Shropshire and Staffordshire Local Flood Risk Management Strategy

Part 1: Group Strategy

Draft Report, June 2014

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Executive Summary

In response to the flood events during 2007, the Government commissioned Sir Michael Pitt to undertake a review. The outcome of this, *Learning Lessons from the 2007 Floods* outlined the need for changes in the way England is adapting to the increased risk of flooding and the role different organisations have to deliver this function.

The Flood and Water Management Act 2010, enacted by Government in response to the recommendations of The Pitt Review, designated unitary and county councils as Lead Local Flood Authorities (LLFAs) with new responsibilities for leading and co-ordinating the management of local flood risk; namely the flood risk arising from surface water runoff, groundwater and ordinary watercourses. This includes a statutory duty to develop, maintain, apply and monitor a strategy for the management of local flood risk.

In the spirit of the Flood and Water Management Act 2010, and recognising the current economic climate, Shropshire Council and Staffordshire County Council have entered into a collaborative working agreement with regard to fulfilling their duties as Lead Local Flood Authorities (LLFAs).

This Local Flood Risk Management Strategy (LFRMS) offers the first opportunity for us to formalise our longer term vision and shape individual priorities that deliver the greatest benefit to the people, property and environment of Shropshire and Staffordshire. In doing this, the Shropshire and Staffordshire Local Flood Risk Management Strategy (LFRMS) documentation has been split into three parts:

- Part 1: Group Strategy (this document);
- Part 2: Policies and Action Plan;
- Part 3: Strategic Environmental Assessment.

Part 1 (this document) covers both Shropshire and Staffordshire, whereas Part 2 and Part 3 consist of individual documents for Shropshire and Staffordshire.

Our Local Flood Risk Management Strategy (LFRMS) complements and supports the *National Strategy* published by the Environment Agency which outlines a National framework for flood and coastal risk management. In addition, the Local Strategy is aligned with the corporate priorities of Shropshire Council and Staffordshire County Council's strategic plans. We have taken the guiding principles from these strategies into account when setting the following objectives for the management of local flood risk:

1) Develop a strategic understanding of flood risk from all sources;
2) Promote effective management of drainage and flood defence systems;

3) Support communities to understand flood risk and become more resilient to flooding;

4) Manage local flood risk and new development in a sustainable manner;

5) Achieve results through partnership and collaboration;

6) Be better prepared for flood events;

7) Secure and manage funding for flood risk management in a challenging financial climate.

The risks of flooding that affect Shropshire and Staffordshire come from a range of sources including main rivers (including the River Severn and River Trent), ordinary watercourses, surface water runoff, groundwater, sewers and reservoirs. Local records indicate multiple sources of flooding for past flood events, which highlights the interactions between different flood mechanisms such as fluvial and surface water flooding. Climate change and continued urbanisation can increase flood risk in the future unless action is taken to mitigate or adapt to that risk.

This Group Strategy outlines the priorities for local flood risk management and provides a delivery plan to manage the risk. In developing this Group Strategy we have been working with communities, businesses and other *Risk Management Authorities* (RMAs), including the Environment Agency, Water Companies, Internal Drainage Boards, Staffordshire boroughs and districts, neighbouring Lead Local Flood Authorities (LLFAs) and other stakeholders to build an evidence base for local flood risk management.

The Group Strategy has been developed to deliver a short to medium term (5 year) improvement plan to establish a sound evidence and knowledge base to develop a longer-term investment programme for flood risk management activities across Shropshire and Staffordshire. Over the next five years we will continue to work with communities and businesses to help them understand the risks they face and what can be done to manage them.

An Action Plan has been prepared for both Shropshire and Staffordshire (see Part 2: Policies and Action Plan) which outlines the measures identified through this Strategy. The outcomes of each action are linked to the objectives of our Local Flood Risk Management Strategy (LFRMS) so that we can monitor how we are delivering our local flood risk management measures.

Longer term strategic development will integrate consideration of flood risk and sustainable drainage into planning and development control systems. Inappropriate development which could increase flood risk will be avoided, as will inappropriate development in areas of significant flood risk.

The structure and content of the Group Strategy has been designed to ensure that the document is accessible for use by both public sector and private

sector organisations as well as the general public. The Local Flood Risk Management Strategy (LFRMS) will be updated periodically to ensure that its content and emphasis remains relevant.

1. Introduction

In England, 5.2 million properties are at risk of flooding. Of these, 1.4 million are at risk from rivers or the sea, 2.8 million are at risk from surface water and 1 million are at risk from both these sources of flooding[1]. This risk was realised in many parts of the country during the summer floods of 2007, which resulted in 55,000 properties flooding, 7,000 rescues by emergency services, 13 deaths and an estimated £3 billion of damages.

In response to the 2007 event, the Government commissioned Sir Michael Pitt to undertake a review. The outcome of this, *Learning Lessons from the 2007 Floods* outlined the need for changes in the way the UK is adapting to the increased risk of flooding and the role different organisations have to deliver this function. The Flood and Water Management Act 2010, enacted by Government in response to the recommendations of The Pitt Review, designated unitary and county councils as Lead Local Flood Authorities (LLFAs) with new responsibilities for leading and co-ordinating the management of local flood risk; namely the flood risk arising from surface water runoff, groundwater and ordinary watercourses. This includes a statutory duty to develop, maintain, apply and monitor a strategy for the management of local flood risk.

The Flood and Water Management Act 2010 also formalised the flood risk management roles and responsibilities for other organisations including the Environment Agency, water companies and highways authorities. The Flood and Water Management Act 2010 also emphasises the need for organisations to work collaboratively together by sharing information and resources so as to improve the way flood risk is managed, both nationally and locally.

In the spirit of the Flood and Water Management Act 2010, and recognising the current economic climate, Shropshire Council and Staffordshire County Council have entered into a collaborative working agreement with regard to fulfilling their duties as Lead Local Flood Authorities (LLFAs). This Local Flood Risk Management Strategy (LFRMS) offers the first opportunity for us to formalise our longer term vision and shape individual priorities that deliver the greatest benefit to the people, property and environment of Shropshire and Staffordshire. In doing this, the Shropshire and Staffordshire Local Flood Risk Management Strategy (LFRMS) documentation has been split into three parts:

- **Part 1: Group Strategy:** (this document) sets out our combined approach to managing flood risk from local sources, in both the short and long term, with proposals for actions that will help to manage the risk.
- **Part 2: Policies and Action Plan Specific to:**

[1] Flooding in England: A National Assessment of Flood Risk. 2009. Environment Agency.

- Shropshire, and;
- Staffordshire.

These individual documents identify potentially significant environmental effects which may be created due to the implementation of the Local Flood Risk Management Strategy (LFRMS).

- **Part 3: Strategic Environmental Assessment Specific to:**
  - Shropshire, and;
  - Staffordshire.

These individual documents identify and describe European Designated Sites within 10km of the Local Flood Risk Management Strategy (LFRMS) area that may be affected by the Local Flood Risk Management Strategy's (LFRMS's) objectives, policies and procedures.

1.1. Managing Flood Risk in Shropshire and Staffordshire

This Local Flood Risk Management Strategy (LFRMS) will play an important role in formalising an integrated approach to local flood risk management in Shropshire and Staffordshire by setting out short, medium and long-term goals and aspirations, which will build on existing knowledge, experience and procedures.

Since taking on our new responsibilities, we have been working with the Environment Agency, Water Companies, local communities, Staffordshire boroughs and districts, neighbouring Lead Local Flood Authorities (LLFAs) and other stakeholders to build an evidence base for local flood risk management in Shropshire and Staffordshire. The development of this Strategy provides the opportunity for us to formalise our longer term flood risk management priorities and shape a future that delivers the greatest benefit to our residents, businesses and environment.

1.2. Flood Risk in Shropshire and Staffordshire

The risks of flooding that affect Shropshire and Staffordshire come from a range of sources including main rivers (encompassing the River Severn and River Trent), ordinary watercourses, surface water runoff, groundwater, sewers and reservoirs. Records indicate multiple sources of flooding for past flood events, which highlights the interactions between different flood mechanisms such as fluvial and surface water flooding. Climate change and continued urbanisation can increase flood risk in the future unless action is taken to mitigate or adapt to this risk.

Shropshire and Staffordshire are both rural counties with similar flooding problems due to their topography. Major towns, such as Shrewsbury and Burton-upon-Trent, suffer from well documented fluvial flooding from the River

Severn and River Trent. However, other parts of the counties are elevated with steep catchments and surface water flooding is often the major concern in these areas. Shropshire and Staffordshire also benefit from large areas of agricultural land and green open space with the potential to offer opportunities for flood storage and the delivery of wider environmental benefits.

Fluvial flood risk from larger rivers is well understood and has been managed at a national scale for many years by the Environment Agency. However, flood risk from local sources, including surface water runoff, groundwater and ordinary watercourses is less well informed, being very localised, often difficult to predict and with sparse historical records available to provide supporting evidence.

Included in Part 2 of this Local Flood Risk Management Strategy (LFRMS), property count analysis has have been undertaken using national scale fluvial and surface water flood maps produced by the Environment Agency. The analysis shows that a large number of properties, within main urban settlements of Shropshire and Staffordshire respectively, are potentially at risk of surface water flooding. Shropshire Council and Staffordshire County Council administrative area boundary maps are presented in Appendix A.

1.3. Context of the Local Flood Risk Management Strategy

The Local Flood Risk Management Strategy (LFRMS) complements and supports the *National Strategy*, published by the Environment Agency, which outlines a National framework for flood and coastal erosion risk management, balancing the needs of communities, the economy and the environment.

The Local Flood Risk Management Strategy (LFRMS) forms a key document in the Shropshire Council and Staffordshire County Council portfolio for flood risk management, drawing together existing flood risk studies and related plans into a single document that outlines how we will manage local flood risk in the future. In managing flood risk in the future we also have the opportunity to deliver wider environmental objectives. In developing the Local Flood Risk Management Strategy (LFRMS), a three month public consultation will be undertaken.

1.3.1 Addressing Local Requirements

Perhaps because the reporting of flooding focuses on large or catastrophic events where intervention is required by agencies and authorities, there is an assumption that these bodies are “responsible” for dealing with all things relating to flooding and that individuals or their communities have no role to play outside the immediate period of flood events. Whilst these organisations may have a role to play in management of flood risk they cannot “solve” flooding; people need to be encouraged and supported to play an active role in managing their own flood risk as individuals and within communities.

A range of legislation gives powers and duties to agencies and authorities to manage aspects of flood risk, with each organisation having a remit which covers one or more specific sources of flooding. This Local Flood Risk Management Strategy (LFRMS) contains information on the various pieces of legislation and the roles and responsibilities that are given to the various authorities involved in flood risk management. Whilst the division of roles is necessary for practicality and accountability it has the potential to fragment available resources, confuse, and interfere with communication. Coordination of planning and activity at a local level will help to make the best use of limited resources and this is one of the major functions of the Local Flood Risk Management Strategy (LFRMS).

This Local Flood Risk Management Strategy (LFRMS) when implemented, *Schedule 3 (Sustainable Drainage Systems) of the Flood and Water Management Act 2010*, will provide further mechanisms to manage flood risk associated with new development by considering all sources of flood risk and the increased use of Sustainable Drainage Systems (SuDS).

In 2011, the government developed a new policy for the funding of flood defence schemes. This is known as *Partnership Funding* and is designed to encourage contributions from private and public sources to supplement government funding, so that more flood defence schemes can be delivered. Through working with partners and those affected by flooding, we aim to explore opportunities for funding and mitigate risks in more affordable ways where multiple benefits can be delivered.

It is not possible to prevent all flooding; however, over time, we will use our Local Flood Risk Management Strategy (LFRMS) to increase the level of understanding of local flood risk posed to communities and to take the lead in implementing measures to manage the risk where appropriate.

This Local Flood Risk Management Strategy (LFRMS) outlines the priorities for local flood risk management and provides a delivery plan to manage the risk. Although the remit of the Local Flood Risk Management Strategy (LFRMS) is to address flooding from surface water, groundwater and ordinary watercourses, it also provides guidance on other forms of flooding, such as main rivers.

2. Legislative Background

This section provides a summary of legislation, policy and guidance relevant to flood risk management. Appendix B provides web-links to each document.

2.1 The Pitt Review 2007

Following the 2007 severe flood events, an independent review of the flood-related emergencies that occurred was undertaken by Sir Michael Pitt on behalf of the Government. The final published report entitled "*Learning Lessons from the 2007 Floods*" called for urgent and fundamental changes in the way the country was adapting to the likelihood of more frequent and intense periods of heavy rainfall.

The report included 92 recommendations, of which 21 specifically referred to local authorities. Of particular importance was the recommendation that local authorities should play a major role in the management of local flood risk, taking the lead in tackling local problems of flooding and co-ordinating all relevant agencies. The Flood and Water Management Act 2010 puts in place the recommendations of Sir Michael Pitt.

2.2 Flood and Water Management Act

The *Flood and Water Management Act* received Royal Assent in April 2010. It revises, modernises and consolidates significant elements of existing legislation covering flooding, land drainage, coastal erosion and reservoir safety. It also strengthens and extends existing flood and water legislation including implementing appropriate recommendations from the Pitt Review into the floods of 2007.

The key provisions of the Flood and Water Management Act 2010 include:

- **New statutory responsibilities for managing flood risk** – There are national strategies and guidance on managing flood risk in England and Wales. Unitary and county councils bring together the relevant bodies to develop local strategies for managing local flood risk;
- **Protection of assets which help manage flood risk** – The Environment Agency, local authorities and Internal Drainage Boards are able to ensure that private assets which help manage the risks of floods cannot be altered without consent;
- **Sustainable drainage** – Drainage systems for all new developments will need to be in line with new National Standards to help manage and reduce the flow of surface water;
- **Powers to carry out environmental works** – The Environment Agency, local authorities and Internal Drainage Boards are able to

manage water levels to deliver leisure, habitat and other environmental benefits;

- **Reservoir safety** – The public will be protected by a new risk-based regime for reservoir safety. It will reduce the burden on regulated reservoirs where people are not at risk, but introduce regulation for some potentially higher-risk reservoirs currently outside of the system;

- **Transfer of private sewers** – On 1st October 2011, water and sewerage companies in England and Wales became responsible for private sewers, which were previously the responsibility of property owners. Not all private sewers and lateral drains were included, for example property owners remain responsible for the sections of pipe between their property and the transferred private sewer or lateral drain;

- **New sewer standards** – In the future all sewers will be required to be built to agreed standards so that they can be adopted and maintained by the relevant sewerage company;

- **Water company charges** – Protection can be offered against unaffordable charges for surface water drainage for community groups such as churches. Social tariffs can be provided for those who would otherwise face difficulty meeting their bills;

- **Protection of water supplies** – Wider powers have been provided for water companies to control non-essential domestic uses of water in times of drought;

- **Other protection for water company customers** – New powers have been provided to reduce the level of debt, new arrangements are in place for managing very risky infrastructure projects which could be a threat to the ability of the water company to provide its services, and updated arrangements have been provided for administration of water companies should they get into difficulties.

The Flood and Water Management Act 2010 creates clearer roles and responsibilities, which include the new role of Lead Local Flood Authority (LLFA) for county councils and unitary authorities in managing local flood risk (from surface water, ground water and ordinary watercourses) and a strategic overview role for all flood risk for the Environment Agency, which retains responsibility for the management of main river (fluvial) flooding.

The Flood and Water Management Act 2010 requires the Environment Agency to *'develop, maintain, apply and monitor a strategy for flood and coastal erosion risk management in England'*. The Environment Agency's National Flood and Coastal Erosion Risk Management Strategy was published in September 2011. The strategy describes, at a high level, what needs to be

done by all organisations involved in flood and coastal erosion risk management. These include local authorities, Internal Drainage Boards, water and sewerage companies, highways authorities, and the Environment Agency.

The national strategy sets out a statutory framework to help communities, the public sector and other organisations to work together to manage flood and coastal erosion risk. It supports local decision-making and engagement in flood risk management, making sure that risks are managed in a co-ordinated way across catchments. This includes the development of Local Flood Risk Management Strategies (LFRMS) by Lead Local Flood Authorities (LLFAs), as well as the Environment Agency's strategic overview of all sources of flooding and coastal erosion.

In carrying out their new roles as the Lead Local Flood Authorities (LLFAs), Shropshire Council and Staffordshire County Council's key duties and responsibilities, once all elements of the Flood and Water Management Act 2010 have been enacted, will include:

- Developing, maintaining and applying, in consultation with key stakeholders, a Local Flood Risk Management Strategy (LFRMS) (this portfolio of documents), which should include risks from surface water run-off, groundwater and ordinary watercourses i.e. those watercourses which are not responsibility of the Environment Agency;
- Establishing local management and governance arrangements with other key stakeholders to provide delivery of effective joined up management of flood risk;
- Fulfilling the requirements of the EU Floods Directive in relation to sources of flood risk by completing Preliminary Flood Risk Assessments (PFRAs), the identification of flood risk areas and preparing Surface Water Management Plans (SWMPs) for areas of greatest risk;
- Approving, adopting and maintaining Sustainable Drainage Systems (SuDS), that meet national standards, for development;
- Establishing and maintaining a register of flood risk management assets. This will include a record of each structure together with details of ownership and, where known, state of repair;
- Designating structures / features, where appropriate, which may affect flood risk so they cannot be altered without consent. Assets can be designated by the Lead Local Flood Authority (LLFA), District/Borough Councils and the Environment Agency;
- Investigating flooding incidents to understand their cause and ensure that appropriate agencies play their role in the effective management of flooding incidents and recovery;

- Powers to undertake works to manage flood risk from surface water run-off and groundwater. District/Borough Councils and Internal Drainage Boards retain their responsibility to undertake works on ordinary watercourses (under the Land Drainage Act 1991), and;
- Planning for the emergency management of flooding as a key partner of the Local Resilience Forum (LRF).

2.3 Land Drainage Act

The *Land Drainage Act 1991* outlines the duties and powers to manage land drainage for a number of bodies including the Environment Agency, Internal Drainage Boards, local authorities, navigation authorities and riparian landowners. The Flood and Water Management Act 2010 has updated many parts of this legislation to integrate the role of Lead Local Flood Authorities (LLFAs). The powers and duties under this act can be summarised as:

- A duty on a drainage board to exercise a general supervision over all matters relating to drainage of land;
- A general duty to the environment when exercising powers;
- Powers to maintain, improve and build new works required for drainage;
- Consenting and enforcement powers for ordinary watercourse;
- Powers to make byelaws, and;
- General powers of entry onto land for water level management so that statutory authorities can exercise flood risk management functions for the common good.

2.4 Highways Act

The *Highways Act 1980* gives county and unitary authorities specific duties and powers, as highway authorities, in relation to flooding and drainage affecting the public highway. With regard to drainage, the powers and duties under this act can be summarised as:

- Powers to maintain, improve and build new works required for drainage;
- General powers of entry onto land;
- Enforcement powers to prevent unauthorised discharges of water on to the public highway.

2.5 Flood Risk Regulations

The *Flood Risk Regulations 2009* incorporate the requirements of the European Floods Directive into national law in England and Wales. As with most European Union law, the Directive was written for the benefit of many different countries. The Flood Risk Regulations (FRRs) are concerned with identifying and taking action in relation to areas with the most significant flood risks across the country. The first stage of implementing the Flood Risk Regulations (FRRs), the Preliminary Flood Risk Assessment (PFRA), was undertaken by Shropshire Council and Staffordshire County Council in June 2011 and has supported the preparation of this Local Flood Risk Management Strategy (LFRMS).

The Flood Risk Regulations (FRRs):

- Give responsibility to the Environment Agency to prepare Preliminary Flood Risk Assessments (PFRAs), flood risk maps, hazard maps and flood risk management plans for flood risk from the sea, main rivers and reservoirs;
- Give responsibility to Lead Local Flood Authorities (LLFAs) to do the same for all other forms of flooding (excluding sewer flooding), including surface water runoff, groundwater and ordinary watercourses, and;
- Require areas of nationally significant risk to be identified, and flood risk maps, hazard maps and management plans to be produced for those areas.

The Environment Agency supplied the core national datasets to undertake this work and guidance was provided on how to identify areas of nationally significant flood risk affecting more than 30,000 people in a 5km^2 area. The Preliminary Flood Risk Assessments (PFRAs) for Shropshire and Staffordshire identified no significant flood risk areas and, therefore, there is no requirement to undertake further work with regard to the Flood Risk Regulations 2009 (FRRs) at this time. However, across England and Wales, 18 significant flood risk areas were identified and the Environment Agency will be working with the relevant Lead Local Flood Authorities (LLFAs) to produce Flood Risk Management Plans (FRMPs).

All of the documents under the Flood Risk Regulations 2009 (FRRs) are to be reviewed and if necessary updated every 6 years. Therefore the second set of Preliminary Flood Risk Assessment (PFRA) reports will be published in 2017.

As part of the Environment Agency's strategic overview of all sources of flood risk, it has shared two national surface water flood maps with Lead Local Flood Authorities (LLFAs) – Areas Susceptible to Surface Water Flooding (ASTSWF) and the Flood Map for Surface Water (FMfSW). However, these maps did not fully meet the requirements of the Flood Risk Regulations 2009

(FRR's). Therefore the Environment Agency has produced a single surface water flood map for all of England and Wales. This will benefit all Lead Local Flood Authorities (LLFAs) by allowing them to focus on managing surface water flood risk, and will enable the public to better understand how the risk of surface water flooding may affect them.

2.6 Reservoirs Act

Responsibility for the management and supervision of reservoirs in England and Wales is regulated by the *Reservoirs Act 1975*. The Reservoirs Act (RA) applies to all reservoirs classified as 'large raised reservoirs', i.e. those that hold a volume of water of 25,000m^3, or more, cubic metres above natural ground level.

The Flood and Water Management Act 2010 amends the Reservoirs Act (RA) by introducing new arrangements for reservoir safety, based on risk rather than the size of the reservoir. It also includes provisions which could if enacted reduce the threshold of structures classified as large raised reservoirs to 10,000m^3.

The key changes as a result of the Flood and Water Management Act 2010 include:

- Large raised reservoirs that are assessed as 'high risk' will be subject to full regulation;
- Large raised reservoirs that are not assessed as 'high risk' will need to be registered but will not be subject to full regulation;
- All incidents at reservoirs will need to be reported;
- All reservoirs that hold more than 10,000m^3 of water above natural ground level may be registered in the future, and;
- If registered, some reservoirs that hold more than 10,000m^3 that are assessed as 'high risk' will be subject to full regulation.

A reservoir is designated as 'high risk' if the Environment Agency considers that "human life could be endangered in the event of an uncontrolled release of water from the reservoir and the reservoir does not satisfy certain conditions".

Full legislation includes appointing a qualified (panel) civil engineer to supervise the design and construction of the reservoir, continually supervise the reservoir once built, carry out an inspection every ten years, and supervise and certify any recommended measures to be taken in the interests of safety.

Reservoirs that hold less than 25,000m^3 of water are subject to safety regulations managed by the Health and Safety Executive (HSE) and local authorities.

2.6.1 Onsite and Offsite Reservoir Emergency Plans

Onsite Reservoir Flood Plans are produced by the reservoir owners or operators. The plan should include details of how the owner or operator will prevent the dam from failing in an emergency and how they will contain and reduce the effects of the failure. Onsite plans will be mandatory in due course.

