and surface water	Flooding from surcharging manholes along culverted watercourse/surface water sewers	Residential property and highway flooding
Rabone Lane, Smethwick	Surface water	Highway flooding then entering factory	Non-residential property flooding
Cranford Street, Smethwick	Surface water	Highway flooding	Highway flooding
Upper St. Mary's Road, Smethwick	Surface water	Highway flooding	Highway flooding
Brook Road, Titford	Ordinary watercourse (Brandhall Brook)	Unknown mechanism	Residential property and highway flooding
Penncricket Lane, Titford	Ordinary watercourse (York Road Brook)	Backing up of flows at culvert entrance.	Residential property and highway flooding

## WALSALL MBC

Location	Source	Description	Consequences
Darlaston Road including Station Street, Kendricks Road	Surface water	Unknown mechanism	Unknown

## WOLVERHAMPTON MBC

Location	Source	Description	Consequences
Penn	Surface water	Unknown mechanism	Localised flooding
Penn Road	Surface water and sewer flooding	Unknown mechanism	Localised flooding
Black Brook Way	Surface water flooding	Unknown mechanism	Unknown
Tettenhall	Surface water flooding	Unknown mechanism	Unknown
Pinfold Grove	Ordinary watercourse (Merry Hill Brook)	Unknown mechanism	Minor flooding

Location	Source	Description	Consequences
Wightwick Mill Farm	Ordinary watercourse (Smestow Brook) / Canal interaction	Unknown mechanism	Canal bank failure led to flooding from Brook
Pendeford Brook	Ordinary watercourse (Pendeford Brook)	Unknown mechanism	40-50 homes flooded, people evacuated
Eccleshall Avenue	Ordinary watercourse (Oxley Brook)	Unknown mechanism	River overtops following heavy rain – localised flooding
Graiseley Brook	Ordinary watercourse (Graiseley Brook)	Unknown mechanism	Localised flooding of low lying land
Pendeford	Worcestershire Canal overtopping	Unknown mechanism	Localised internal and external flooding
Newbolds, Scotlands, Merry Hill, Bradmore and Blakenhall	Groundwater flooding – water seeping out the ground		Unknown
Amanda Avenue, Ashmore Park, Low Hill, Hobnock Road, New Cross Hospital and the Wolverhampton Ring Road	Surface water and sewer flooding	Unknown mechanism	Unknown