Offsite Reservoir Flood Plans are produced by the Local Resilience Forum (LRF). Offsite plans set out what the emergency services will do to warn and protect people and property downstream in the event of an incident which could lead to dam or reservoir failure. Local authorities are responsible for coordinating offsite plans for reservoir flooding and ensuring communities are well prepared. Local authorities will work with other members of Local Resilience Forums (LRFs) to produce these plans.

2.6.2 Reservoir Flood Mapping

The Environment Agency has produced flood maps to show the impact that a dam or reservoir failure resulting in an uncontrolled release of water, could have downstream. The outline extent of flooding is shown on the *Environment Agency's online mapping*. More detailed maps are available to upper-tier local authorities, reservoir owners and operators, and emergency responders. These detailed maps are used to develop the offsite plans within the Local Resilience Forums (LRFs).

2.7 Other Pieces of Legislation and Guidance

2.7.1 The National Planning Policy Framework

The *National Planning Policy Framework* outlines the core planning principles taking flood risk management into consideration and highlights the need for the effective planning for flood risk infrastructure. The framework emphasises that flood risk should be included in the environmental assessment of development and that pre-application engagement and front-loading is essential for developers to understand what is required of them in relation to flood risk assessment, mitigation and management. The framework also includes objectives to minimise the vulnerability to climate change and to manage the risk of flooding.

Planning Practice Guidance released in June 2014 provides additional advice to local planning authorities to ensure the effective implementation of planning policy on development in areas at risk of flooding.

2.7.2 Water White Paper

The Government published the *Water White Paper in 2011* to highlight that water is essential for economic growth and that the environment should be protected for future generations. It also:

- Outlines plans to modernise the rules which govern how we take water from our rivers;
- Explains how we will improve the condition of our rivers by encouraging local organisations to improve water quality and making sure we are extracting water from our environment in the least harmful way;
- Announces plans to reform the water industry and deregulate water markets to drive economic growth, and;
- Enables business and public sector customers to negotiate better services from suppliers and cut their costs.

2.7.3 Conservation of Habitats and Species Regulations

These regulations transpose the EU Habitats Directive into UK law. The *Conservation of Habitats and Species Regulations* aim to help maintain and enhance biodiversity throughout the EU, by conserving natural habitats. The main way it does this is by establishing a coherent network of protected areas and strict protection measures for particularly rare and threatened species.

2.7.4 Climate Change Act

The *Climate Change Act* requires a UK-wide climate change risk assessment every five years, accompanied by a national adaptation programme that is also reviewed every five years. The Act has given the Government powers to require public bodies and statutory organisations, such as water companies, to report on how they are adapting to climate change.

2.7.5 Making Space for Water

Making Space for Water states that the Government will, over the 20-year lifetime of the strategy, implement a more holistic approach to managing flood and coastal erosion risks in England. The approach involves taking account of all sources of flooding, embedding flood and coastal risk management across a range of Government policies. The aim is to manage risks by employing integrated approaches which reflect both national and local priorities, so as to reduce the threat to people and their property and deliver the greatest environmental, social and economic benefit, consistent with the Government's sustainable development principles.

2.7.6 Developing Urban Blue Corridors, Scoping Study

The concept of *Developing Urban Blue Corridors* represents a consolidation of what were previously recognised as separate flood risk management options / solutions and will form an important part of future local authority flood risk schemes. By designating overland flow paths, surface water ponding areas, urban watercourse buffer areas and multi-use flood storage areas and linking

these solutions together, Lead Local Flood Authorities (LLFAs) can begin to more effectively manage urban flood risk.

2.7.7 Civil Contingencies Act

The *Civil Contingencies Act (2004)* aims to deliver a single framework for civil protection in the UK and sets out the actions that need to be taken in the event of a flood. The Civil Contingencies Act (CCA) is separated into two substantive parts: local arrangements for civil protection (Part 1) and emergency powers (Part 2).

Responsibilities under Part 1 of the Civil Contingencies Act (CCA) include:

- The undertaking of risk assessments;
- Developing Emergency Plans;
- Developing Business Continuity Plans;
- Arranging to make information available to the public about civil protection matters and maintaining arrangements to warn, inform and advise the public in the event of an emergency;
- Sharing information with other local responders to enable greater co-ordination;
- Co-operating with other local responders to enhance co-ordination and efficiency, and;
- Providing advice and assistance to businesses and voluntary organisations about business continuity management.

2.7.8 Strategic Environmental Assessment Directive

The *Strategic Environmental Assessment (SEA) Directive 2001* (European Commission Directive 2001/42/EC) is legislation which aims to increase the consideration of environmental issues during decision making related to strategic documents. The Strategic Environmental Assessment (SEA) Directive identifies any significant environmental effects that are likely to result due to the implementation of a plan, programme or strategy.

2.7.9 Water Framework Directive

The *Water Framework Directive 2000* (WFD) is the most substantial piece of European Commission water legislation to date and is designed to improve and integrate the way water bodies are managed throughout Europe. The Water Framework Directive (WFD) came into force in December 2000 and was transposed into UK law in 2003. Member States must aim to reach “good” chemical and ecological status in inland and coastal waters by 2015. It is designed to:

- Prevent deterioration of aquatic ecosystems, protect them and improve the ecological condition of waters;
- Aim to achieve at least good status for all waters. Where this is not possible, good status should be achieved by 2021 or 2027;
- Promote sustainable use of water as a natural resource;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants, and;
- Contribute to mitigating the effects of floods and droughts.

To address this, the Environment Agency is the coordinating authority and has produced river basin management plans to develop new and better ways of protecting and improving the water environment.

2.7.10 Drainage Strategy Framework for Water and Sewerage Companies

This *Drainage Strategy Framework* good practice guide, commissioned by the Environment Agency and The Water Services Regulation Authority (OFWAT), illustrates how water and sewerage companies should prepare a drainage strategy for a particular catchment using six guiding principles:

- **Partnership** – The document recognises that water and sewerage companies cannot develop Drainage Strategies on their own;
- **Uncertainty** – Strategies should explain the reliability of the data and knowledge about current and future performance of drainage systems;
- **Risk-based** – Strategies should be risk-based, to ensure that investment is made where risks are the greatest;
- **Whole life costs and benefits**;
- **Live process** – Strategies should be adaptable and periodically reviewed;
- **Innovative and sustainable**.

2.7.11 Surface Water Management: Interim Guidance for Developers

The *Surface Water Management: Interim Guidance for Developers* document advises prospective developers and planning applicants in Shropshire of acceptable flood risk management techniques as part of the planning process.

It is important to note that this document will be superseded by the Shropshire and Staffordshire Sustainable Drainage Handbook once published.

3. Overview of Regional Flood and Coastal Committees, Risk Management Authorities and other Key Stakeholders

3.1. Who has Responsibility for Managing Flood Risk?

Flood risk management is the responsibility of everyone, not solely the organisations identified by the Flood and Water Management Act 2010. No single body has the means to reduce all flood risk. Effective management will involve various bodies each with a range of relevant duties and powers. The more that the relevant organisations are able to find opportunities to work together and with the community, the better use will be made of their capacity and resources. Regional Flood and Coastal Committees (RFCCs) play a fundamental role in the management of flood risk.

3.2. The Role of the Regional Flood and Coastal Committees

Regional Flood and Coastal Committees (RFCCs) are committees established by the Environment Agency under the Flood and Water Management Act 2010. They meet on a quarterly basis and bring together members appointed by Lead Local Flood Authorities (LLFAs) and independent members with relevant experience for three purposes:

- To ensure there are coherent plans for identifying, communicating and managing flood and coastal erosion risks across catchments and shorelines;
- To promote efficient, targeted and risk based investment in flood and coastal erosion risk management that optimises value for money and benefits for local communities, and;
- To provide a link between the Environment Agency, Lead Local Flood Authorities (LLFAs), other Risk Management Authorities (RMAs) and other relevant bodies to promote a mutual understanding of flood and coastal erosion risks in its area.

Shropshire and Staffordshire are covered by three Regional Flood and Coastal Committees (RFCCs):

- Severn and Wye Regional Flood and Coastal Committee (RFCC) covers the majority of Shropshire, with member representation and a small part of Staffordshire, with no member representation (Shropshire Council represents Staffordshire County Council regarding flood matters within Staffordshire);
- Trent Regional Flood and Coastal Committee (RFCC) covers none of Shropshire and the majority of Staffordshire, with member representation, and;

- North West Regional Flood and Coastal Committee (RFCC) covers a very small part of Shropshire, with no member representation and a very small part of Staffordshire, with no member representation.

3.2.1 Member Representation

Shropshire Council has an appointed member of cabinet who sits on the Severn and Wye Regional Flood and Coastal Committee (RFCC). Staffordshire County Council has an appointed member of cabinet who sits on the Trent Regional Flood and Coastal Committee (RFCC) (Figure 3-1).

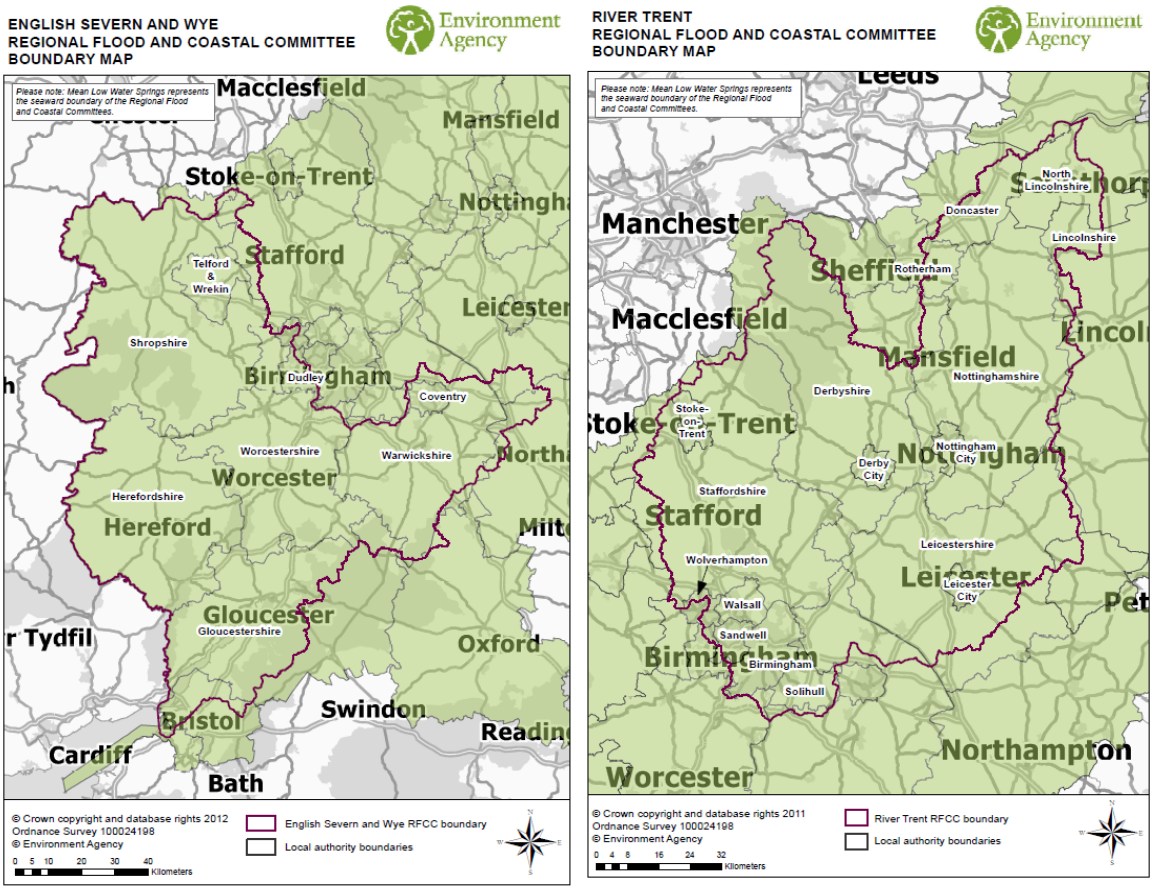


Figure 3-1: RFCC Boundary Map

The Regional Flood and Coastal Committee (RFCC) boundary map provided in Appendix A indicates the coverage of each RFCC across Shropshire and Staffordshire.

3.3. Risk Management Authorities

In addition to designating Lead Local Flood Authorities (LLFAs), the FWMA identifies certain organisations as Risk Management Authorities (RMAs) which have specific responsibilities, duties and powers related to flood risk management. Some responsibilities are new, and others are existing duties

and powers set out in previous legislation. Table 3.1 and Table 3.2, set out the Risk Management Authorities (RMAs) in Shropshire and Staffordshire respectively.

Table 3-1 Flood Risk Management Authorities in Shropshire

Risk Management Authority	Name of organisation
Environment Agency	Environment Agency
Lead Local Flood Authority	Shropshire Council
Internal Drainage Board	Melverley Internal Drainage Board Powysland Internal Drainage Board Rea Internal Drainage Board
Water Company	Severn Trent Water United Utilities Welsh Water Dwr Cymru
Highway Authority	Shropshire Council Highways Agency

Table 3-2 Flood Risk Management Authorities in Staffordshire

Risk Management Authority	Name of Organisation
Environment Agency	Environment Agency
Lead Local Flood Authority	Staffordshire County Council
District/Borough Council	Cannock Chase District Council East Staffordshire Borough Council Lichfield District Council Newcastle Under Lyme Borough Council South Staffordshire District Council Stafford Borough Council Staffordshire Moorlands District Council Tamworth Borough Council
Internal Drainage Board	Sow and Penk Internal Drainage Board

Water Company	Severn Trent Water United Utilities
Highway Authority	Staffordshire County Council Highways Agency

3.3.1 Environment Agency

The Environment Agency has a role in flood risk management both as a national strategic body and also, more locally, operating as a Risk Management Authority (RMA) at a catchment and area level. Aspects of the strategic role that are relevant to this Local Flood Risk Management Strategy (LFRMS) are:

- Using strategic plans, like the Catchment Flood Management Plans (CFMPs), to set the direction for flood risk management;
- Collation and review of the assessments, plans and maps that Lead Local Flood Authorities (LLFAs) produce to meet the Flood Risk Regulations 2009 (FRRs);
- Provision of the data, information and tools to inform government policy and aid Risk Management Authorities (RMAs) in delivering their responsibilities;
- Supporting collaboration, knowledge-building and sharing of good practice including provision of capacity-building schemes such as trainee schemes and officer training;
- Managing the Regional Flood and Coastal Committees (RFCCs) and supporting their decisions in allocating funding for flood defence and flood resilience schemes;
- Monitoring activity and reporting on flood and coastal erosion risk management, and;
- Providing grants to Risk Management Authorities (RMAs) to support the implementation of their incidental flooding or environmental powers.

The Environment Agency's local role as a Risk Management Authority (RMA) is relevant in the following areas:

- Regulation of main rivers including an assessment of flood risk and permissive powers to require landowners to maintain main rivers on their land / property where flood risk is a concern;

- Regulation of large raised reservoirs including an assessment of flood risk;
- Communication about risk and flood warnings to the public, the media and to partner organisations;
- Supporting communities to be flood resilient through sharing best practice and provision of information advising on the planning process;
- Emergency planning, and input to Multi-Agency Flood Plans (MAFPs), which are developed by local resilience forums, and;
- Bringing forward flood defence schemes through the Regional Flood and Coastal Committees (RFCCs), working with Lead Local Flood Authorities (LLFAs) and local communities to shape schemes which respond to local priorities.

The Environment Agency boundary map provided in Appendix A indicates the coverage of each Environment Agency Regional Office across Shropshire and Staffordshire.

3.3.2 Lead Local Flood Authorities

Shropshire Council and Staffordshire County Council, as the Lead Local Flood Authorities (LLFAs) in Shropshire and Staffordshire, have an important role to play as the strategic leaders for local flood risk management. This includes:

- Developing a Local Flood Risk Management Strategy (LFRMS);
- Ensuring that all organisations involved in flood risk management are aware of their responsibilities;
- Monitoring progress and activity by all parties involved in flood risk management, and;
- Co-ordinating communication, both with the public and between organisations.

To support the above, both councils have agreed to work together to deliver a range of duties which include:

- Preparing reports and plans to meet the requirements of the Flood Risk Regulations 2009 (FRRs);
- Carrying out investigations of flooding where appropriate and publishing reports;
- Keeping a public register and associated record of structures and features which have a significant effect on local flood risk;

- Designation of structures and features where appropriate;
- Regulation of ordinary watercourses, including permissive powers to require landowners to maintain ordinary watercourses on their land / property where flood risk is a concern;
- Establishment of a joint Sustainable Drainage System (SuDS) Approval Body (SAB), and;
- Establishment of joint governance arrangements for the delivery of flood risk management functions.

In addition the authorities have permissive powers which allow them to carry out practical works to manage flood risk from surface water and groundwater.

Both councils also have a number of other roles that relate to flood risk management. These include:

- **Highway Authority** – management of public, non-trunk, roads and their associated drainage.
- **Planning Authority** –
    - Shropshire Council, being a unitary authority, must prepare a local plan containing policies to guide development in the planning authority area. The local plan is informed by a Strategic Flood Risk Assessment (SFRA) (also prepared by the planning authority) to ensure future development is steered to areas of lowest flood risk first;
    - Shropshire Council is also the planning authority for minerals and waste development, together with its own projects (e.g. school sites). The Minerals and Waste Plan is also informed by a Strategic Flood Risk Assessment (SFRA);
    - Shropshire Council is also responsible for deciding whether a development (anything from an extension on a house to a new shopping centre) should go ahead. The local plan policies form the basis of deciding planning applications;
    - Staffordshire County Council is the planning authority for minerals and waste development together with its own projects e.g. school sites. The authority produces a Strategic Flood Risk Assessment (SFRA) to support the Minerals and Waste Plan.
- **Emergency Planning** – The authorities are category one responders under the Civil Contingencies Act (CCA) and the role is set out in the Multi Agency Flood Plan (MAFP);

- **Historical and Natural Environment** - Maintenance of databases which are shared with other authorities. The information is relevant to planning of practical works and assessing of potential for environmental impacts.

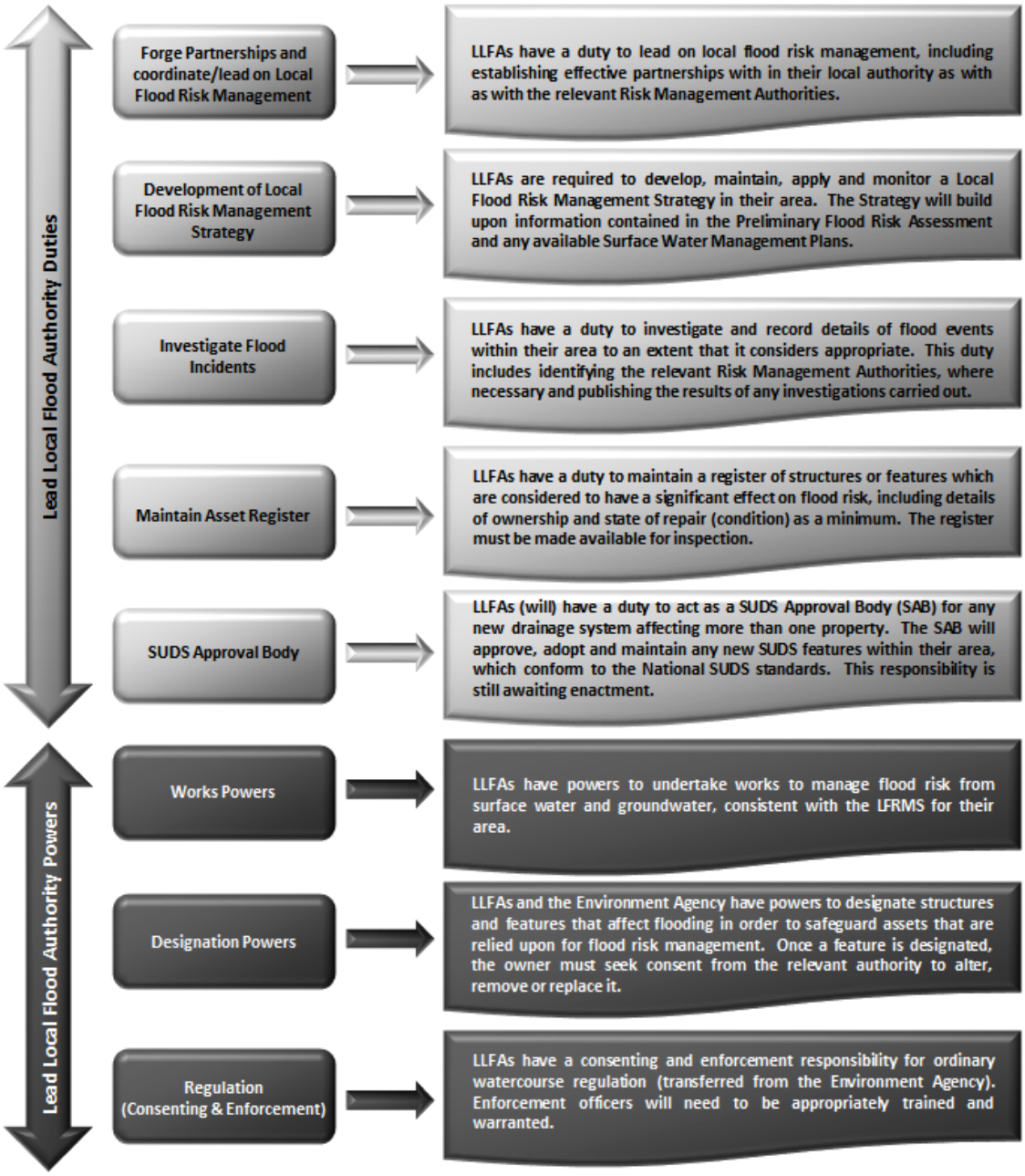


Figure 3-2: Lead Local Flood Authority Duties and Powers

3.3.3 District and Borough Councils within Staffordshire

District and Borough Councils have a flood risk management function relating to ordinary watercourses and in addition have a range of functions which are relevant to this Local Flood Risk Management Strategy (LFRMS):

- As planning authorities the District/Borough Councils prepare a local plan to guide development. Flood risk is taken into account based on a Strategic Flood Risk Assessment (SFRA) which must consider flood risk from all forms of flooding;
- Under the Flood and Water Management Act 2010 District/Borough Councils have powers to carry out works on ordinary watercourses to reduce flood risk;
- Activity relating to powers under the Land Drainage Act (LDA) to make bylaws relating to ordinary watercourses;
- District/Borough Councils own and manage public spaces, which could potentially perform a flood risk management function, and;
- Responsibilities for emergency planning as a responder under the Civil Contingencies Act (CCA) and this role is outlined in the Multi Agency Flood Plan (MAFPs).

3.3.4 Internal Drainage Boards

In addition to the universal responsibilities under the Flood and Water Management Act 2010, Internal Drainage Boards (IDBs) have the following new roles and responsibilities:

- Power to designate structures and features that affect flooding;
- Duty to act consistently with local and national strategies;
- Regulation of ordinary watercourses, within the Internal Drainage Board (IDB) district, including permissive powers to require landowners to maintain ordinary watercourses on their land / property where flood risk is a concern and;
- Statutory consultees to the Sustainable Drainage System (SuDS) approval process where proposed drainage systems will involve discharge of water into an ordinary watercourse in an Internal Drainage Board's (IDB's) district.

Parts of Shropshire and Staffordshire located within Internal Drainage Board (IDB) areas are presented in Appendix A.

3.3.5 Water Companies

There are two types of water company serving Staffordshire. South Staffordshire Water is a water supply company, while Severn Trent Water and United Utilities are water and sewerage companies providing both water supply and wastewater services.

In Shropshire, the three water companies are Severn Trent Water, Welsh Water Dwr Cymru and United Utilities. These are all water and sewerage companies providing both water supply and wastewater services.

The coverage of each water supply and sewerage company within Shropshire and Staffordshire is presented in Appendix A.

3.3.6 Water and Sewerage Companies

Water and sewerage companies, as Risk Management Authorities (RMAs), have the following responsibilities with regard to flood risk management:

- Responding to flooding incidents involving their assets;
- Maintaining a register of properties at risk of flooding due to a hydraulic overload in the sewerage network (DG5 register);
- Undertaking asset improvements to alleviate sewer flooding problems on the DG5 register;
- Providing, maintaining and operating systems of public sewers and works for the purpose of effectively draining an area;
- Having a duty to co-operate with other relevant authorities in the exercise of their flood and coastal erosion risk management functions;
- Having a regard to national and local flood and coastal erosion risk management strategies;
- Being subject to scrutiny from Lead Local Flood Authorities' (LLFA) democratic processes;
- Having a duty for the adoption of private sewers, and;
- Being a statutory consultee to the Sustainable Drainage Systems (SuDS) Approval Body (SAB) when such a drainage system is proposed to connect to the public sewer.

3.3.7 Water Supply Companies

Water supply companies are not Risk Management Authorities (RMAs) and do not have the same obligations to co-operate and be subject to scrutiny by Lead Local Flood Authorities (LLFAs). However, like all organisations, they are required to provide information related to flood risk to Staffordshire County Council and the Environment Agency.

3.3.8 Highways Agency

The Highways Agency is an Executive Agency of the Department for Transport (DfT), and is responsible for operating, maintaining and improving

the strategic road network in England on behalf of the Secretary of State for Transport. It acts as the Highways Authority for a number of major highways in Shropshire and Staffordshire.

Table 3-3 provides a list of motorways and trunk roads located within Shropshire and Staffordshire where the Highways Agency is the authority responsible for operation and maintenance. A map illustrating the Highways Agency Road Network is presented in Appendix A.

Table 3-3 Highways Authority Motorways and Trunk Roads

Motorways	Trunk Roads
M6	A5 west of Telford
M6 Toll	A49 south of Shrewsbury
M54	A458 west of Shrewsbury
M42	A449 south of Stafford
	A50 north of Uttoxeter
	A38 east of Litchfield
	A483 south of Oswestry

As a Highways Authority, the Highways Agency has the same obligation to cooperate on flood risk issues as the other Risk Management Authorities (RMAs). It also has the following responsibilities and powers under other legislation:

- Responsibility to maintain trunk roads. This includes the drainage systems which serve them;
- Powers to deliver works considered necessary to protect the highway from flooding, and;
- Powers to divert parts of a watercourse 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 provide a new means of access to any premises from a highway.

3.3.9 Common Law – Responsibilities for Roadside Ditches and Watercourses

The Highway Authority has prescriptive powers to drain the highway into roadside ditches and watercourses, and can cleanse and restore the profile of these ditches as appropriate and charge the landowner where necessary. Common Law imposes a duty on the owner of land adjoining a highway to maintain these ditches that provide natural drainage for both the land and highway. In view of this in the majority of cases the responsibility for ditch maintenance rests with the adjacent landowner and this includes sections of ditches which have been culverted (piped).

However, where the ditch was created by the Highway Authority and owned by them solely for draining the highway, then the ditch will form part of the highway and will be the responsibility of the Highway Authority (Figure 3-2).

Figure 3-2: Responsibilities for Roadside Ditches and Watercourses

3.4. Other Stakeholders with Responsibilities for or Influence over Flood Risk Management

3.4.1 Businesses, Householders and Landowners

- **Property Owners and Residents** – It is the responsibility of householders and business owners to look after their property, including its protection from flooding. While, in some circumstances, other organisations or property owners may be liable due to neglect of their own responsibilities, there will be many occasions when flooding occurs despite all parties meeting their responsibilities. Consequently it is important that house and business owners, whose properties are at risk of flooding, take steps to ensure that their homes and belongings are protected. Further information on how to protect your property is available on the *National Flood Forum's* website.

- **Riparian Landowners** – Riparian land ownership is a legal term given to a householder, business owner or other landowner who owns land adjacent to a watercourse (river, stream, ditch etc.). Riparian landowners are responsible for the maintenance of watercourses, ensuring the normal flow of water. Lead Local Flood Authorities (LLFAs) and the Environment Agency has permissive powers to require riparian

landowners to carry out maintenance work where flood risk is a concern. Where a watercourse forms the boundary between two properties / landowners, responsibility is deemed to be up to the centreline of the watercourse. Typical maintenance activities include:

- Removal of blockages and obstructions;
- Managing vegetation;
- Accepting the natural flow from upstream and transferring it downstream without obstruction, pollution or diversion, and;
- Maintaining any structures, including culverts, weirs and sluice gates.

Riparian landowners have a right to protect their property from flooding and erosion, but should discuss proposals with the Lead Local Flood Authority (LLFA), the Environment Agency or the Internal Drainage Board (IDB) as certain types of work require prior consent (refer to Part 2: Policies and Action Plan Specific to Shropshire / Staffordshire). Further information can be found in the Environment Agency's document '*Living on the edge*'.

- **Owners of other Agricultural Land** - Changes in agricultural land management practices can increase rates of surface water runoff. Typical issues that can have a significant impact include crop selection, removal of hedges and ditches (the removal of ditches is consentable) and soil compaction from grazing. In view of this we will work with landowners, Parish Councils, the National Farmers Union (NFU), Country Land and Business Association (CLA) and other similar organisations to promote changes in agricultural land management practices which can reduce the impact of flooding and provide opportunities to incorporate ecological benefits.

3.4.2 Utility and Infrastructure Providers

Utility and infrastructure providers such as Network Rail, Canal and River Trust, energy companies and telecommunication companies are not Risk Management Authorities (RMAs). However they have a crucial role to play in flood risk management and their assets can be an important consideration in planning for flooding. Moreover, as riparian landowners, they may own assets, such as culverts, weirs and sluice gates etc., which need to be properly maintained.

They already maintain plans for the future development and maintenance of the services they provide and it is important that they factor in flood risk management issues into this planning process. This will ensure that their assets and systems are resilient to flood and coastal risks and that the required level of service can be maintained in the event of an incident.

3.4.3 Voluntary Organisations

Voluntary organisations, such as the *National Flood Forum*, have proven to play an important role in giving advice to individuals as well as supporting communities in setting up flood action groups. Many members of the National Flood Forum have been affected by flooding themselves, and therefore have first-hand experience of the traumas and challenges faced by flood victims.

The National Flood Forum has produced the *Blue Pages Directory* which provides a list of products and services associated with flood protection measures for homes and businesses.

4. Overview of Flood Risk in Shropshire and Staffordshire

4.1. What do we mean by Flood Risk?

When considering 'flood risk' we must take into account the likelihood of a flood occurring together with the impact of what may be affected by the flood. Assessing flood risk in financial terms can help us to prioritise where funding should be directed as well as supporting applications for funding. When evaluating flood risk we must also take into account the severity of impacts from a flood event, which can be highly variable in terms of social, economic and environmental consequences. Consequences are often measured by the number of properties flooded and the level of economic damage. It is also influenced by vulnerability (i.e. a basement flat or a key emergency service station is more vulnerable than a commercial warehouse).

Table 4-1 provides three examples to outline how flood risk can be assessed.

Table 4-1 Examples of how Flood Risk can be assessed

Example of High Risk Situation:

- 50 homes adjacent to a watercourse with a probability of internal flooding once in every 20 years with an estimated cost of damages of £2,500,000

Example of Medium Risk Situation:

- 20 homes adjacent to a watercourse with a probability of internal flooding once in every 100 years with an estimated cost of damages of £1,000,000

Example of Low Risk Situation:

- 100 homes adjacent to a watercourse with a probability of internal flooding once in every 1000 years with an estimated cost of damages of £5,000,000

4.2. Sources of Flood Risk

Flooding, as a natural process, has a major influence in shaping the environment and has been a major challenge to mankind in its desire to effect changes in land use. Based upon our experience to date, evidence shows that the culverting and diversion of watercourses as well as changes in land use have, in many cases, been carried out in a manner which has resulted in increased flood risk.

Typical issues include:

- Flooding due to inappropriately sized culverts;

- The inability to carry out maintenance due to access restrictions;
- Increased likelihood of blockage due to poor design (e.g. blockage of trash screens, build-up of silt);
- A lack of understanding of riparian landownership responsibilities;
- A lack of records leading to accidental damage by third parties;
- A lack of inspection and monitoring of condition; or,
- Increased runoff from agricultural land due to changes in crop selection, removal of hedges and ditches and soil compaction from grazing and machinery.

Flooding can also cause substantial physical, financial and emotional damage, adversely affecting quality of life. It is therefore important to understand flood risk within Shropshire and Staffordshire and how the impacts of flooding can be avoided or reduced.

Shropshire and Staffordshire are at risk of flooding from a variety of sources, some of which are known to interact with each other. The main sources of flood risk include surface water, groundwater and fluvial (watercourse) flooding, the effects of which are expected to increase as a result of climate change.

Shropshire and Staffordshire are both rural counties with similar flooding problems due to their topography. Major towns, such as Shrewsbury and Burton-upon-Trent, suffer from well documented fluvial flooding from the River Severn and River Trent. However, other parts of the counties are elevated with steep catchments and surface water flooding is often the major concern in these areas. Shropshire and Staffordshire also benefit from large areas of agricultural land and green open space with the potential to offer opportunities for flood storage and the delivery of wider environmental benefits.

The various sources of flood risk are outlined in Table 4-2.

Table 4-2: Sources of Flood Risk

Source	Description
Fluvial flooding (flooding from rivers / watercourses etc.)	Fluvial flooding occurs when the capacity of a watercourse is exceeded, causing water to spill out of the channel into surrounding areas. These areas are known as the floodplain. Fluvial flooding can be exacerbated due to a lack of maintenance causing blockages both within natural open channels or culverted/piped sections.

Source	Description
Surface Water Flooding	Surface water flooding usually occurs when high intensity rainfall results in overland flows on the surface of the ground. This can result in ponding against obstructions, such as road and rail embankments, and in low lying areas. As experienced in both 2007 and 2012, it can be exacerbated when the soil is saturated and receiving drainage systems have insufficient capacity to cope with the additional flow.
Sewer / highway flooding	During heavy rainfall flooding from sewers or highway drains may occur if (a) the rainfall event exceeds the design capacity of the drainage system, (b) the system becomes blocked and/or (c) the system cannot discharge due to high water levels in receiving watercourses. Sewer and highway flooding typically results in localised short term flooding.
Groundwater Flooding	Groundwater flooding occurs as a result of water rising up from the underlying aquifer or from water flowing from springs. This tends to occur after much longer periods of sustained high rainfall and can be sporadic in both location and time often lasting longer than a fluvial or surface water flood. High groundwater level conditions may not always lead to widespread groundwater flooding; however, they have the potential to exacerbate the risk of surface water and fluvial flooding by reducing the infiltration capacity of the ground, and to increase the risk of sewer flooding through sewer / groundwater interactions.
Artificial Sources	Artificial sources include any water bodies not covered under other categories, such as canals, lakes and reservoirs.

4.3. Available Evidence and Assessments of Flood Risk

The production of the Preliminary Flood Risk Assessment (PFRA) reports identified that appropriate records of flood events were not being recorded and, where they did exist, were not in a consistent format.

Both Shropshire and Staffordshire are committed to recording and monitoring future flood events so that historic flood event information will be more readily available. The records that have been obtained generally relate to more recent events, some of which are listed in Table 4-3.

Table 4-3: Selected Historic Flood Events

Selected Historical Flooding Events in Shropshire

- October 1998 – Severn Valley: Shrewsbury, Bridgnorth (Heavy rainfall and flooding),
- November 2000 – Severn Valley: Shrewsbury, Bridgnorth (Heavy rainfall and flooding),
- July 2006 – Albrighton and Cosford (Heavy rain causing flash floods),
- June 2007 – Shifnal (watercourse burst its banks),
- June 2007 – Ludlow (Burway Bridge on River Corve collapsed),
- June 2007 – Bridgnorth (Severn Valley Railway line from Bridgnorth was closed after landslips),
- June 2007 – Much Wenlock and Farley (Surface water and fluvial flooding).
- June to November 2012 – Prolonged period of wet weather resulting in numerous local flooding issues across Shropshire

Selected Historical Flooding Events in Staffordshire

- Oct/Nov 2000 – Central North West and South East band of county (combination of flood sources),
- August 2004 – Central North West and South East band of county (combination of flood sources),
- June/July 2007 – Whole county (interaction of all forms due to excess rainfall).
- October 2010 – Centred on North West corner of county (combination of heavy rainfall and trash screen blockage)
- June to November 2012 – Prolonged period of wet weather resulting in numerous local flooding issues across Staffordshire.

4.4. Fluvial Flood Risk

Fluvial flood risk, associated with watercourses with catchment areas exceeding 3km, has been modelled by the Environment Agency to assess the risk to properties.

The Environment Agency Flood Zone maps provide predictions of flood extents across Shropshire and Staffordshire without the provision of flood defences. These Flood Zones clearly show that a number of the main settlements are at risk from fluvial flooding.

The Environment Agency Flood Zone maps are publically available online at http://www.environment-agency.gov.uk/homeandleisure/37837.aspx.

Based on the detailed river network data, available from the Environment Agency, we have a total of 5,760 km of watercourse in Shropshire and 4,786 km in Staffordshire. It is estimated that approximately 4% of the total length of all watercourses are culverted, mainly in urban areas.

The availability of accurate information regarding the location and condition of the majority of culverts is limited. This will be addressed through improvement work associated with the updating of the register of structures and features (see the individual Shropshire and Staffordshire Local Flood Risk Management Strategy (LFRMS) – Part 2: Policies and Action Plan documents).

Table 4-4 and Table 4-5 provide a breakdown of these figures for Shropshire and Staffordshire respectively, based upon the Flood Forum Areas (FFAs) in Shropshire and the Boroughs and Districts of Staffordshire.

Table 4-4: Watercourses in Shropshire

Flood Forum Area	Length of Main River (km)	Length of Ordinary Watercourse (km)
Coverdale and Clee Hill	31	675
Lower Severn Corridor	80	1,082
Mid West Shropshire	37	769
North East Shropshire	72	558
North West Shropshire	63	559
Severn Tributaries	155	473
Shifnal and Albrighton	46	188
Shrewsbury	5	32
South West Shropshire	65	873
Total	552	5208

Table 4-5: Watercourses in Staffordshire

Borough/District	Length of Main River (km)	Length of Ordinary Watercourse (km)
Cannock Chase	8	95
East Staffordshire	134	627
Lichfield	112	456
Newcastle-under-Lyme	17	317
South Staffordshire	107	498
Stafford	123	909
Staffordshire Moorlands	69	1,260
Tamworth	15	39
Total	**585**	**4201**

The River Severn catchment with large areas at risk of fluvial flooding includes Shrewsbury and Bridgnorth. The Environment Agency Flood Zone map indicates that a small area of Shrewsbury benefits from formal flood defences.

Settlements located within the River Trent catchment with large areas at risk of fluvial flooding include Stafford, Tamworth, Burton-upon-Trent and Newcastle-under-Lyme. The Environment Agency Flood Zone map indicates that large areas of Tamworth and Burton upon Trent benefit from formal flood defences. However, there is a residual risk that these defences may fail or overtop.

The Strategic Flood Risk Assessments (SFRAs) provide further information on the fluvial flood risk in Shropshire and Staffordshire.

4.5. Surface Water Flood Risk

It is estimated that 65% of the flooding in 2007 was due to surface water runoff. Since that time, Lead Local Flood Authorities (LLFAs) have been given responsibilities to manage this risk.

As part of its strategic overview role, the Environment Agency has produced a national surface water flood map, available online at *www.watermaps.environment-agency.gov.uk*. This 'Updated Flood Map for Surface Water' (uFMfSW) shows overland flow paths and areas where ponding may occur.

Across both Shropshire and Staffordshire there are many areas where the steep topography, combined with low permeability soils, can exacerbate surface water flood risk.

Changes in agricultural land management practices can also increase rates of surface water runoff. Typical issues that can have a significant impact include crop selection, removal of hedges and ditches and soil compaction from grazing and machinery.

In addition to the potential for property damage, the impacts of deep and / or fast flowing water can result in hazardous conditions and pose a risk to life. To help understand the impacts of surface water flooding in areas identified at greatest risk, Surface Water Management Plans (SWMPs) have been undertaken across parts of Shropshire and Staffordshire. These studies consider the interactions between various drainage systems to give an overall view of flood risk and, where necessary, include detailed modelling and scheme option appraisals.

Surface water flooding is influenced across much of the study area through complex interactions between watercourses, overland flow paths, groundwater springs and piped drainage systems.

The Updated Flood Map for Surface Water (uFMfSW) has been used to provide an indication of the number of properties at risk from pluvial (surface water) flooding across the study area. Further information regarding the number of properties at risk of flooding within each settlement is contained within the individual Shropshire and Staffordshire Local Flood Risk Management Strategy (LFRMS) – Part 2: Policies and Action Plan documents.

4.6. Sewer Flood Risk

Over the years design standards for sewer systems have been adjusted to reflect a reasonable balance between mitigating flooding and the expense of providing new drainage infrastructure. Whilst new surface water sewers are designed to accommodate rainfall events with a 1 in 30 year return period, it should be recognised that due to their historic nature many existing sewers fall below this standard. Therefore, rainfall events with a rainfall probability of less than 1 in 30 years may result in flooding from parts of the existing sewerage systems.

Severn Trent Water, Welsh Water Dwr Cymru and United Utilities, as water companies with responsibilities for managing the sewerage network, maintain a register of properties which have suffered flooding from public sewers, known as the DG5 Register. This contains details of internal property flooding together with flooding to curtilages, highway and other open areas. It also estimates the anticipated likelihood of repeat flooding but only as a result of hydraulic deficiencies in the public sewer network. Consequently it does not hold details of flooding caused by assets other than the public sewer (e.g. from highways, land drainage or watercourses). As part of their obligation with the Water Services Regulation Authority (OFWAT), there is a requirement to undertake capacity improvements to alleviate some of the most severe flooding with priority being given to more frequent internal flooding problems.

To inform various studies and reports, water companies have previously provided excerpts from their DG5 databases which detail the properties at risk of sewer flooding (both externally and internally) based on historic flood incidents. This includes records of flooding from foul sewers, combined sewers and surface water sewers which are deemed to be public and therefore maintained by the water company.

Climate change is expected to increase the potential risk from sewer flooding as summer storms become more intense and winter storms more prolonged.

4.7. Groundwater Flood Risk

Historically, information on the susceptibility to risk of groundwater flooding has been sparse and there is currently no evidence to suggest that this is a major problem within Shropshire and Staffordshire. Based on this it is anticipated that groundwater flooding issues are likely to be localised in their nature, affecting only a small number of properties.

4.8. Flood Risk From Artificial Sources

Artificial sources include any water bodies not covered under other categories, such as canals, lakes and reservoirs. The Canal and River Trust keeps records of flooding incidents associated with the canal network.

The Environment Agency oversees the management of large raised reservoirs. Such reservoirs have a capacity exceeding 25,000m^3, and are regulated under the provisions of the Reservoirs Act (RA) 1975. This is done through a statutory inspection regime undertaken by independent and suitably qualified engineers, who identify what essential safety work is to be carried out. Through this regulatory process, the Environment Agency seeks to ensure that reservoir flooding remains extremely unlikely. In Shropshire, there are 28 reservoirs which fall under the Reservoirs Act (RA) 1975. In Staffordshire, there are 45 such reservoirs.

Flood risk maps associated with large raised reservoirs are publically available online at *www.watermaps.environment-agency.gov.uk.*

4.9. Flood Risk Studies and Reports

A number of studies have been undertaken to inform and improve the understanding of flood risk in Shropshire and Staffordshire. These have identified and quantified risk across the area from different sources of flooding using the best available information at the time.

However, evidence and assessment methods are constantly evolving to enable improved assessment of the risk facing communities in Shropshire and Staffordshire and we will continue to collate and use this information as appropriate to build a better understanding of flood risk.

A list of flood risk studies and reports that have a bearing on flood risk within Shropshire and Staffordshire can be found in Appendix C.

5. Objectives for Managing Local Flood Risk

5.1. Guiding Principles

The *National Strategy for Flood and Coastal Erosion Risk Management* (FCERM) provides the overarching framework for future action by all Risk Management Authorities (RMAs) to address flooding and coastal erosion in England. It has been prepared by the Environment Agency with input from Defra, in order to reflect Government policy. Localism is at the heart of the new strategy, recognising that there is a limit to what Government and national bodies can achieve alone, and that national priorities are only part of the picture.

The National Strategy for Flood and Coastal Erosion Risk Management (FCERM) encourages more effective risk management by enabling people, communities, business, infrastructure operators and the public sector to work together.

The following diagram, taken from the National Strategy for Flood and Coastal Erosion Risk Management (FCERM), demonstrates how the Environment Agency intends to work with individuals, communities and organisations to reduce the risk of flooding:

Figure 5-1: Managing Flood and Coastal Erosion Risks

5.2. Objectives

Under the Flood and Water Management Act 2010, all Local Flood Risk Management Strategies (LFRMSs) must be consistent with the National Strategy. In addition, it is important that the Local Flood Risk Management Strategy (LFRMS) is aligned with the corporate priorities of Shropshire Council and Staffordshire County Council's strategic plans. We have taken the guiding principles from these strategies into account when setting the following objectives for the management of local flood risk:

1. **Develop a strategic understanding of flood risk from all sources:**

   We will continue to gather Information on different sources of flood risk, and how various drainage systems interact, in Shropshire and Staffordshire. We will endeavour to provide better records for historic flooding through investigating the cause of flood events. This will provide a clearer understanding of the overall flood risk in our area. Flooding information will be risk based, with areas shown to be at locally significant risk analysed in more detail as part of a prioritised programme. This information will form the evidence base to help focus local resources and funding.

2. **Promote effective management of drainage and flood defence systems:**

   We aim to raise awareness of the responsibilities for both man-made and natural drainage systems. This will be achieved by a series of measures including publicity information, engaging directly with those who are responsible, approval of Sustainable Drainage Systems (SuDS), designation of features, consenting works and, where appropriate, using our permissive land drainage powers to manage the ordinary watercourse network.

3. **Support communities to understand flood risk and become more resilient to flooding:**

   Our aim is to provide local communities with improved flood risk information as it becomes available so they can increase their understanding and allow them to make informed decisions on how they can protect themselves. Where local flood alleviation schemes are identified, communities will be engaged via local stakeholders in the project process to influence the design, bring in contributions and maximise the schemes potential.

4. **Manage local flood risk and new development in a sustainable manner:**

   We will aim to manage flood risk and drainage associated with new development such that no new flood risk is created and, wherever possible,

opportunities to reduce flood risk are taken through early engagement with developers. Local flood risk will be managed via a risk-based and evidence-based programme, incorporating proportionate and practical measures taking into account the effects of climate change. Measures used should be multi-beneficial as far as possible, integrating flood risk management solutions alongside sustainable development and social and environmental benefits to enhance the natural environment.

5. **Achieve results through partnership and collaboration:**

   Shropshire Council and Staffordshire County Council will adopt consistent methods of working and continue to work in partnership to enhance their resource capabilities for the better management of local flood risk. Partnerships with risk management authorities, other organisations, landowners and community groups will be strengthened to target resources and provide co-ordination of expertise and funding. Partnerships will be formed across catchment and authority boundaries (as required), to manage flood risk. A partnership approach will provide opportunities to build links with wider plans, avoid transfer of flood risk elsewhere and provide multi-benefit schemes for affected local communities.

6. **Be better prepared for flood events:**

   The improved information on flood risk will be used to ensure that emergency responders, partner organisations and communities better understand the nature of local flood risk and can use the information to improve their preparedness for flood events. Communities and individuals will be encouraged and supported to take part in preparing for flood events, forming local action groups and planning for future flood risks.

7. **Secure and manage funding for flood risk management in a challenging financial climate:**

   We will strive to achieve savings through collaboratively working with partner organisations and reducing duplication of effort. Funding for flood risk management will be directed to areas most at need or where solutions will be most effective. Opportunities to attract external funding for flood risk management projects will be actively pursued, and funding prioritised, taking into account the evidence of flooding and sustainability of the proposed solution. As a result, resources will be dedicated to areas where they will be most effective.

5.3. Current Position

In setting the above objectives for the management of local flood risk in Shropshire and Staffordshire it is important to recognise where we are starting from in order to understand the key steps that will need to be taken.

- Both Shropshire and Staffordshire have established partnerships with other organisations but these should be streamlined to reflect the collaborative working approach and reduce the frequency of meetings;

- Both Shropshire and Staffordshire have undertaken some Surface Water Management Plans (SWMPs) and completed Preliminary Flood Risk Assessments (PFRAs). As a consequence, initial information has been collated on local flood risk, however, this is not in a consistent format. This information is being used in conjunction with national data for the updating of the national flood maps, for both fluvial and surface water flooding. It is also being used to help prioritise the order in which future information is gathered and reviewed.

- There is currently limited capacity across both authorities, with two relatively small flood risk management teams. A collaborative working agreement between Shropshire and Staffordshire has been entered into, which provides the opportunity to review the use of resources. This will be particularly relevant with the implementation of the Sustainable Drainage Systems (SuDS) Approving Body (SAB) role, in late 2014.

- Both Shropshire and Staffordshire have established processes for:
  - The regulation of ordinary watercourses;
  - The use of Geographical Information Systems (GIS) to record asset and flood risk information from all sources;
  - Investigation and recording of locally significant flood events; and,
  - Engagement with communities at risk of flooding.

  As part of the collaborative working arrangement between Shropshire and Staffordshire, consistencies need to be made across these processes.

- At a strategic level, Multi Agency Flood Action Plans (MAFPs) have been produced for both Shropshire and Staffordshire. Consistent information on the location and operation of important flood defence / drainage assets needs to be made available to front line teams to assist with the coordination of activities in the early stages of a flood event.

- In Shropshire and Staffordshire, fluvial flood risk is taken into account by the planning system and Strategic Flood Risk Assessments (SFRAs) have been produced. In addition, Shropshire Council, being a unitary authority, has introduced procedures to review surface water flood risk as part of development proposals. Procedures for the consistent review of flood risk as part of new development will be aligned with the implementation of the Sustainable Drainage Systems (SuDS) Approving Body (SAB) role, in late 2014.

- To attract national funding (Flood and Coastal Erosion Risk Management Grant in Aid (FCERM-GiA)) and regional funding (local levy from the Regional Flood and Coastal Committees (RFCCs)), both Shropshire and Staffordshire have flood risk management schemes on the Environment Agency's medium term programme. Both authorities are aware of the importance of securing funding from other sources to support these funding applications. Such contributions have a significant impact on the viability of flood risk management schemes. Officer support is given to the appointed cabinet member to monitor progress of schemes, and this is fed back to the Regional Flood and Coastal Committees (RFCCs).

- To reflect the potential impacts of climate change, both authorities have produced climate change adaptation plans, which include information on the increased risk of flooding which may occur in the future.

5.4. Complimentary Strategies and Plans

As previously mentioned, our objectives have been developed taking into account:

- Historic and predicted flood risk;

- The Environment Agency's National Flood and Coastal Erosion Risk Management (FCERM) Strategy;

- Objectives and aims set out in complimentary plans and strategies;

- The views of local residents, businesses, Risk Management Authorities (RMAs) and Elected Members that have come to light as a result of our new role as Lead Local Flood Authorities (LLFAs).

5.5. National Flood Risk Management Strategy Objectives

The objectives for the National Flood and Coastal Erosion Risk Management (FCERM) Strategy have been developed in line with the Environment Agency's *National Strategy for Flood and Coastal Erosion Risk Management*. This sets out the following National objectives for flood risk management:

- **Understand the risks** - understanding the risks of flooding and coastal erosion, working together to put in place long-term plans to manage these risks and making sure that other plans take account of them;

- **Prevent inappropriate development** - avoiding inappropriate development in areas of flood and coastal erosion risk and being careful to manage land elsewhere to avoid increasing risks;

- **Manage the likelihood of flooding** - building, maintaining and improving flood and coastal erosion management infrastructure and

systems to reduce the likelihood of harm to people and damage to the economy, environment and society;

- **Help people to manage their own risk** - increasing public awareness of the risk that remains and engaging with people at risk to encourage them to take action to manage the risks that they face and to make their property more resilient;

- **Improve flood prediction, warning and post-flood recovery and the risks** - improving the detection, forecasting and issue of warnings of flooding, planning for and co-ordinating a rapid response to flood emergencies and promoting faster recovery from flooding.

5.6. Other Complementary Plans and Strategies

In addition to the flood risk studies and reports referred to in Section 4.9 and listed in Appendix C, a number of other plans and strategies also exist.

A summary of the key plans and strategies influencing our Local Flood Risk Management Strategy (LFRMS) is provided in Appendix D. These plans and strategies outline how flood risk management and the achievement of wider environmental objectives will be delivered. We have considered the objectives set out in each of these to ensure that our Local Flood Risk Management Strategy (LFRMS) compliments and seeks to deliver these through local flood risk management.

Figure 5-2 illustrates how relevant legislation and subsequent studies and reports feed into the Shropshire and Staffordshire Local Flood Risk Management Strategy (LFRMS) (Group Strategy).

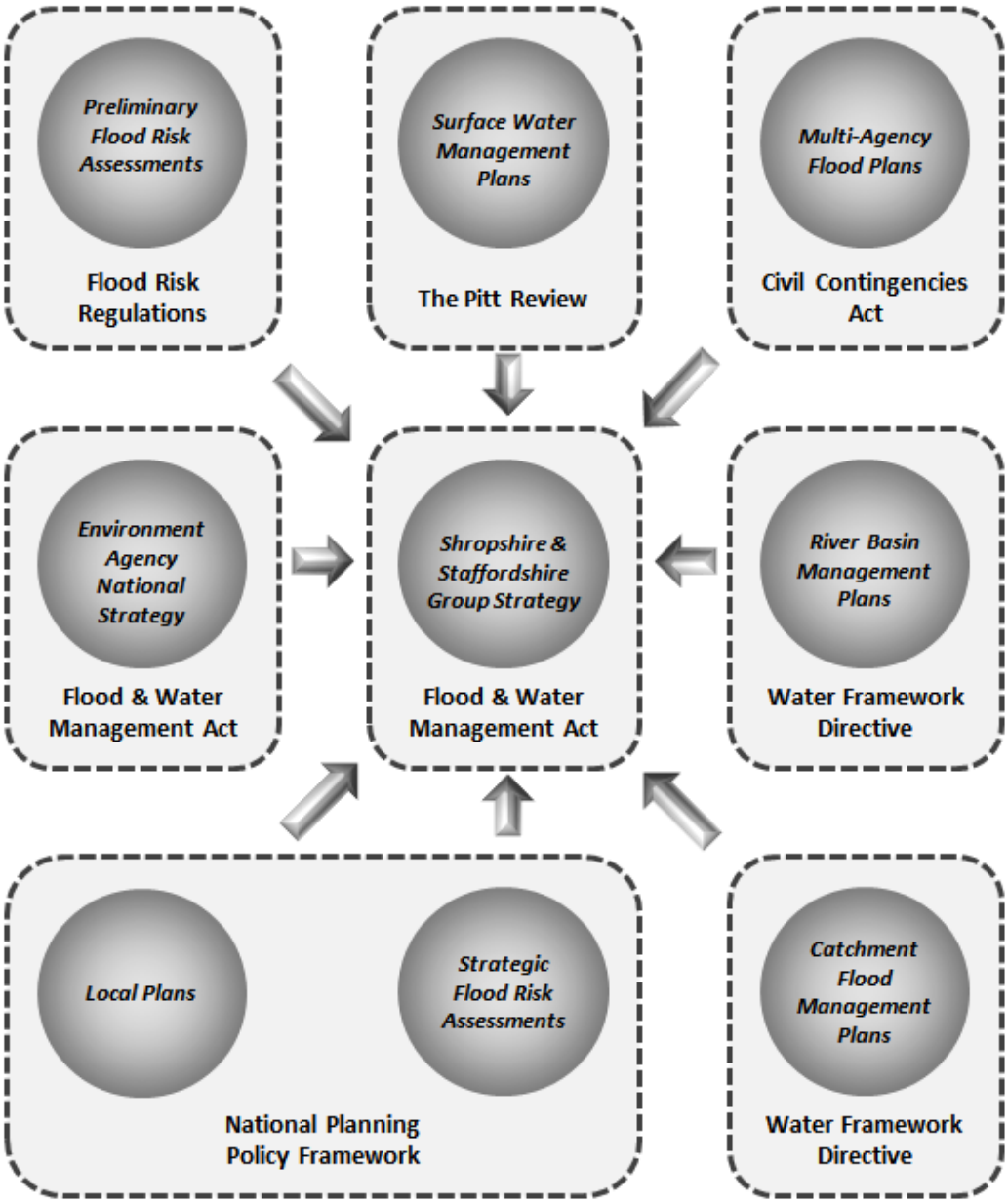


Figure 5-2: Studies and Plans informing the Shropshire and Staffordshire Local Flood Risk Management Strategy

6. A Collaborative Approach to Flood Risk Management

This chapter focuses on the collaborative approach to flood risk management adopted by Shropshire Council and Staffordshire County Council and proposals for partnership development and community engagement.

Shropshire Council and Staffordshire County Council have agreed to work together to deliver a collaborative working approach towards flood risk management for their geographical areas. This approach fits in with the corporate values of both authorities and is providing opportunities for efficiencies through the sharing of resources and joint procurement of services as well as pooling of specialist flood risk management skills which are nationally in short supply.

The aims of the collaborative approach are to:

- Work together collaboratively to fulfil our roles as Lead Local Flood Authorities (LLFAs) in accordance with the spirit of the Flood and Water Management Act 2010;
- Work effectively together to a common objective based on a culture of partnering and trust and sharing of ideas, resources and methods, and;
- Ensure that wherever surface water and flood risk management issues are contiguous with other issues such as community resilience, emergency planning and climate change strategies and adaptation, the collaborative working approach will seek to support these functions.

There is a wide range of organisations and individuals with an interest in Flood Risk Management across Shropshire and Staffordshire. These range from the Risk Management Authorities (RMAs) outlined in Section 3.3 to local town and parish councils, community flood action groups and individual riparian landowners. Finding an appropriate way for this wide range of interested parties to be involved in and interact with the Local Flood Risk Management Strategy (LFRMS) is a priority for us, as Lead Local Flood Authorities (LLFAs). However, it is also recognised that the process of arranging frequent meetings can be a strain on resources for those involved.

To this end the Local Flood Risk Management Strategy (LFRMS) is proposing an approach to partnership based on strategic overview as well as local delivery. This will ensure that the appropriate bodies and organisations are present at the appropriate time. To support the collaborative working approach, a new governance structure has been established to provide appropriate scrutiny of the progress of this strategy and effective engagement between Regional Flood and Coastal Committees (RFCCs), partner organisations and community groups (see Figure 6-1).

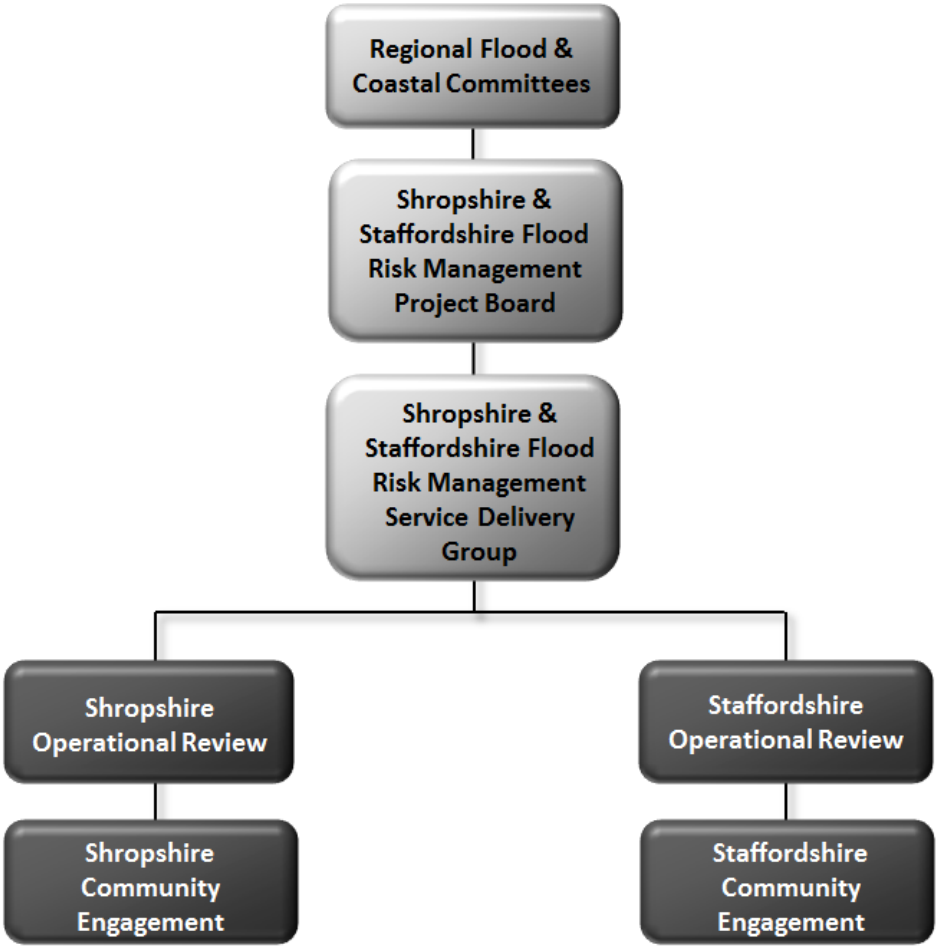


Figure 6-1: Shropshire and Staffordshire Flood Risk Management Governance Structure

6.1. Regional Flood and Coastal Committees

Regional Flood and Coastal Committees (RFCCs) are committees established by the Environment Agency under the Flood and Water management Act 2010. They meet on a quarterly basis and bring together members appointed by Lead Local Flood Authorities (LLFAs) and independent members with relevant experience for three purposes:

- To ensure there are coherent plans for identifying, communicating and managing flood and coastal erosion risks across catchments and shorelines;
- To promote efficient, targeted and risk based investment in flood and coastal erosion risk management that optimises value for money and benefits for local communities, and;

- To provide a link between the Environment Agency, Lead Local Flood Authorities (LLFAs), other Risk Management Authorities (RMAs) and other relevant bodies to promote a mutual understanding of flood and coastal erosion risks in its area.

Further information on the roles of Regional Flood and Coastal Committees (RFCCs) and elected member representation can be found in Section 3.2.

6.2. Shropshire and Staffordshire Flood Risk Management Project Board

To monitor the effectiveness of the collaborative working approach to flood risk management in Shropshire and Staffordshire, the Flood Risk Management Project Board has been formed. The Project Board will comprise the following members:

- Respective Shropshire Council and Staffordshire County Council Regional Flood and Coastal Committee (RFCC) members;
- Appropriate members of management teams from Shropshire Council and Staffordshire County Council, and;
- Flood Risk Managers from Shropshire Council and Staffordshire County Council.

The Board will meet annually, with the aim of monitoring the effectiveness of this strategy and providing overall strategic management and direction of flood risk management activities within Shropshire and Staffordshire.

6.3. Shropshire and Staffordshire Flood Risk Management Service Delivery Group

The Shropshire and Staffordshire Flood Risk Management Service Delivery Group will include the key organisations, across both Shropshire and Staffordshire, which will serve to support the strategic elements of this strategy. The Shropshire and Staffordshire Flood Risk Management Service Delivery Group will hold the overview function of respective programmes of works and coordinate public awareness and community engagement initiatives across Shropshire and Staffordshire. It will meet at least on an annual basis and will include the following bodies:

- Shropshire Council (Lead Local Flood Authority (LLFA);
- Staffordshire County Council (Lead Local Flood Authority (LLFA);
- Environment Agency;
- Severn Trent Water;
- United Utilities, and;

- Welsh Water Dwr Cymru.

Note: from time to time it may be necessary to include representations from other Risk Management Authorities (RMAs) and Stakeholders to discuss issues that are specific to them. Such organisations include District/Borough Councils, Internal Drainage Boards (IDBs), Highways Agency, Canal and River Trust etc.

6.4. Shropshire and Staffordshire Operational Review

Regular engagement between organisations with a role related to flood risk management is crucial to ensure that work and the problems of those affected by flooding are dealt with in an effective manner. This engagement must happen across organisations as well as across individual teams within those organisations.

Rather than a prescribed schedule of meetings, success of the Operational Review process will be judged on the ability of different teams and organisations to engage appropriately as and when required. Any issues arising from the engagement process will be raised with the Shropshire and Staffordshire Flood Risk Management Service Delivery Group.

Within Shropshire Council and Staffordshire County Council, officers with responsibilities in the following areas need to be engaged:

- Flood Risk Management;
- Highways;
- Highways development control;
- Emergency planning;
- Planning development control (Shropshire only);
- Planning policy;
- Minerals and waste;
- Ecology and biodiversity, and;
- Climate change.

Officers from the following, external, organisations need to be engaged:

- District/Borough Councils;
    - Land drainage;
    - Emergency planning;

  - Planning development control;
  - Planning policy;
- Water companies;
- Internal Drainage Boards;
- Highways Agency, and;
- Canal and River Trust.

6.5. Shropshire and Staffordshire Community Engagement

Active engagement with communities at risk of flooding is paramount. Based on the experience gained to date, there cannot be a single, one size fits all, approach that works for all communities. We will seek to find the most appropriate way forward to support each community depending on their individual needs. In some cases, local communities may wish to be proactive by setting up a flood action group with support from the Lead Local Flood Authority (LLFA) and partnering organisations. In other cases, communities may look for additional support from elected members from Local Authorities or Parish Councils. Communities have also requested the involvement of independent organisations, such as the National Flood Forum, which has proved particularly beneficial given their experience of supporting flood victims.

Through effective communication with stakeholders and communities everyone will have an understanding of the roles of respective organisations and the practical implications of reducing flood risk. As well as seeking to resolve flooding issues, we wish to support communities to help them understand the causes and impacts of flooding. This will help them to become more resilient and independent and, when practicable, will help them to take personal responsibility to protect themselves and their properties from the impacts of flooding. For example, some areas have benefitted from having designated flood wardens who provide an important role when planning for emergency response.

In addition to those who have been directly affected by flooding, it is very important to raise awareness of flood risk in other areas which may be at risk. This can be achieved using a variety of approaches, including:

- Making information available via the internet;
- Presenting information to town and parish councils and community groups;
- Holding public information events, such as flood fairs.

7. Prioritising Local Flood Risk in Shropshire and Staffordshire

7.1. How will we Prioritise Flood Risk Management Activities?

In order to better understand flood risk across Shropshire and Staffordshire, further assessments of the areas, sources and extents of flood risk will need to be completed. Depending on the complexity of the problem, it may be necessary to undertake the Surface Water Management Plan (SWMP) process, or other technical study, to assess the interaction between drainage systems. These processes would then enable appropriate design options to be identified, sufficient for a funding application to be made. Recognising that some areas will have a greater level of flood risk than others, it will be necessary to prioritise the areas requiring further assessment.

So that resources and funding are targeted at those areas and activities of highest importance we will, therefore, prioritise our activities based on:

- Historic and on-going flood risk;
- Availability of funding and external contributions;
- Identified benefits to properties, communities, businesses and/or infrastructure;
- Where there is strong community engagement;
- Where there are opportunities to support economic growth;
- Where there are opportunities to work collaboratively with other Risk Management Authorities (RMAs), and;
- The delivery of multiple benefits, including wider environmental benefits.

This prioritisation process will build up a picture over time of the most beneficial flood risk management projects within the highest risk areas, allowing Shropshire Council and Staffordshire County Council and our partners to focus efforts on funding local projects. However, it must be recognised that it is possible for projects to advance more quickly than the initial prioritisation if local funding becomes available which would ‘unlock’ a project’s potential for moving forward. In this way local communities and organisations could consider investing in raising local contributions as beneficiaries of a proposed scheme in order for it to be realised.

We have undertaken an assessment of properties at risk of flooding from a number of sources across Shropshire and Staffordshire. Moving forward, these property counts (along with the factors listed above) will be used to inform future investment in local flood risk management activities. Further information regarding the number of properties at risk of flooding within each

settlement is contained within the individual Shropshire and Staffordshire Local Flood Risk Management Strategy (LFRMS) – Part 2: Policies and Action Plan documents.

8. How Flood Risk Management is Funded

8.1. Funding for Lead Local Flood Authorities Responsibilities

The Government has committed funding annually to support Lead Local Flood Authorities (LLFAs) in their 'new' flood risk management roles up to 2015. The funding has been allocated by Department for Environment and Rural Affairs (Defra), based on the individual risk each local authority faces. Beyond this period funding commitments are unclear and there are likely to be pressures on further funding given the significant challenges local government faces within the current spending review.

As a consequence, Shropshire Council and Staffordshire County Council are mitigating the risks associated with this financial uncertainty by entering in to a collaborative working agreement to jointly deliver their local flood risk management responsibilities. This approach fits in with the corporate values of both authorities and is providing opportunities for efficiencies through the sharing of resources and joint procurement of services as well as pooling of specialist flood risk management skills which are nationally in short supply.

8.2. Funding for Flood Risk Management Studies and Schemes (Projects)

In the main, flood risk management projects are funded by a combination of the following funding streams:

- National funding – Flood and Coastal Erosion Risk Management Grant in Aid (FCERM-GiA);
- Regional funding – Local Levy, and;
- Local / other funding contributions

It should be noted that the mechanism for attracting Flood and Coastal Erosion Risk Management (FCERM) Flood Defence Grant in Aid (FDGiA) or Local Levy funding gives priority to the protection of residential properties. See Defra's *Partnership Funding and Collaborative delivery of local flood risk management* guidance for further information.

A brief summary of the main funding streams is given below.

8.3. Flood and Coastal Erosion Defence Grant in Aid

Flood and Coastal Erosion Risk Management (FCERM) Flood Defence Grant in Aid (FDGiA) is the capital budget set aside by central government for flood defence projects across England. Following consultation during 2011, Defra introduced a new approach to the funding of flood risk management capital projects. This new approach was termed the 'Flood and Coastal Resilience Partnership Funding' approach. The key benefits of the new approach are that:

- Communities, through their Regional Flood and Coastal Committees (RFCCs), can take decisions on which projects should proceed, based on local willingness to contribute towards the benefits that would be delivered;
- The programme of capital works will be prioritised based on the damages being prevented by the project, and;
- A higher proportion of capital projects can be eligible for some government funding, subject to resources being available.

8.4. Local Levy

This funding is raised by way of a levy on Lead Local Flood Authorities (LLFAs) within the boundary of each Regional Flood and Coastal Committee (RFCC). The Local Levy is used to support, with the approval of the committee, flood risk management projects that are not considered to be national priorities and hence do not attract full national funding through Flood and Coastal Erosion Risk Management (FCERM) Flood Defence Grant in Aid (FDGiA).

The Local Levy allows locally important projects to go ahead to reduce the risk of flooding within each committee's area. In addition to prioritising where Local Levy is to be spent, each Regional Flood and Coastal Committee (RFCC) annually sets the level of local levy funding that Lead Local Flood Authorities (LLFAs) will contribute in the following year.

As noted in Section 3.2, Shropshire and Staffordshire are covered by three separate Regional Flood and Coastal Committees (RFCCs), each with its own programme of works and local levy funding arrangements.

8.5. Other Sources of Funding

In order to maximise the benefits of the new approach to the funding of flood risk management capital projects, Lead Local Flood Authorities (LLFAs) should work closely with partnering organisations and other bodies to attract alternative sources of funding. It is important to note that the likelihood of securing Flood and Coastal Erosion Risk Management (FCERM) Flood Defence Grant in Aid (FDGiA) or Local Levy funding can significantly increase when other sources of funding are secured.

Whilst the process of attracting funding from private sources is still in its infancy, Table 8-1 highlights possible sources of funding that could contribute to the delivery of flood defence capital projects.

Table 8-1: Summary of Other Funding Streams

Funding Source	Description
Private contributions	Contributions from private organisations / individuals who benefit from flood risk management projects.
Water Company investment	Water companies are able to contribute to flood risk management projects where it can be demonstrated that joint benefits can be obtained.
Community Infrastructure Levy (CIL)	A locally set general charge which planning authorities can choose to implement. Levied on developers, per square metre of certain types of development across an authority's area. Local communities set their own priorities on how the majority of this funding is allocated.
Developer contributions through Section 106 agreements	Planning obligations, or 'Section 106 agreements' are a well-established mechanism for securing funding for agreed issues arising from a development proposal.
Other	There are a multitude of alternative funding sources available depending on the type of activity or scheme being proposed. For example, this could include delivery of Water Framework Directive (WFD) objectives, and will be dependent on the activity or scheme seeking funding.

It is clear from the above that funding to deliver capital projects will need to be sought from a variety of sources as government funding will be limited each year and is likely, in many cases, to be a contribution towards project costs rather than full funding.

Many projects are likely to be developed through partnership working, with partners and organisations with relevant flood risk responsibilities or assets relating to the project engaged in the production of the scheme. Partnership working may also provide opportunities for reduction in costs through shared benefits. Local contributions are not mandatory and a decision can be taken on whether to collect contributions. It will need to be decided how to raise the additional money, taking into account partners involved, those likely to benefit and the ability to pay a contribution. The process for collecting local contributions can also be lengthy.

8.6. Funding Allocation Process and the Flood Risk Management Capital Programme

Flood and Coastal Resilience Partnership Funding is the name given to the capital allocation process which is managed by the Environment Agency. Although primarily designed for the distribution of Flood and Coastal Erosion Risk Management (FCERM) Flood Defence Grant in Aid (FDGiA), the assessment process is used for all flood risk management schemes. This consistent approach enables members of the Regional Flood and Coastal

Committees (RFCCs) to reach decisions on which schemes to progress and make decisions regarding the distribution of local levy funding.

Flood and Coastal Erosion Risk Management (FCERM) Flood Defence Grant in Aid (FDGiA) can be applied for by the Environment Agency, Local Authorities, Internal Drainage Boards (IDBs), Highways Authorities and Water Companies, to deliver projects managed by them. Local communities and flood action groups can work with any of these organisations to develop a scheme and put in an application for funding on their behalf. Funding can be made available for a variety of projects ranging from substantial defences to individual property protection.

In order for schemes to be eligible they have to be buildable, environmentally acceptable and cost beneficial. They need to reduce the risk of flooding to homes from either surface water, ground water, fluvial or coastal sources. In the cases of schemes from Highway or Water Companies, only the costs associated with reducing flood risk for which they are not responsible are eligible for funding.

All viable and cost beneficial projects are able to secure some Flood and Coastal Erosion Risk Management (FCERM) Flood Defence Grant in Aid (FDGiA) funding, however not all projects will be able to secure 100% funding from this source. The amount of the project funding available from Flood and Coastal Erosion Risk Management (FCERM) Flood Defence Grant in Aid (FDGiA) is dependent on three factors:

- The value of benefits for householders as a result of the project, simply expressed as the number of homes which are moved from a high level of flood risk to a lower level of flood risk;
- The value of other benefits of the project such as: the benefits to business, agricultural productivity and protection for critical infrastructure;
- The environmental benefits of the project.

At the time of writing this Local Flood Risk Management Strategy (LFRMS), government introduced a new 6 year capital programme (2015/16 to 2020/21), for inclusion in the Autumn Statement announcement in December 2014.

The capital programme is reviewed on an annual basis and retains some flexibility which should enable new schemes to be integrated into the on-going programme of works. Although the programme focusses on the six year period to 2020/21, schemes with a longer lead in time can be included so that the need for future funding is identified.

Specific information is required in order to make an application for funding so that its benefits can be compared, in a consistent and transparent manner, with other projects. Table 8-2, summarises the information required.

Table 8-2: Information Required for Funding Applications

Information required	Source of information	Example
Number of households and level of flood risk before project	Environment Agency fluvial and surface water flood maps. Lead Local Flood Authority (LLFA) surface water flood maps, where available. Historic information.	20 homes at a 5% risk of river flooding.
Number of households and level of flood risk after project	Level of protection determined by the design standard chosen for the project. This can be determined by hydraulic modelling or providing a level of protection above a previously recorded flood level.	20 homes at a 1% risk of river flooding. i.e. the risk to the homes will be reduced due to the project.
Number of households in deprived areas	Data supplied by the Department of Communities and Local Government.	The 20 homes at risk are all within the 20% most deprived areas of the country.
Duration of benefits provided by the project	The lesser period of either: a) the design life of the project before significant further investment is required, or; b) the amount of time the project will remain effective, taking the effects of climate change into account.	The project to protect the 20 homes consists of a flood wall and small pumping station. The design life of the flood wall is 100 years, but the pumping equipment will need replacing after 40 years. The duration of the benefits delivered by the scheme is therefore 40 years.
Cost of project	This is the total cost of the design and construction of the project.	The project will cost £40,000 to design and £210,000 to construct the flood wall and pumping station.

Information required	Source of information	Example
Whole life cost of project	This is the total cost of the design and construction of the project, plus the total cost of any future maintenance that may be required.	The project will cost £250,000 to design and construct, plus £3,000 per year, for 40 years, for maintenance and electricity charges for the pumping station.
Cash value of other benefits delivered by the project	This covers the costs that would be avoided in the future as a result of the project being carried out. For large projects these benefits can be assessed using the Middlesex University 'Multi-Coloured Handbook'	As a result of the project, the 20 homes will no longer incur flood damages after a 1% flood event. Based upon the 40 year duration of benefits, it is estimated that the homes could flood twice without the project in place. Flood damages of around £30,000 per property per flood are estimated, which equates to potential cash benefits of £1,200,000 by carrying out the project.
Details of any environmental benefits	This should relate to whether the project achieves any of the objectives of the Water Framework Directive. Further advice on calculating any benefits can be sought from the Environment Agency.	After consulting the Environment Agency, the project achieved no additional environmental benefits.

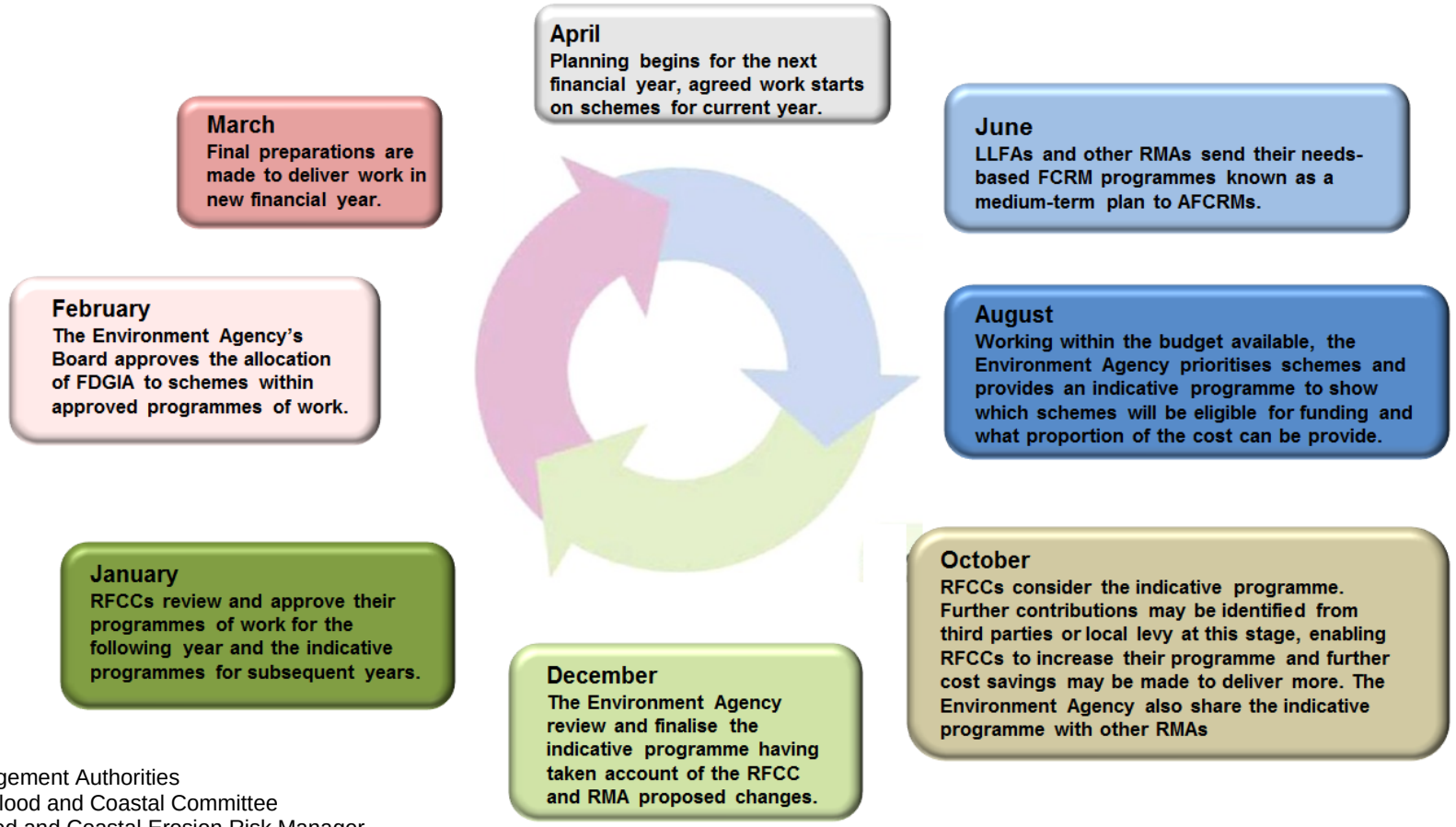
Information required	Source of information	Example
Details of when the funding is required	Most projects are likely to run over a number of years. Funding for each part of the project should be allocated to the financial year in which it will be required.	In order to allow time to complete negotiations over land, the cost of the project was spilt over two years with the design costs of £40,000 being allocated in year 1 and funded by part of the local levy contribution. The project will be constructed during year 2 at a cost of £210,000. This will be funded by the contribution from homeowners, the remaining local levy contribution, and the FCERM-GiA.
Contributions secured towards the project	This is the amount of external funding, in addition to FCERM-GiA, that is available to support the project. The Regional Flood and Coastal Committee (RFCC) can agree to use local levy funding for this purpose, particularly for projects where external funding is difficult to secure.	To assist with making the project financially viable, the 20 homeowners agreed to contribute £500 each towards the project, and allowed the flood wall to be situated on their land. The Regional Flood and Coastal Committee (RFCC) supported the scheme with a contribution of £140,000. With these contributions, the project received sufficient justification for the remaining £100,000 to be allocated from FCERM-GiA.

Note: figures relating to future costs are discounted to reflect present day values, so that benefits from different projects can be readily assessed and prioritised.

Once the bid for Flood and Coastal Erosion Risk Management (FCERM) Flood Defence Grant in Aid (FDGiA) has been submitted to the Environment Agency it will be processed and prioritised nationally. The Environment Agency will then prioritise the funding in the following order:

- Projects which, for legal or health and safety reasons, need to be completed the following year;
- Projects, with approved levels of funding, which are already under construction;
- New projects which are prioritised based on the benefits they will deliver, taking into account the timing and availability of external contributions.

The broad timetable for submitting funding applications for new projects, based on previous year's methodology, is shown below in Figure 8-1. The dates shown in Figure 8-1 are indicative, and precise dates on the timetable are confirmed each year, and are aligned with the meetings of the Regional Flood and Coastal Committees (RFCCs).



Abbreviations:
RMAs – Risk Management Authorities
RFCC – Regional Flood and Coastal Committee
AFCRM – Area Flood and Coastal Erosion Risk Manager

Figure 8-1: Flood and Coastal Erosion Risk Management Grant Aid Allocation Calendar (adapted from the FCERM-GIA Handbook)

9. Wider Environmental Objectives

9.1. Identification of Environmental Opportunities

The implementation of the Local Flood Risk Management Strategy (LFRMS) within Shropshire and Staffordshire provides a significant opportunity to improve the natural, rural and built environment. This includes helping to provide better environments for residents and businesses as well as improving biodiversity and local habitats for wildlife. The Flood and Water Management Act 2010 states that the Local Flood Risk Management Strategy (LFRMS) must specify how it will contribute to the achievement of wider environmental objectives and sustainable development. Potential environmental impacts have been considered in Part 3: Strategic Environmental Assessment which has been produced to support the implementation of this strategy and consist of documents specific to Shropshire and Staffordshire.

Shropshire Council and Staffordshire County Council are committed to the protection and enhancement of locally, nationally and internationally recognised environmental sites. Whilst a Strategic Environmental Assessment (SEA) has been undertaken as part of the development of this Local Flood Risk Management Strategy (LFRMS), there is considerable uncertainty involved in strategic assessments at this level. It is therefore important that, during the development of any specific measures or actions emanating from this Local Flood Risk Management Strategy (LFRMS) that further appropriate environmental appraisal work is undertaken at project level.

Environmental impacts will, therefore, be considered as part of any flood risk management activities. Appropriate assessment will be made at every stage and we will not pursue any activities which could result in a negative environmental impact within Shropshire and Staffordshire or in neighbouring Lead Local Flood Authority (LLFA) areas.

Environmental objectives that the Local Flood Risk Management Strategy (LFRMS) may contribute to through the effective management of local flood risk include:

- Encouraging source control measures, such as Sustainable Drainage Systems (SuDS), which can help improve water quality through reducing runoff and providing filtration, natural treatment and settling. This can reduce the levels of diffuse pollution entering watercourses and drainage systems;
- Enhancing biodiversity and habitat creation as part of any flood risk management activities. As demonstrated by the Making Space for Water report and, more recently, the Developing Urban Blue Corridors Scoping Study, the creation of multi-functional green spaces can deliver amenity, flood risk management and environmental benefits;

- Considering opportunities to enhance / protect biodiversity and create habitats when consenting works affecting ordinary watercourses, considering issues which may require enforcement action, undertaking maintenance activities or when giving advice to other organisations or individuals;

- Assisting the Environment Agency with the delivery of Water Framework Directive (WFD) targets (under Article 4.1). Some of those which are relevant to this Local Flood Risk Management Strategy (LFRMS) include:

    - Ensuring no deterioration of surface water and groundwater and the protection of all water bodies;

    - Achieving 'good' ecological status by 2015 for surface water and groundwater;

    - Reducing levels of pollution and hazardous substances in surface water and groundwater;

    - Reversing any upward trends of pollutants in groundwater, and;

    - Achieving standards and objectives set for protected areas.

- Prioritising solutions to manage flooding from local sources that work with natural processes, encouraging biodiversity enhancements and minimising adverse effects to the local environment;

- Allowing for the impacts of climate change as part of local flood risk management measures, in order to build in community and operational resilience;

- Protecting Sites of Special Scientific Interest (SSSIs) within Shropshire and Staffordshire. All Flood Risk Management authorities have a duty, under the Wildlife and Countryside Act 1981, to take reasonable steps to further the conservation and enhancement of Sites of Special Scientific Interest (SSSIs);

- Ensuring no loss or degradation of habitat through flood risk management works to comply with the Biodiversity Action Plan (BAP). As Risk Management Authorities (RMAs), both Shropshire Council and Staffordshire County Council have a duty, under, the Natural Environment and Rural Communities Act 2006, to conserve biodiversity;

- Linking to other environmental strategies to achieve common goals and objectives, and;

- Adhering to the Conservation of Habitats and Species Regulations 2012, as amended ('Habitats Regulations'). Government policy protects

all internationally designated sites such as Special Areas for Conservation, Special Protection Areas and Ramsar sites (internationally significant wetlands). An Appropriate Assessment will be undertaken for any activities assessed as having a likely significant effect, under Regulation 61 of The Habitats Regulations. The Local Flood Risk Management Strategy (LFRMS) will ensure that the integrity of internationally designated sites will not be adversely affected.

The diagram below, taken from the Developing Urban Blue Corridors Scoping Study, demonstrates some of the opportunities available for achieving multiple benefits when undertaking flood risk management activities.

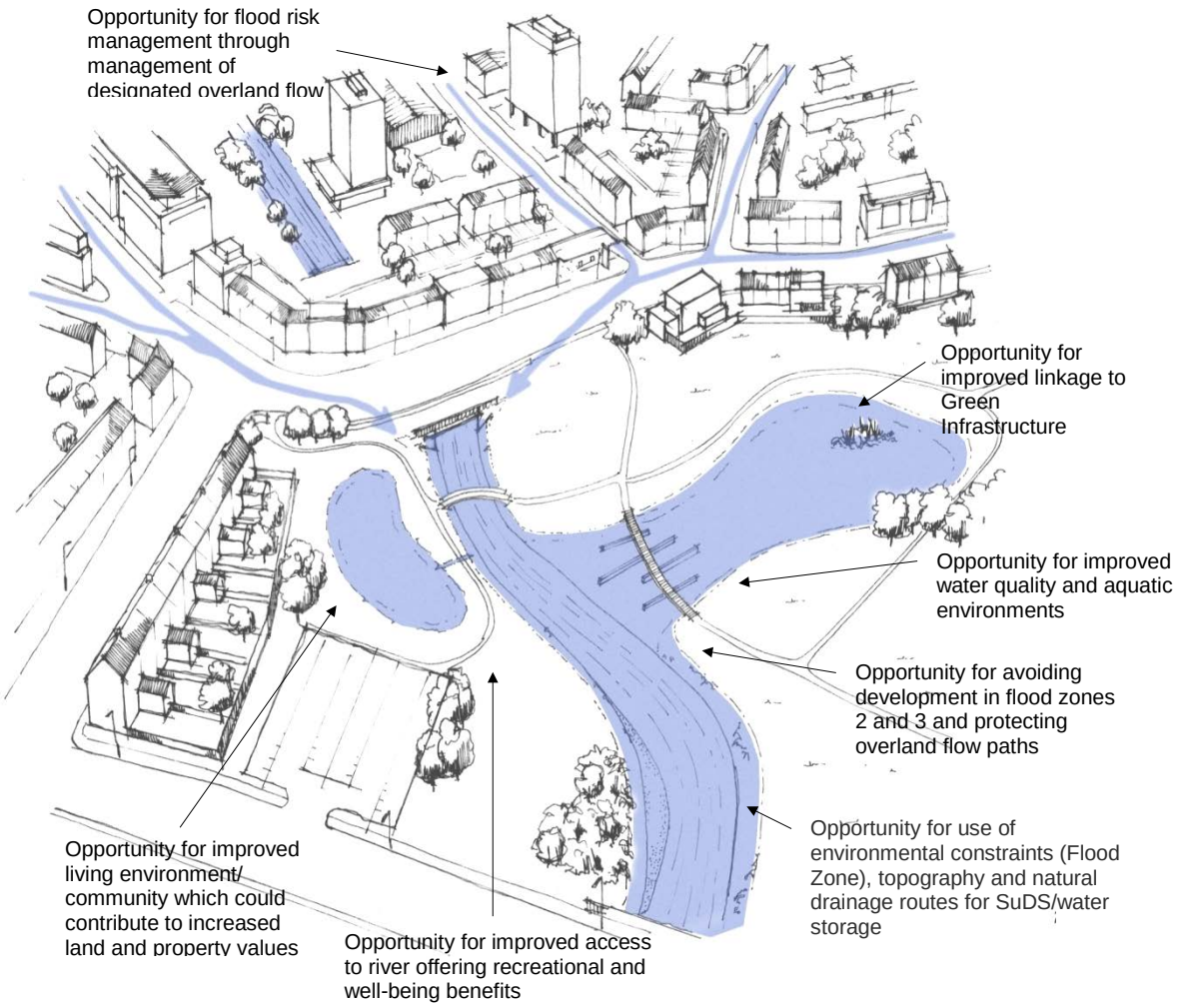


Figure 9-1: Delivery of Multiple Benefits as part of Flood Risk Management Activities

9.2. Environmental Sites in Shropshire and Staffordshire

Throughout Shropshire and Staffordshire there are a number of Sites of Special Scientific Interest (SSSIs). These sites are considered as the country's

very best wildlife and geological sites. With pressure from development, pollution, climate change and unsustainable management, it is essential to conserve remaining natural heritage for both current and future generations. According to Natural England, there are over 4,100 Sites of Special Scientific Interest (SSSIs) in England covering 8% of the country's land area. This includes approximately 110 sites in Shropshire and 60 sites in Staffordshire.

Within Staffordshire and Shropshire there are approximately 60 Local Nature Reserves (LNRs), some of which are also considered as Sites of Special Scientific Interest (SSSIs). These Local Nature Reserves (LNRs) are sites that have value for wildlife conservation and biodiversity, as well as being close to communities with a genuine need for access to natural open space.

Further information on the environmental sites in Shropshire and Staffordshire can be found within the separate Strategic Environmental Assessment (SEA) reports, which have been produced to support the implementation of this strategy.

9.3. Complimentary Environmental Plans and Strategies

A number of environmental plans and strategies exist that we will draw on through the delivery of local flood risk management to ensure consistency with and achievement of wider environmental objectives. These have formed a key part in developing the objectives and measures for managing local flood risk over the coming years as part of the Local Flood Risk Management Strategy (LFRMS).

9.4. Delivery of Wider Environmental Objectives

The primary focus of the Group Strategy is to reduce flood risk from local sources where it threatens public and private property and local infrastructure. We are committed to maximising opportunities to carry out sustainable flood risk reduction in ways which complement national and council environmental priorities, are affordable and recognise social demographic differences when delivering flood risk reduction across all vulnerable communities.

We will seek to adopt a sustainable approach and wider benefits for all measures we deliver through local flood risk activities and in particular seek to deliver wider environmental objectives as identified through both existing and emerging environmental plans and strategies.

9.5. Sustainability

All flood risk management authorities should make a contribution towards the achievement of sustainable development. Defra has defined the approach that risk management authorities should take via their document '*Guidance for risk management authorities on sustainable development in relation to their flood and coastal erosion risk management functions*'. The key components of this guidance are summarised below.

9.6. What is Sustainable Development?

The most widely accepted definition is that of the Brundtland Commission (1987) which defines sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Essentially, the principle of sustainable development recognises the concern that we are living beyond our means, unsustainably exceeding the capacity of the planet to support our needs.

There are three generally recognised and interlinking components, known as the “three pillars” of sustainable development. Long term growth depends on the recognition and incorporation of all three into the decision making process:

- Economic sustainability;
- Environmental sustainability , and;
- Social sustainability.

9.7. Sustainable Development within the context of Flood Risk Management

The Defra guidance (described above) states that sustainable development, in the context of flood and coastal erosion risk management, includes:

- Taking account of the safety and wellbeing of people and the ecosystems on which they depend;
- Using finite resources efficiently, and minimising waste;
- Taking action to avoid exposing current and future generations to increasing risk, and;
- Improving the resilience of communities, the economy and the natural, historic, built and social environment to current and future risks.

When considering flood risk and planning issues, it is also important to consider the importance of sustainable development to the National Planning Policy Framework (NPPF) which has a presumption in favour of it. The presumption is a new government policy designed to ensure that the planning system as a whole focuses on opportunities. The presumption means that where local plans are not up-to-date, or do not provide a clear basis for decisions, development should be allowed. But the development should not be allowed if it would undermine the key principles for sustainability in the NPPF (such as protecting the Green Belt and Areas of Outstanding Natural Beauty). The presumption also means that where development is in line with the local plan, it should be allowed without delay.

The government hopes that the presumption will encourage plan-making by councils and communities, giving them a greater say in how they meet their development needs. It hopes that it will also give communities, developers and

investors more certainty about the types of applications that are likely to be approved. This, it hopes, will help to speed up the planning process.

9.8. How can Sustainable Development be achieved?

Sustainable development can be achieved by considering a range of alternative ways to reduce risk. This can include focusing on increasing the awareness and preparedness of communities and businesses, improving emergency warning and response procedures, as well as employing effective development control to reduce the likelihood of new developments increasing risk, for example with the use of Sustainable Drainage Systems (SuDS).

Consideration should be taken into how flood and coastal erosion risks can be managed in a manner which not only solves these issues, but also provides multiple benefits. For example, it is considered that the creation of multi-functional parks and open spaces can play an important role, not only in providing amenity, but also in managing flood risk and creating opportunities for environmental and biodiversity benefits.

When considering management options, decision processes should be transparent and make clear the route which was taken to reach the decision, particularly when publicly funded. If any trade-offs are made between different forms of sustainability then this should be clear and properly explained.

Recognition needs to be made of the role that sustainable development plays at all scales, for example by adapting and establishing the priorities of a project based on leading local issues whilst recognising wider societal objectives. For schemes to be effective it is important that local communities are engaged with Flood Risk Management Authorities' projects.

9.9. Climate Change

9.10. Impact

There is clear scientific evidence that global climate change is happening now. Over the past century around the United Kingdom we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. Some of the changes might reflect natural variation however the broad trends are in line with projections from climate change models.

Greenhouse gas levels in the atmosphere are likely to cause higher winter rainfall in future. Past emissions mean some climate change is inevitable in the next 20 to 30 years. Lower emissions could reduce the amount of climate change further into the future, but changes are still projected at least as far ahead as the 2080s. There is enough confidence in large scale climate change models to say that we must plan for change. There is more uncertainty at a local scale but model results can still help us plan to adapt. For example it is understood that rain storms may become more intense, even if there is uncertainty about exactly where or when. By the 2080s, the latest United

Kingdom Climate Projections (UKCP09) are that there could be around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day). It is plausible that the amount of rain in extreme storms (with a 1 in 5 annual chance or rarer) could increase locally by 40%.

9.11. Implications

Climate change can affect local flood risk in several ways and impacts will vary, depending on local conditions and vulnerability.

Prolonged periods of rain, resulting in saturated ground, followed by intense storms, such as those experienced in 2007 and 2012, have been shown to increase the likelihood of flooding. More intense rainfall causes more surface runoff, increasing localised flooding and causing erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers.

9.12. Adapting to Change

It is essential for us to respond by planning ahead. We can prepare by understanding our current and future vulnerability to flooding, developing plans for increased resilience and expanding our capacity to adapt. Shropshire Council and Staffordshire County Council have produced strategy documents and advice to adapt to the effects of climate change.

9.13. Projected Changes

Across Shropshire and Staffordshire, the climate is expected to change in several ways. Annual average temperatures are expected to rise by 1°C every thirty years, with a maximum temperature rise of around 4°C by the 2080s, from 1990 levels.

This rise will be most pronounced during the summer months, with the potential for a greater than 5°C rise by 2080. Winter temperatures are also set to rise by around 3°C by the same time.

Although there will be little change in precipitation annually, seasonal patterns are likely to vary somewhat from today's trends. Maximums of 30% less are expected in the 2080s during summer months and 30% more during winter months by the same decade. Overall, summers are likely to be hotter and drier, with winters milder and wetter.

In addition to the supporting data from UKCP09, the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report states that the UK will experience more severe weather events than at present, with a higher risk of flash flooding and storms all year round. This report *'assists governments and other decision-makers in the public and private sector in formulating and implementing appropriate responses to the threat of human- induced climate change.'*

9.14. Adaptation Measures

With the significant changes in our weather patterns and our climate it is now essential to adapt our behaviour and plan for severe weather events and the likely implications, such as flooding, to build resilience and reduce the potential damage and cost.

Shropshire Council has produced a Climate Change Guide for Communities and similarly Staffordshire County Council has produced a Climate Change Adaptation Action Plan. This is to ensure that the councils are prepared to manage climate change risks to service delivery, local communities and the natural environment.

From a flood risk perspective, the weather experienced in 2012 highlighted the extremes and uncertainty in our weather patterns, with drought conditions being experienced in the spring followed by some of the wettest weather on record. It is these types of weather patterns which could become more commonplace with climate change and which need to be considered when undertaking flood risk management activities.

When considering the impacts of flood risk, allowances for the changing climate will be made such that assets perform adequately throughout their design life. For example, in the design of surface water drainage systems serving residential areas, rainfall is increased by 30% to represent the increased surface water runoff anticipated during the expected life of the development.

The implementation of the Sustainable Drainage Systems (SuDS) Approving Body (SAB) role will help us adapt to climate change locally and should contribute to the mitigation and management of the risks that could arise from damaging floods in the future.

10. Implementation, Monitoring and Review

10.1. How will the Strategy be Implemented?

This Local Flood Risk Management Strategy (LFRMS) will be updated, in consultation with other organisations and individuals, and should be considered a 'live' document which will evolve over time as new information becomes available and flood events occur.

To deliver the objectives of the Local Flood Risk Management Strategy (LFRMS), it is recognised that we must work in partnership with stakeholders, including local communities and businesses. This, in turn, will build relationships and trust and help deliver the measures identified in the action plan.

This Local Flood Risk Management Strategy (LFRMS) will provide the framework for the delivery of Shropshire Council and Staffordshire County Council's flood risk management responsibilities. It will be formally approved by the Shropshire Council and Staffordshire County Council cabinets and adopted as the Local Flood Risk Management Strategy (LFRMS) by both.

The Action Plan included in Part 2 of the Local Flood Risk Management Strategy (LFRMS) describes the general, long term or policy measures that we have put in place to achieve our objectives. There are number of measures already being delivered that will reduce or manage flood risk, and these have been included in the table.

10.2. Shropshire and Staffordshire Local Flood Risk Management Strategy Action Plan

The Local Flood Risk Management Strategy (LFRMS) has been developed to deliver a short to medium term (5 year) improvement plan to establish a sound evidence and knowledge base to develop a longer-term investment programme for flood risk management activities across Shropshire and Staffordshire.

The outcomes of each action are linked to the objectives of our Local Flood Risk Management Strategy (LFRMS) so that we can monitor how we are delivering our local flood risk management measures. The Action Plan outlines the measures identified through this Local Flood Risk Management Strategy (LFRMS) and how we will deliver these.

The Action Plans are contained in the individual Shropshire and Staffordshire Local Flood Risk Management Strategy (LFRMS) – Part 2: Policies and Action Plan documents.

10.3. How will the Strategy be Monitored and Reviewed?

The Shropshire and Staffordshire Local Flood Risk Management Strategy (LFRMS) will be formally monitored as part of the collaborative working approach agreed between the two authorities. The measures contained within the Action Plan will be integrated into the work carried out by both Shropshire's and Staffordshire's Flood Risk Management Teams. The Action Plan will be reviewed and updated annually with the agreement of the Shropshire and Staffordshire Flood Risk Management Project Board.

A major review of the Shropshire and Staffordshire Local Flood Risk Management Strategy (LFRMS) is programmed for 2018, in line with the review timetable of the Shropshire and Staffordshire collaborative working approach. However, the Local Flood Risk Management Strategy (LFRMS) may need to be updated within this period if:

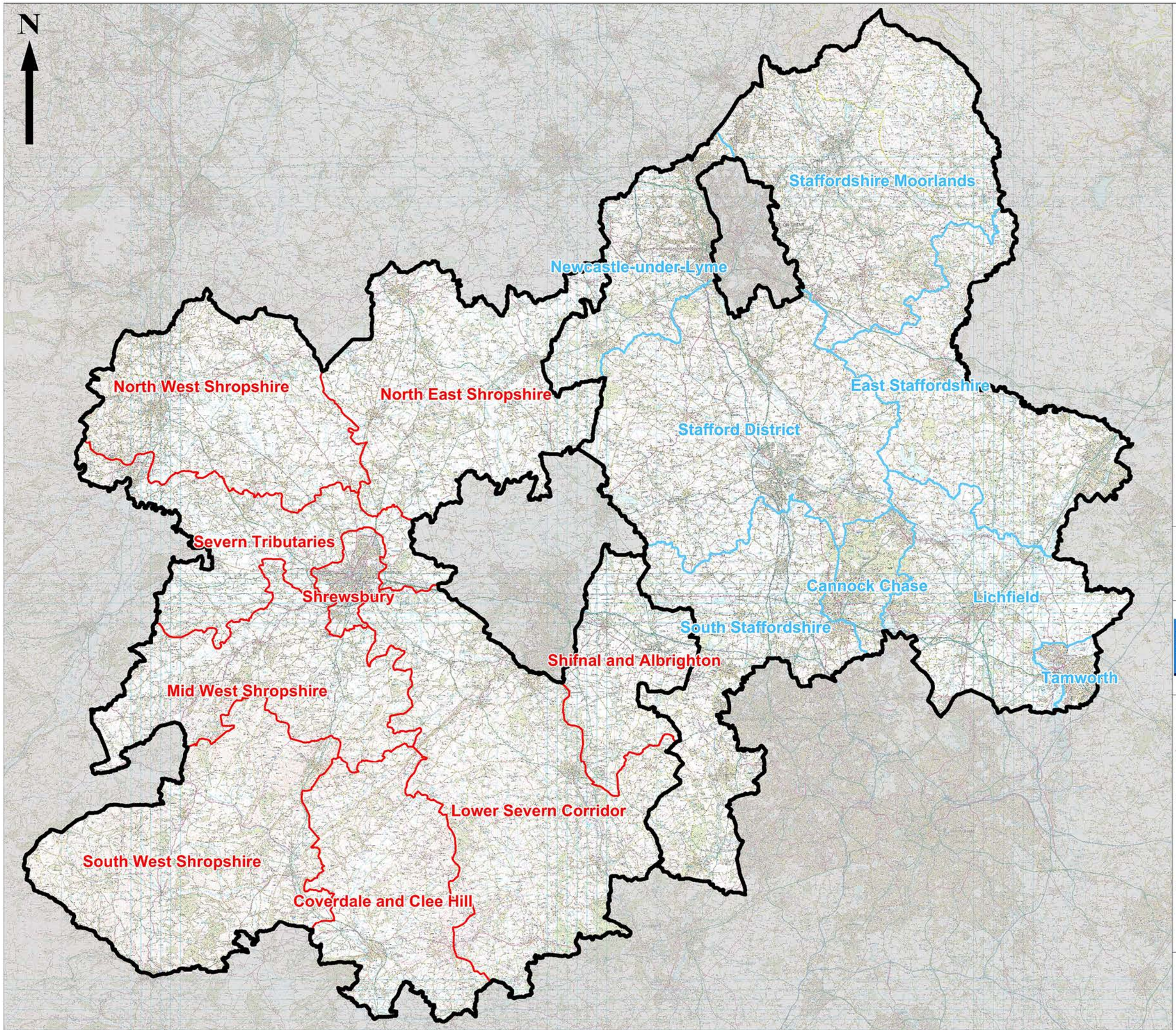
- There are significant flood events that challenge the conclusions of the risk assessment;
- There are significant changes to any of the datasets that underpin the risk assessment;
- There are significant policy changes that amend the roles and responsibilities of Risk Management Authorities (RMAs);
- The annual monitoring identifies that the Local Flood Risk Management Strategy (LFRMS) is not achieving its objectives, or;
- There is a change in funding availability which has a significant effect on the actions proposed in this Group Strategy.

10.4. Consultation

The Local Flood Risk Management Strategy (LFRMS) is subject to a three month public consultation period from 1st April 2014 for three calendar months.

This includes a consultation response form, consisting of a number of set questions, to assist with the evaluation of feedback. Following the consultation, the comments will be reviewed and the Local Flood Risk Management Strategy (LFRMS) updated and published.

Appendix A – Informative Maps



Legend:

- Shropshire Council and Staffordshire County Council Boundaries
- Shropshire Flood Forum Areas
- Staffordshire District Council Boundaries

Shropshire Council

Staffordshire County Council

Appendix: APPENDIX A1

Title: COUNCIL BOUNDARY MAP

Project: SHROPSHIRE AND STAFFORDSHIRE GROUP STRATEGY

Client: SHROPSHIRE COUNCIL AND STAFFORDSHIRE COUNTY COUNCIL

URS

Appr'd:	Drawn:	Date:
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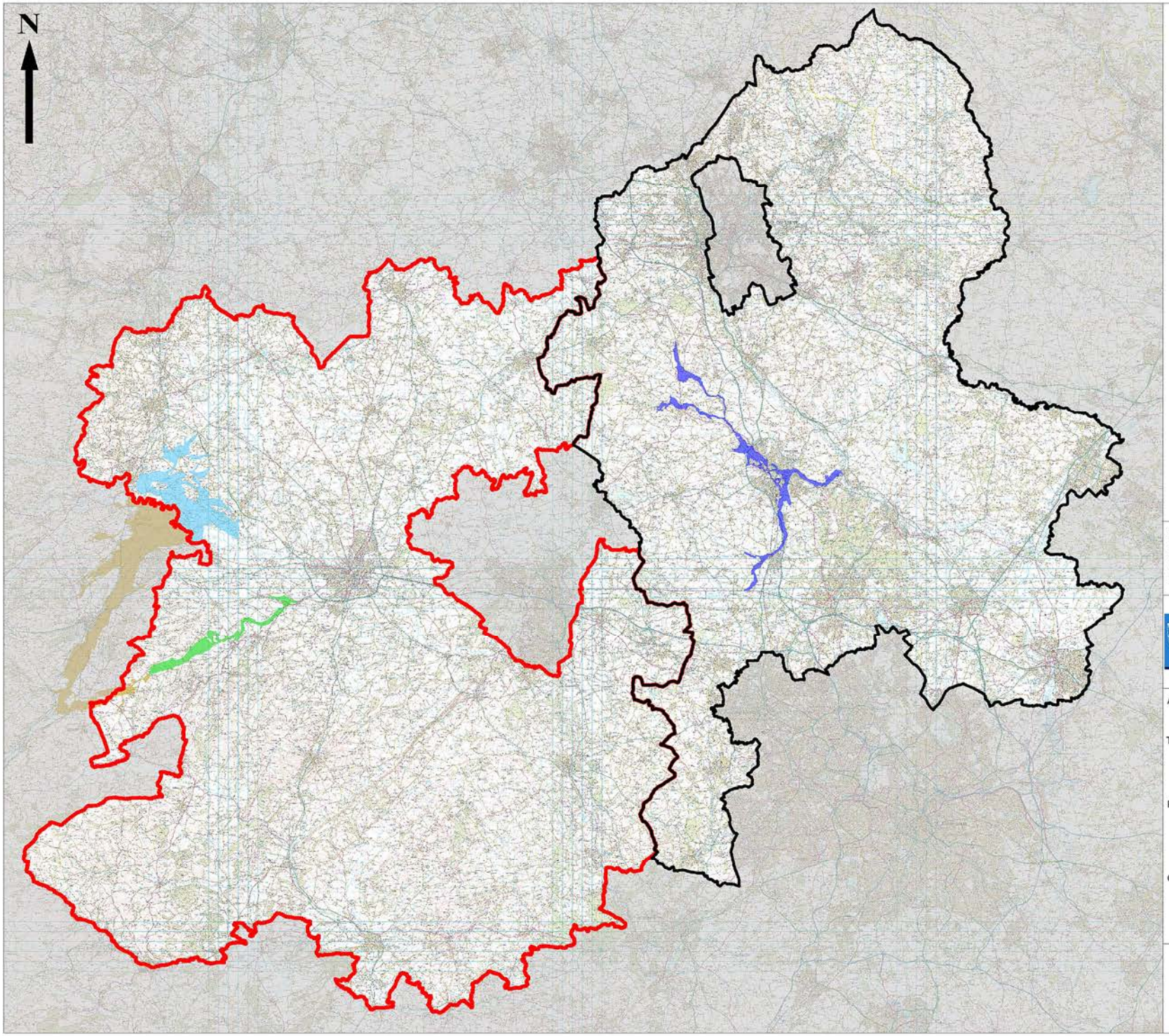

Legend:

Boundaries:

- Shropshire Boundary
- Staffordshire Boundary

IDB Boundaries:

- Staffordshire IDB
- Powysland IDB
- Melverley IDB
- Rea IDB

Shropshire Council

Staffordshire County Council

Appendix: APPENDIX A2

Title: INTERNAL DRAINAGE BOARD (IDB) BOUNDARY MAP

Project: SHROPSHIRE AND STAFFORDSHIRE GROUP STRATEGY

Client: SHROPSHIRE COUNCIL AND STAFFORDSHIRE COUNTY COUNCIL

URS

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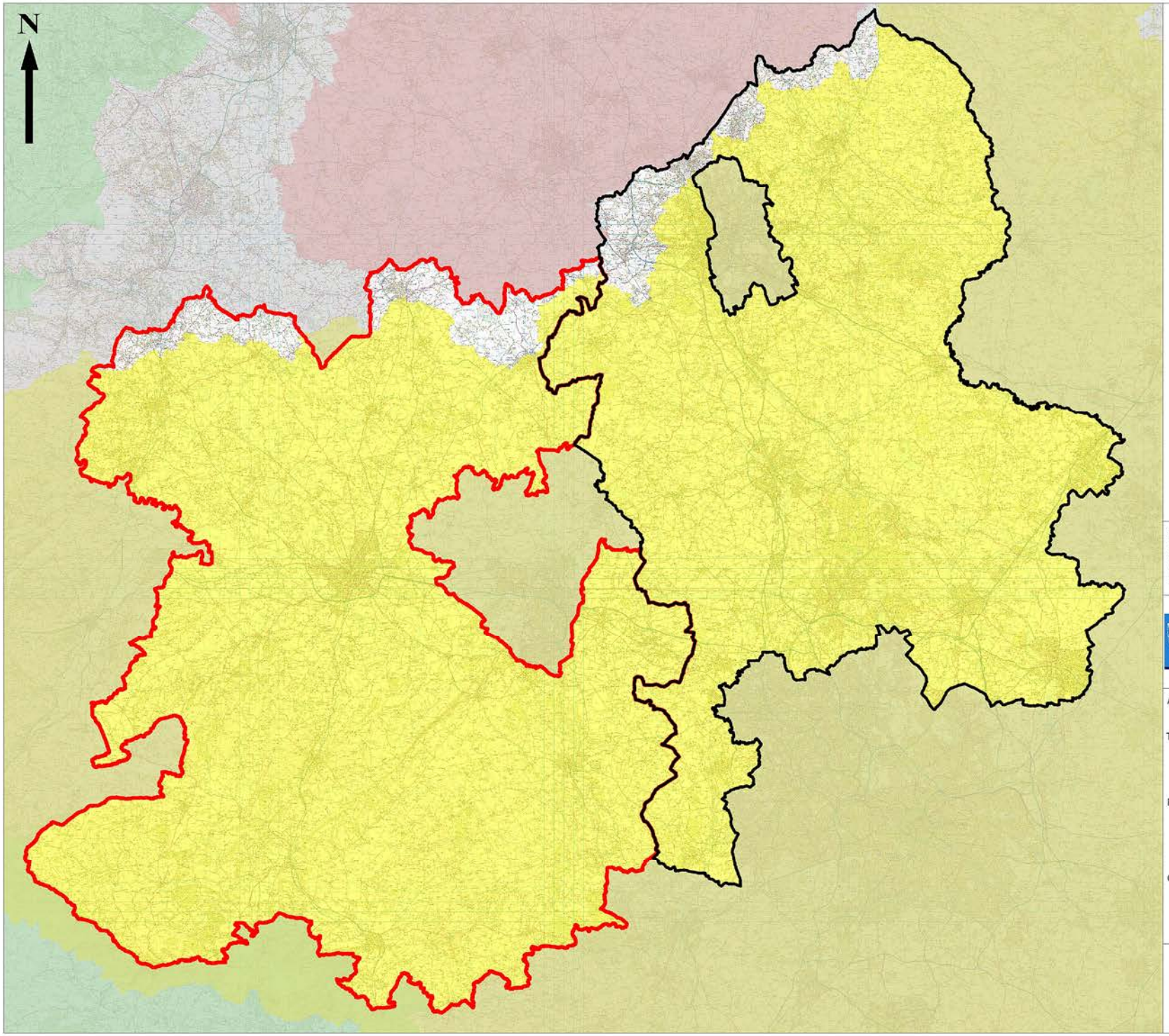
A3		47066841
Drawing Number:		Revision:
APPENDIX_A2		1



Legend:

Boundaries:

- Shropshire Boundary
- Staffordshire Boundary

Water Company Boundaries:

- United Utilities
- Dwr Cymru Welsh Water
- Severn Trent Water

Shropshire Council

Staffordshire County Council

Appendix: APPENDIX A3

Title: WATER COMPANY BOUNDARY MAP

Project: SHROPSHIRE AND STAFFORDSHIRE GROUP STRATEGY

Client: SHROPSHIRE COUNCIL AND STAFFORDSHIRE COUNTY COUNCIL

URS

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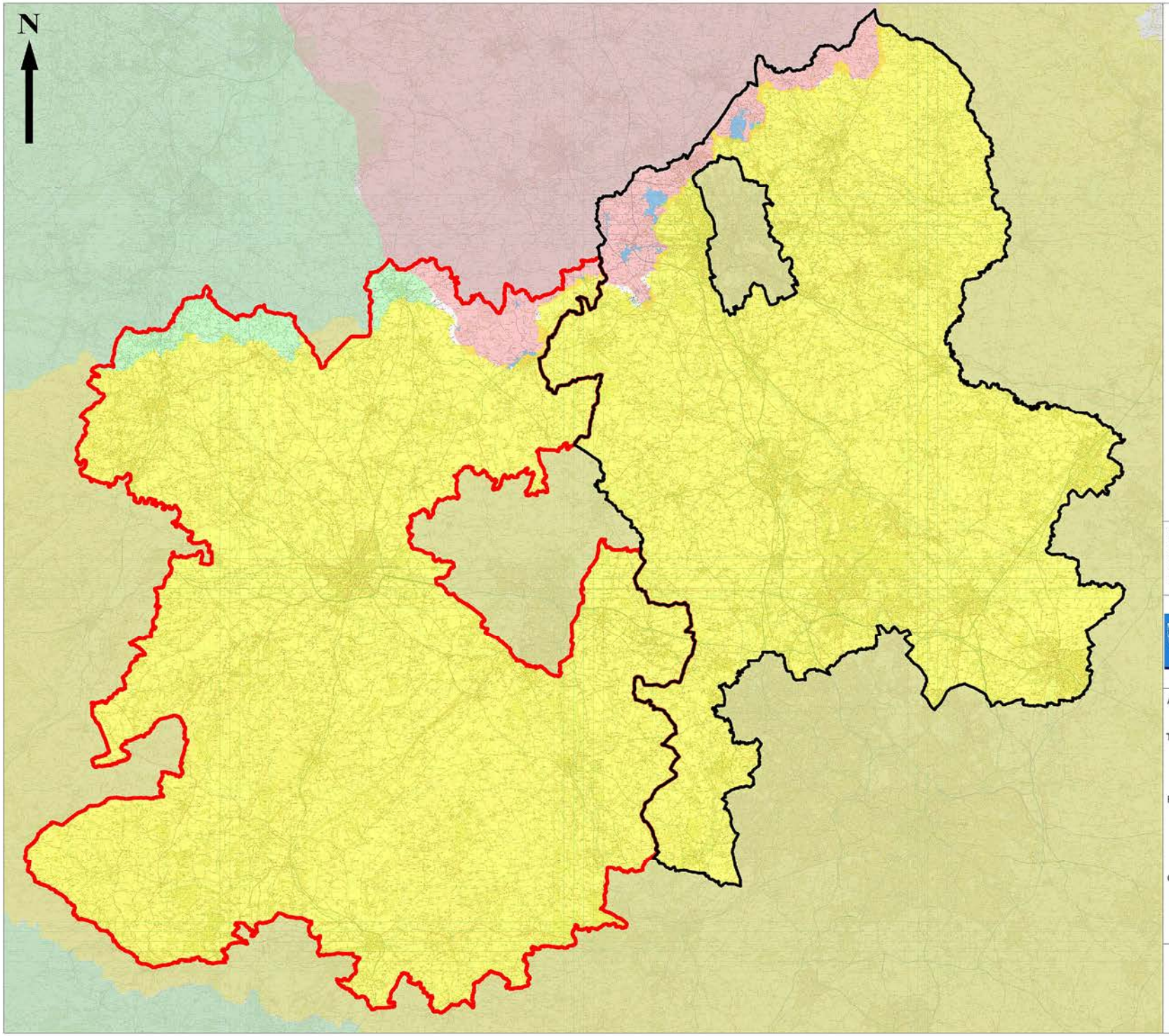
Drawing Number: APPENDIX_A3		Revision: 1



Legend:

Boundaries:

- Shropshire Boundary
- Staffordshire Boundary

Sewer Company Boundaries:

- United Utilities
- Dwr Cymru Welsh Water
- Severn Trent Water

Drainage Boundaries:

- United Utilities

Shropshire Council

Staffordshire County Council

Appendix: APPENDIX A4

Title: SEWER COMPANY BOUNDARY MAP

Project: SHROPSHIRE AND STAFFORDSHIRE GROUP STRATEGY

Client: SHROPSHIRE COUNCIL AND STAFFORDSHIRE COUNTY COUNCIL

URS

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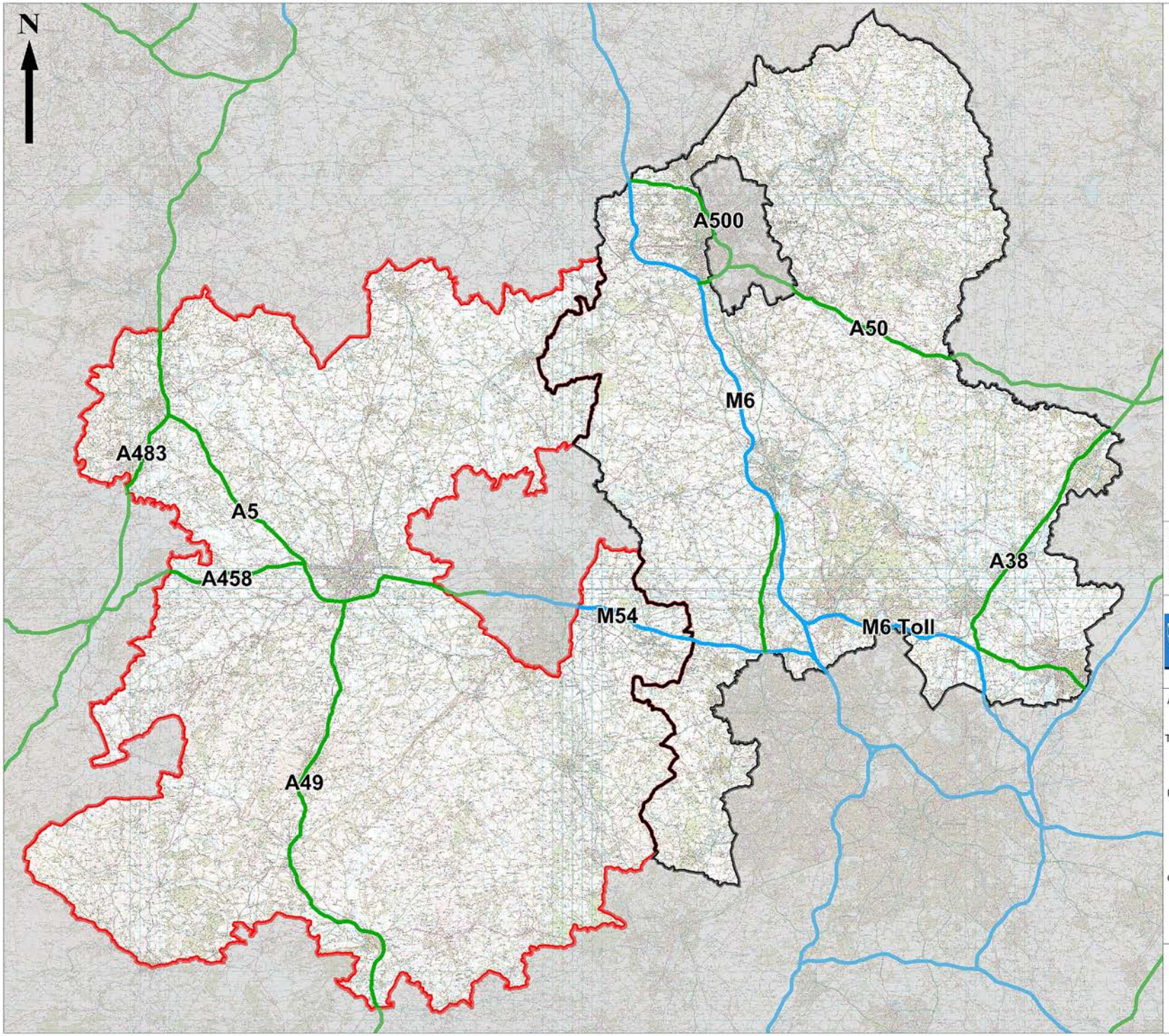

Legend:

Boundaries:

Shropshire Boundary

Staffordshire Boundary

Highways:

Motorways

A Roads

Notes:

Shropshire Council

Staffordshire County Council

Appendix: APPENDIX A5

Title: HIGHWAYS AGENCY ROAD NETWORK MAP

Project: SHROPSHIRE AND STAFFORDSHIRE GROUP STRATEGY

Client: SHROPSHIRE COUNCIL AND STAFFORDSHIRE COUNTY COUNCIL

URS

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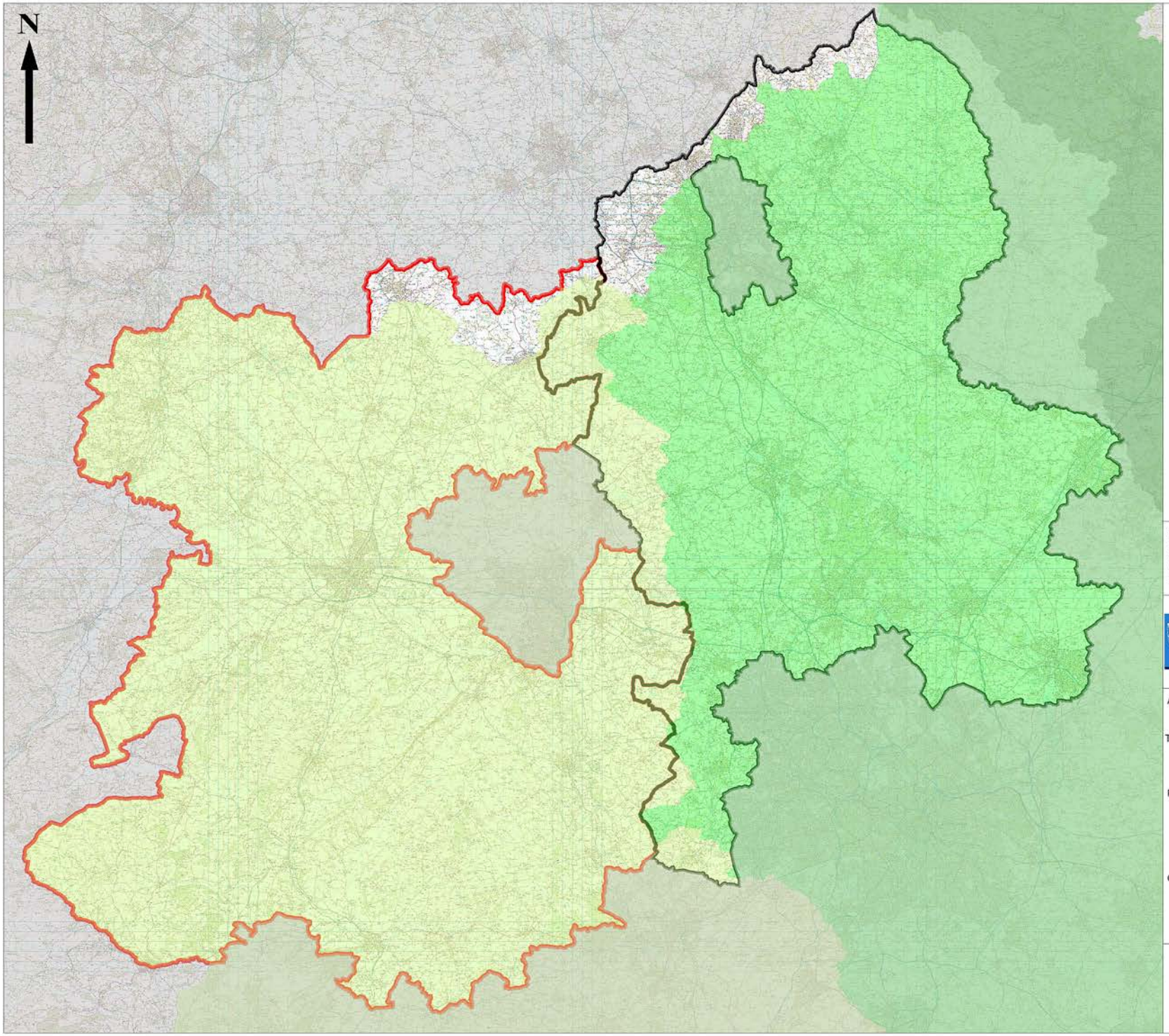

Legend:

Boundaries:

Shropshire Boundary

Staffordshire Boundary

Environment Agency Regions

West

Central

East

Notes:

Shropshire Council

Staffordshire County Council

Appendix: APPENDIX A6

Title: ENVIRONMENT AGENCY REGIONS MAP

Project: SHROPSHIRE AND STAFFORDSHIRE GROUP STRATEGY

Client: SHROPSHIRE COUNCIL AND STAFFORDSHIRE COUNTY COUNCIL

URS

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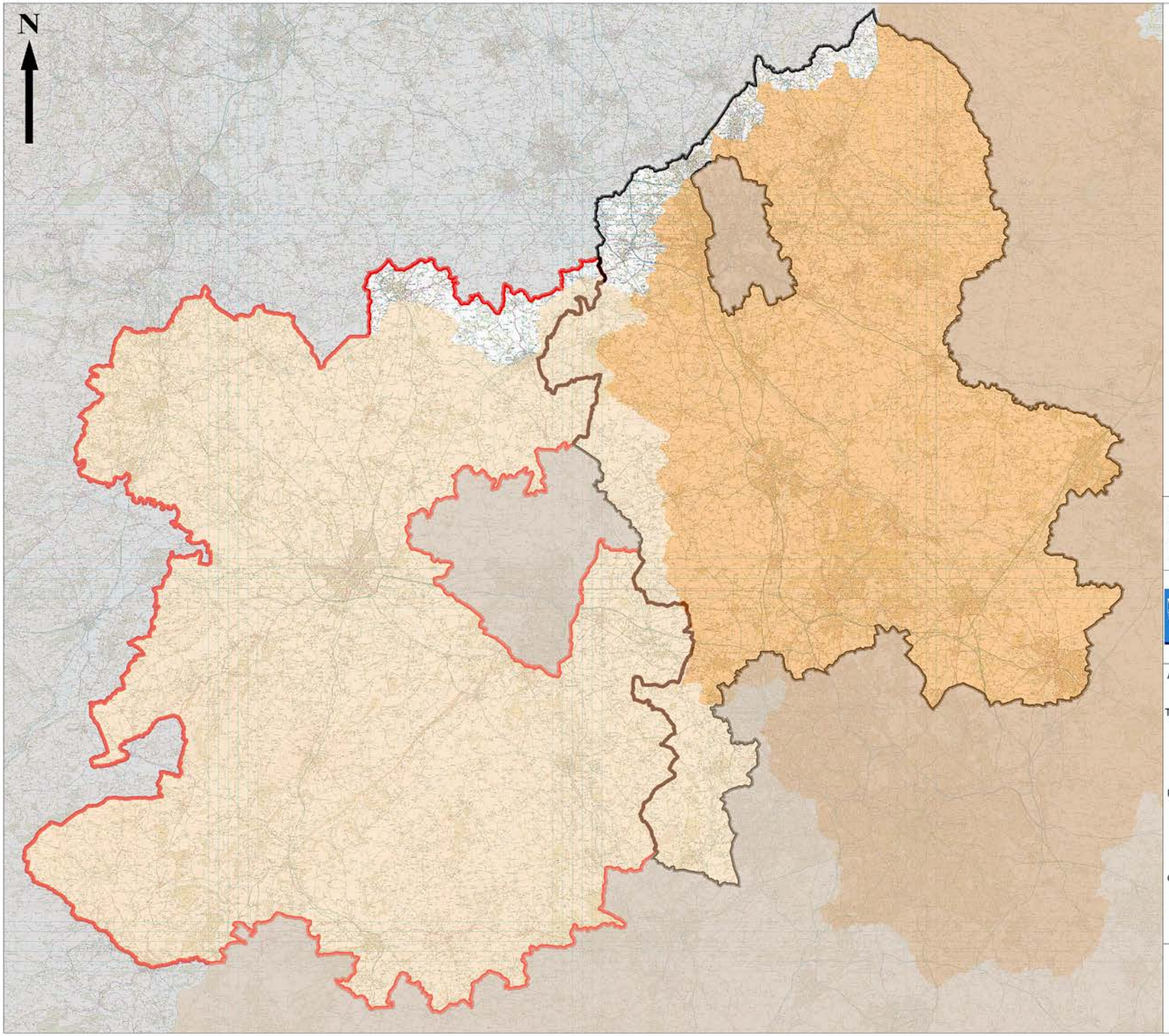

Legend:

Boundaries:

Shropshire Boundary

Staffordshire Boundary

RFCC Boundaries:

Severn-Wye

Trent

Notes:

Shropshire Council

Staffordshire County Council

Appendix: APPENDIX A7

Title: REGIONAL FLOOD AND COASTAL COMMITTEE BOUNDARY MAP

Project: SHROPSHIRE AND STAFFORDSHIRE GROUP STRATEGY

Client: SHROPSHIRE COUNCIL AND STAFFORDSHIRE COUNTY COUNCIL

URS

Appr'd:	Drawn:	Date:
AW	RM	MARCH 2014
Drg Size: A3		Job No: 47066841
Drawing Number: APPENDIX_A7		Revision: 1

Appendix B – Legislation and Guidance

Key Legislation			
Reference	**Date**	**Author**	**Web-Link**
Sir Michael Pitt Report 'Learning Lessons from the 2007 Floods'	2008	Cabinet Office	http://webarchive.nationalarchives.gov.uk/20100807034701/http:/archive.cabinetoffice.gov.uk/pittreview/thepittreview/final_report.html
Flood and Water Management Act	2010	HM Government	http://www.legislation.gov.uk/ukpga/2010/29/contents
Land Drainage Act	1991	HM Government	http://www.legislation.gov.uk/ukpga/1991/59/contents
Highways Act	1980	HM Government	http://www.legislation.gov.uk/ukpga/1980/66/contents
Flood Risk Regulations	2009	HM Government	http://www.legislation.gov.uk/uksi/2009/3042/pdfs/uksi_20093042_en.pdf
Reservoirs Act	1975	HM Government	http://www.legislation.gov.uk/ukpga/1975/23
National Flood and Coastal Erosion Risk Management (FCERM) Strategy for England	2011	Environment Agency	http://www.environment-agency.gov.uk/research/policy/130073.aspx

Other Pieces of Legislation and Guidance			
Reference	**Date**	**Author**	**Web-Link**
National Planning Policy Framework	2012	Communities and Local Government	https://www.gov.uk/government/publications/national-planning-policy-framework--2
Flood Risk and Coastal Change – Planning Practice Guidance	2014	Communities and Local Government	http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/
Water White Paper	2011	HM Government	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228861/8230.pdf
Conservation of Habitats and Species Regulations	2010	HM Government	http://www.legislation.gov.uk/uksi/2010/490/contents/made
Climate Change Act	2008	HM Government	http://www.legislation.gov.uk/ukpga/2008/27/contents
Developing Urban Blue Corridors, Scoping Study	2011	Department for Environment, Food and Rural Affairs (Defra)	http://randd.defra.gov.uk/Document.aspx?Document=FD2619_10152_FRP.pdf
Civil Contingencies Act	2004	HM Government	http://www.legislation.gov.uk/ukpga/2004/36/contents
Strategic Environmental Assessment Directive	2001	HM Government	https://www.gov.uk/government/collections/strategic-environmental-assessments
Water Frameworks Directive	2000	HM Government	http://ec.europa.eu/environment/water/water-framework/
Drainage Strategy Framework	2013	Environment Agency and OFWAT	http://webarchive.nationalarchives.gov.uk/20140328084622/http://cdn.environment-agency.gov.uk/LIT_8210_5081b1.PDF
Surface Water Management: Interim Guidance for Developers		Shropshire Council	http://www.shropshire.gov.uk/media/161818/surface-water-management-interim-guidance-for-developers.pdf
Natural England Sites of Special Scientific Interest	2013	Natural England	http://www.naturalengland.org.uk/ourwork/conservation/designations/sssi/default.aspx

Living on the Edge	2012	Environment Agency	http://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx
Private Sewers Information	2013	Severn Trent Water Website	http://www.stwater.co.uk/households/waste-water-and-sewers/responsibility-for-sewer-pipes/

Useful Funding Documents			
Reference	**Date**	**Author**	**Web-Link**
Flood and Coastal Erosion Risk Management Grant in Aid	2013	Environment Agency Website	http://www.environment-agency.gov.uk/research/planning/135234.aspx
Community Infrastructure Levy	2013	Inside Government Website	https://www.gov.uk/government/policies/giving-communities-more-power-in-planning-local-development/supporting-pages/community-infrastructure-levy
Partnership Funding and Collaborative delivery of local flood risk management: a practical resource for LLFAs	2012	Halcrow Group Limited for Defra	http://randd.defra.gov.uk/Document.aspx?Document=9958_FD2643_Partnershipfundingguide.pdf
Midland Flood and Coastal Committees	2013	Environment Agency	https://www.gov.uk/government/groups/trent-regional-flood-and-coastal-committee https://www.gov.uk/government/groups/english-severn-and-wye-regional-flood-and-coastal-committee

Appendix C - Flood Risk Studies and Reports

Flood Risk Studies and Reports			
Reference	**Date**	**Author**	**Description and Web-Link**
National Flood Management Plans			
Flooding in England: A National Assessment of Flood Risk	2009	Environment Agency	The Environment Agency has prepared a national assessment of flood risk for England, which was published in 2009. The national assessment sets out the current level of risk from rivers and the sea and what the Environment Agency is doing to manage it. http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geho0609bqds-e-e.pdf
Catchment Flood Management Plans			
River Severn Catchment Flood Management Plan (CFMP)	2009	Environment Agency	The Environment Agency produced the River Severn and River Trent CFMPs to give an overview of the flood risks across the catchments. River Severn CFMP - https://www.gov.uk/government/publications/river-severn-catchment-flood-management-plan River Trent CFMP https://www.gov.uk/government/publications/river-trent-catchment-flood-management-plan
River Trent Catchment Flood Management Plan (CFMP)	2010	Environment Agency	
River Basin Management Plans			
Humber River Basin Management Plan (RBMP)	2009	Environment Agency	The delivery mechanism for Water Framework Directive objectives. The plan focuses on the protection, improvement and sustainable use of the water environment in the Humber and Severn River Basin Districts respectively. Humber RBMP - https://www.gov.uk/government/publications/river-basin-management-plan-humber-district Severn RBMP - https://www.gov.uk/government/publications/river-basin-management-plan-severn-river-basin-district
Severn River Basin Management Plan (RBMP)	2009	Environment Agency	
Preliminary Flood Risk Assessments			
Shropshire Preliminary Flood Risk Assessment (PFRA) (2011)	2011	Shropshire Council	The Preliminary Flood Risk Assessments (PFRAs) provide a high level summary of significant flood risk from surface water, ordinary watercourses and groundwater through collection of information on past (historic) and future (potential) floods. They are a requirement of the Flood Risk Regulation 2009 and must be produced every 6 years. Shropshire PFRA - http://www.shropshire.gov.uk/environmental-maintenance/drainage-and-flooding/shropshire-preliminary-flood-risk-assessment/ Staffordshire PFRA – Not available at time of publication
Staffordshire Preliminary Flood Risk Assessment (PFRA) (2011)		Staffordshire County Council	

Flood Risk Studies and Reports			
Reference	**Date**	**Author**	**Description and Web-Link**
Level 1 Strategic Flood Risk Assessments			
Shropshire Strategic Flood Risk Assessment (SFRA) Level 1 Update	2012	Shropshire Council	A Strategic Flood Risk Assessment (SFRA) gives an overview of flood risk in a given area to guide development to areas of lower risk. The Shropshire Level 1 Strategic Flood Risk Assessment (SFRA) Update document combines all of the former District and Borough Strategic Flood Risk Assessments (SFRAs) into one document for the Unitary Authority of Shropshire Council and incorporates new information available since the completion of the previous Level 1 Strategic Flood Risk Assessments (SFRAs). Shropshire Level 1 SFRA Update: http://www.shropshire.gov.uk/environmental-maintenance/drainage-and-flooding/planning-policy-with-regard-to-flood-risk/
Staffordshire and Stoke-on-Trent Strategic Flood Risk Assessment (SFRA) to support the Joint Waste Core Strategy	2010-2026	Staffordshire County Council and Stoke-on-Trent City Council	A Strategic Flood Risk Assessment (SFRA) gives an overview of flood risk in a given area to guide waste facilities to areas of lower risk. http://www.staffordshire.gov.uk/environment/planning/policy/StrategicFloodRiskAssessment.aspx
Cannock Chase DC Strategic Flood Risk Assessment (SFRA) Level 1	2008	Cannock Chase District Council	A Strategic Flood Risk Assessment (SFRA) gives an overview of flood risk in a given area to guide development to areas of lower risk. Cannock Chase Level 1 SFRA: http://www.cannockchasedc.gov.uk/downloads/download/960/sfra_2008 East Staffordshire Level 1 SFRA: http://www.eaststaffsbc.gov.uk/Planning/PlanningPolicy/LocalPlanEvidenceBase/Pages/Environment.aspx Lichfield Level 1 SFRA: http://www.lichfielddc.gov.uk/info/856/local_plan/1014/evidence_base/9 Newcastle-under-Lyme Level 1 SFRA: http://www.newcastle-staffs.gov.uk/planning_content.asp?id=SXEAEE-A7809C84&cat=1363 South Staffordshire Level 1 SFRA: http://www.sstaffs.gov.uk/your_services/strategic_services/planning_policy_-_local_plans/the_evidence_base.aspx Stafford Level 1 SFRA: http://www.staffordbc.gov.uk/flood-risk-and-strategic-flood-risk-assessments-sfras Staffordshire Moorlands Level 1 SFRA: http://www.staffsmoorlands.gov.uk/sm/council-services/evidence-base/strategic-flood-risk-assessment
East Staffordshire BC Strategic Flood Risk Assessment (SFRA) Level 1	2008	East Staffordshire Borough Council	
Lichfield DC Strategic Flood Risk Assessment (SFRA) Level 1	2008	Lichfield District Council	
Newcastle-under-Lyme Strategic Flood Risk Assessment (SFRA) Level 1	2008	Newcastle Borough Council	
South Staffordshire DC Strategic Flood Risk Assessment (SFRA) Level 1	2008	South Staffordshire District Council	
Stafford BC Strategic Flood Risk Assessment (SFRA) Level 1	2008	Stafford Borough Council	
Staffordshire Moorlands DC Strategic Flood Risk Assessment (SFRA) Level 1	2008	Staffordshire Moorlands District Council	

Flood Risk Studies and Reports			
Reference	**Date**	**Author**	**Description and Web-Link**
Tamworth BC Strategic Flood Risk Assessment (SFRA) Level 1	2008	Tamworth Borough Council	Tamworth Level 1 SFRA: http://www.tamworth.gov.uk/sites/default/files/planning_docs/G-Natural_Environment_Climate_Change_A/G13_SFRA_Level_1_Report_2009.pdf?bcsi_scan_E956BCBE8ADBC89F=1
Level 2 Strategic Flood Risk Assessments			
Shrewsbury Strategic Flood Risk Assessment (SFRA) Level 2	2009	Shropshire Council	To facilitate application of the Exception Test a Level 2 Strategic Flood Risk Assessment (SFRA) is sometimes required. The Level 2 Strategic Flood Risk Assessment (SFRA) considers the detailed nature of the flood hazard by taking flood depth, velocity and times to inundation. The presence of flood risk management measures are also taken into account. Shrewsbury Level 2 SFRA: http://www.shropshire.gov.uk/environmental-maintenance/drainage-and-flooding/shrewsbury-level-2-strategic-flood-risk-assessment/ Rugeley Level 2 SFRA: http://www.cannockchasedc.gov.uk/site/scripts/download_info.php?downloadID=1210 Burton upon Trent and Uttoxeter Level 2 SFRA: http://www.eaststaffsbc.gov.uk/Planning/PlanningPolicy/LocalPlanEvidenceBase/Pages/Environment.aspx
Rugeley Strategic Flood Risk Assessment (SFRA) Level 2	2009	Cannock Chase District Council	
Burton upon Trent and Uttoxeter Strategic Flood Risk Assessment (SFRA) Level 2	2008	East Staffordshire Borough Council	
Surface Water Management Plans			
Craven Arms Surface Water Management Plan	2012	Shropshire Council	Surface Water Management Plans (SWMPs) assess the surface water flood risk across an area using both historical information and modelling to determine the future flood risk for a range of rainfall events. High level mitigation measures were recommended for further assessment. A number of SuDS attenuation options to reduce flooding have also been modelled with recommendations provided. Craven Arms SWMP: http://www.shropshire.gov.uk/environmental-maintenance/drainage-and-flooding/surface-water-management-plans/craven-arms-surface-water-management-plan/ Church Stretton SWMP: http://www.shropshire.gov.uk/environmental-maintenance/drainage-and-flooding/surface-water-management-plans/church-stretton-surface-water-management-plan/
Church Stretton Surface Water Management Plan	2011	Shropshire Council	
Shifnal Surface Water Management Plan	2011	Shropshire Council	

Flood Risk Studies and Reports			
Reference	**Date**	**Author**	**Description and Web-Link**
			Shifnal SWMP: http://www.shropshire.gov.uk/environmental-maintenance/drainage-and-flooding/surface-water-management-plans/shifnal-surface-water-management-plan/
Much Wenlock Integrated Urban Drainage Management Plan	2011	Shropshire Council	Due to the frequency and severity of past flood events in Much Wenlock Shropshire Council has undertaken a detailed Integrated Urban Drainage Management Plan to allow the flooding mechanisms and the characteristics of the catchment to be better understood. A number of mitigation options were identified and modelled with a combination of options being recommended to improve flooding issues. An Action Plan was compiled and the objectives are supported by the stakeholders, who have agreed to work with Shropshire Council to achieve the objectives and deliver the Action Plan to the full extent of their flood risk management responsibilities. Much Wenlock IUDMP: http://www.shropshire.gov.uk/environmental-maintenance/drainage-and-flooding/surface-water-management-plans/much-wenlock-iudmp/
Oswestry Surface Water Management Plan	2013	Shropshire Council	Due to the nature of the watercourses that run through Oswestry, Shropshire Council are undertaking a detailed assessment to better understand the flooding mechanisms that can affect the town. The study will involve a modelling of the drainage systems within Oswestry to accurately map the flood risk in the area and to fully assess the benefits of a number of different options to reduce the risk. Oswestry SWMP: http://www.shropshire.gov.uk/environmental-maintenance/drainage-and-flooding/surface-water-management-plans/oswestry-surface-water-management-plan/
Shrewsbury Surface Water Management Plan Intermediate Report	2012	Shropshire Council	Due to the severity of past flood events in Shrewsbury, from both the larger watercourses and other local sources, Shropshire is undertaking a detailed assessment of flood risk to allow us to better understand the various flooding mechanisms that affect the town. The study will involve modelling of the drainage systems within Shrewsbury to accurately map the flood risk in the area and to fully assess the benefits of a number of different options to reduce the risk.

Flood Risk Studies and Reports			
Reference	**Date**	**Author**	**Description and Web-Link**
			Prior to the detailed assessment being carried out, an intermediate report has been prepared which includes an Action Plan identifying key responsibilities and timescales for implementing the preferred options. Shrewsbury SWMP Intermediate Report: http://www.shropshire.gov.uk/environmental-maintenance/drainage-and-flooding/surface-water-management-plans/shrewsbury-surface-water-management-plan/
Kidsgrove & Church Lawton Surface Water Management Plan	2013	Staffordshire County Council and Cheshire East Council	Surface Water Management Plans (SWMPs) assess the surface water flood risk across an area using both historical information and modelling to determine the future flood risk for a range of rainfall events. This study which, is currently being carried has out jointly with Cheshire East Council, has involved the creation of a hydraulic model with a view to identifying a number of attenuation options and mitigation measures to reduce flooding. The final report and findings is anticipated to be available in December 2013
Southern Staffordshire Surface Water Management Plan – Phase 1 and addendum	2010	Cannock, Chase District Council, Lichfield District Council, South Staffordshire District Council, Stafford Borough Council Tamworth Borough Council	The key objective and outcome of this study was the identification of the locations within the study area at greatest risk of surface water flooding. The following settlements were identified as being at high risk of surface water flooding and requiring further investigation as part of a Phase 2 SWMP (i.e. Stafford town, Lichfield City, Cannock town, Tamworth town; and Penkridge. Cannock Chase District Council link to SWMP documents http://www.cannockchasedc.gov.uk/site/scripts/download_info.php?fileID=2586 http://www.cannockchasedc.gov.uk/downloads/file/4108/114a_southern_staffordshire_phase1_swmp_addendum Lichfield District Council link to SWMP documents http://www.lichfielddc.gov.uk/info/856/local_plan/1014/evidence_base/27 South Staffordshire District Council link to SWMP documents http://www.sstaffs.gov.uk/your_services/strategic_services/planning_policy_-_local_plans/the_evidence_base.aspx Stafford Borough Council SWMP link to documents http://www.staffordbc.gov.uk/water-cycle-study-and-surface-water-management-strategy Tamworth Borough Council SWMP link to documents http://www.tamworth.gov.uk/core-documents-local-plan#A
Cannock Town Surface Water Management Plan – Phase 2	2011	Cannock, Chase District Council,	To inform the individual Phase 2 SWMP a model has been constructed to include overland flow, fluvial flows affected by surface water and the underground drainage network (public sewers but not highway drains, private drains or gullies). Mapping showing flood extent, depth and velocity for a variety of annual probabilities of flooding, including three
Lichfield Town Surface Water	2011	Lichfield District	

Flood Risk Studies and Reports			
Reference	**Date**	**Author**	**Description and Web-Link**
Management Plan – Phase 2		Council,	climate change scenarios have been produced. Average Annual Damages (AAD) have been calculated for both the current and future flood risk scenarios, using basic available information, accounting for damages to property, stress related impacts and emergency costs. Key flood risk issues and mitigation strategies have been identified based on improved maintenance regimes, proposed SuDS measures with an emphasis on partnership working between organisations. Cannock Chase District Council link to SWMP documents http://www.cannockchasedc.gov.uk/downloads/file/3526/cannock_phase_2_surface_water_management_plan Lichfield District Council link to SWMP documents http://www.lichfielddc.gov.uk/info/856/local_plan/1014/evidence_base/27 South Staffordshire District Council link to SWMP documents http://www.sstaffs.gov.uk/your_services/strategic_services/planning_policy_-_local_plans/the_evidence_base.aspx Stafford Borough Council link to SWMP documents http://www.staffordbc.gov.uk/water-cycle-study-and-surface-water-management-strategy Tamworth Borough Council link to SWMP documents http://www.tamworth.gov.uk/core-documents-local-plan#A
Penkridge Village Surface Water Management Plan – Phase 2	2011	South Staffordshire District Council,	
Stafford Town Surface Water Management Plan – Phase 2	2011	Stafford Borough Council	
Tamworth Town Surface Water Management Plan – Phase 2	2011	Tamworth Borough Council	

Appendix D – Key Plans and Strategies

Other Complimentary Plans and Strategies			
Reference	**Date**	**Author**	**Description/Web-Link**
Shropshire Council Plan	2011-2013	Shropshire Council	The Shropshire Council Plan sets out the role and purpose of the council and how it will deliver its services to the vision and priorities of Shropshire's longer term Community Strategy. http://shropshire.gov.uk/media/141756/Shropshire-Council-Plan.pdf
Staffordshire County Council Strategic Plan	2013-2018	Staffordshire County Council	The Staffordshire County Council Strategic Plan sets out the values and priorities for the years ahead and what the County Council wants to achieve and how it intends to do so over the next 5 years (2013-2018) in line with the longer term Sustainable Community Strategy. https://www.staffordshire.gov.uk/yourcouncil/strategicplan/Strategic-Plan-2013--2018.pdf
Multi-Agency Flood Plans (MAFPs)	-	Shropshire Council Staffordshire County Council (and others)	Outline the multi-agency response to flood incidents, including a community-level assessment of flood risk from rivers, defence failures and extreme rainfall events
Open Spaces Strategies / Planning Guidance	-	Shropshire Council Staffordshire County Council	Provides guidance on the provision of open space as part of new development to assist in implementing core strategies.
Local Plans (Shropshire Core Strategy and Staffordshire Borough / Districts Core Strategies).	-	Shropshire Council and Staffordshire Borough / District Core Strategies.	The Local Plans set out the council's spatial strategy, policies and site proposals for the development and other use of land. The Local Plans produced by Shropshire Council and the Staffordshire Boroughs / Districts all contains policies of particular relevance to flood risk management in and sustainable development (i.e. sustainable drainage systems).
Climate Change Strategies and associated Adaptation Plans	2013	Shropshire Council Staffordshire County Council	Climate Change Strategies and associated adaptation plans bring together policies and actions to help mitigate and adapt to climate change.
Sustainability Policies and Strategies	2011	Shropshire Council Staffordshire County Council	Provides guidance on how to integrate sustainability, environmental and climate change considerations into strategic decision making processes. They often set the overall strategic direction and long-term vision for the economic, social and environmental wellbeing of an area, in a way that contributes to sustainable development.
Shropshire Biodiversity Action Plan	2009	Shropshire Biodiversity Partnership for Shropshire Council	http://www.shropshire.gov.uk/environment/biodiversity-and-ecology/shropshire-biodiversity-action-plan/
Staffordshire Biodiversity Action Plan	1998	Staffordshire County Council	The SBAP is a planning tool to protect, enhance and create many threatened habitats and provide a framework for effectively monitoring species recovery. http://www.sbap.org.uk/

Shropshire Local Flood Risk Management Strategy Supporting Documents	2013	Shropshire Council	http://www.shropshire.gov.uk/environmental-maintenance/drainage-and-flooding/
Staffordshire Local Flood Risk Management Strategy Supporting Documents	2013	Staffordshire County Council	http://www.staffordshire.gov.uk/environment/planning/policy/thedevelopmentplan/home.aspx
Water Cycle Studies			
Shropshire Outline Water Cycle Study	2010	Halcrow	http://www.shropshire.gov.uk/media/161806/shropshire-outline-water-cycle-study-report.pdf
South Staffordshire Outline Water Cycle Study	2011	Royal Haskoning	http://www.staffordbc.gov.uk/water-cycle-study-and-surface-water-management-strategy

Appendix E – Glossary

Term	Definition
Attenuation	In the context of this report - the storing of water to reduce its peak discharge.
Breach	An accidental opening – for example in a flood defence.
Catchment Flood Management Plan	A high-level planning strategy through which the Environment Agency works with its key decision makers within a river catchment to identify and agree policies to secure the long-term sustainable management of flood risk.
Category 1 Responders	As defined under Schedule 1 of the Civil Contingencies Act, Category 1 responders are "core responders" in the event of an emergency and include emergency services, local authorities, health bodies and Government agencies including the Environment Agency.
Civil Contingencies Act	Aims to deliver a single framework for civil protection in the UK and sets out the actions that need to be taken in the event of an emergency. The Civil Contingencies Act is separated into two substantive parts: local arrangements for civil protection (Part 1) and emergency powers (Part 2)
Critical Drainage Area	A discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding during severe weather thereby affecting people, property or local infrastructure.
Culvert	A channel or pipe that carries a watercourse below the level of the ground.
DG5 Register	A water-company held register of properties which have experienced sewer flooding due to hydraulic overload, or properties which are 'at risk' of sewer flooding more frequently than once in 20 years.
Flood Zone 1	Area at low probability of flooding, as defined by the Environment Agency.
Flood Zone 2	Area at medium probability of flooding. Probability of fluvial flooding is 0.1 – 1%. Probability of tidal flooding is 0.1 – 0.5 %, as defined by the Environment Agency.
Flood Zone 3a	Area at high probability of flooding. Probability of fluvial flooding is 1% (1 in 100 years) or greater. Probability of tidal flooding is 0.5%(1 in 200 years), as defined by the Environment Agency.
Flood Zone 3b	Functional floodplain, as defined by the Local Authority and agreed with the Environment Agency.
Environment Agency	Environment regulator for England. Risk Management Authority responsible for management of flood risk from fluvial (main rivers), tidal and coastal sources of flooding and Reservoirs.
Flood and Water Management Act 2010	An Act to make provision about water, including provision about the management of risks in connection with flooding and coastal erosion.
Flood Defence	Infrastructure used to protect an area against floods such as floodwalls and embankments; they are designed to a specific standard of protection (design standard).
Floodplain	Area adjacent to river, coast or estuary that is naturally susceptible to flooding.
Flood Resilience	Resilience is a design measure that can reduce the damage that occurs to buildings from flooding. It does not prevent floodwater from entering a building. It involves constructing a building in such a way that although floodwater may enter the building, its impact is minimised.
Flood Risk	The level of flood risk is the product of the frequency or likelihood of the flood events and their consequences (such as loss, damage, harm, distress and disruption)
Flood Risk Assessment	Considerations of the flood risks inherent in a project, leading to the development of

Term	Definition
	actions to control, mitigate or accept them.
Flood Risk Regulations 2009	The Flood Risk Regulations 2009 transposes the EC Floods Directive (Directive 2007/60/EC on the assessment and management of flood risk) into domestic law in England and Wales and to implement its provisions.
Flood Storage	An area that temporarily stores excess runoff or river flow. This is often in ponds or reservoirs.
Fluvial	Relating to the actions, processes and behaviour of a watercourse (river or stream)
Fluvial flooding	Flooding from a river or a watercourse.
Functional Floodplain	Land where water has to flow or be stored in times of flood.
Greenfield	Previously undeveloped land.
Groundwater	Water that is in the ground, this is usually referring to water in the saturated zone below the water table.
Highways Act 1980	Sets out the main duties (management and operation of the road network) of highways authorities in England and Wales. The Act contains powers to carry out functions/tasks on or within the highways such as improvements, drainage, acquiring land etc.
Hydraulic Modelling	A computerised model of a drainage system to simulate flows and estimate water levels and flood extents.
Infiltration	The penetration of water through the ground's surface.
Infrastructure	Physical structures that form the foundation for development.
Land Drainage Act 1991	Sets out the statutory roles and responsibilities of key organisations such as Internal Drainage Boards, local authorities, the Environment Agency and Riparian owners with jurisdiction over watercourses and land drainage infrastructure. Parts of the Act have been amended by the Flood and Water Management Act 2010.
Local Flood Risk	Defined in the Flood and Water Management Act 2010 as flooding from surface runoff, ordinary watercourses and groundwater
Lead Local Flood Authority	The statutory body defined under the Flood and Water Management Act 2010 responsible for the management of local flood risk, namely surface water runoff, groundwater and ordinary watercourses.
Local Flood Risk Management Strategy	The Flood and Water Management Act 2010 requires lead local flood authorities to develop, maintain, apply and monitor a local flood risk management strategy. The strategy should consider all sources of local flood risk, i.e. surface water, groundwater, and ordinary watercourses in order to determine distinct objectives to manage local flood risk to local communities. Local flood risk management strategies should be consistent with the National Strategy and other flood risk management documents.
Local Planning Authority	Body that is responsible for controlling planning and development through the planning system.
Main River	Watercourse defined on a 'Main River Map' designated by Defra. The Environment Agency has permissive powers to carry out flood defence works, maintenance and operational activities on Main Rivers.
Mitigation Measure	An element of development design which may be used to manage flood risk or avoid an increase in flood risk elsewhere.
National Strategy	National Flood and Coastal Erosion Risk Management Strategy for England, developed by the Environment Agency.
Ordinary Watercourse	A watercourse that does not form part of a Main River. This includes "all rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices (other than public sewers within the meaning of the Water Industry Act) and passages, through which water flows"

Term	Definition
	according to the Land Drainage Act 1991.
Overland Flow	Flooding caused when intense rainfall exceeds the capacity of the drainage systems or when, during prolonged periods of wet weather, the soil is saturated such that it cannot accept any more water.
Overtopping	Water carried over the top of a defence structure due to the wave height exceeding the crest height of the defence.
Preliminary Flood Risk Assessment	The Preliminary Flood Risk Assessment aims to provide a high level screening exercise to facilitate flood risk management. The assessment involves the collection and collation of historic and future flood risk data which will facilitate the identification of Flood Risk Areas (where appropriate) and local flood risk management.
Residual Flood Risk	The remaining flood risk after risk reduction measures have been taken into account.
Return Period	The average time period between rainfall or flood events with the same intensity and effect.
Riparian Owner	Anyone who owns land or property alongside a watercourse. Responsibilities include maintaining river beds/banks and ensuring the normal flow of water can pass without obstruction.
Risk	The probability or likelihood of an event occurring.
Risk Management Authorities	The Flood and Water Management Act 2010 identifies certain organisations as risk management authorities which have flood risk management powers and duties.
River Basin Management Plan	The River Basin Management Plans describe the river basin district, and the pressures that the water environment faces. It shows what this means for the current state of the water environment in the river basin district, and what actions will be taken to address the pressures.
River Catchment	The area drained by a river.
SuDS ApprovalBody	Statutory body responsible for the approval of Sustainable Drainage Systems (SuDS) in new development, when enacted under the Flood and Water Management Act 2010.
Sewer Flooding	Flooding caused by a blockage or overflowing in a sewer.
Standard of Protection	The flood event return period above which significant damage and possible failure of the flood defences could occur.
Strategic Flood Risk Assessment	A Strategic Flood Risk Assessment (SFRA) gives an overview of flood risk in a given area to sequential guide development to areas of lower risk.
Surface Water Management Plan	Surface water management plans are projects to investigate local flooding issues that occur as a result of heavy rainfall. They should identify options to mitigate local flooding and incorporate a realistic action plan to implement or deliver the agreed management measures.
Sustainable Drainage System (SuDS)	A method of drainage design which mimics the drainage characteristics of an area prior to development.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations meeting their own needs.
Tributary	A body of water, flowing into a larger body of water, such as a smaller stream joining a larger stream.
Water Cycle Study	Water Cycle Studies seek to identify and understand the relationship between development and the water environment within the defined study area, by examining the potential impacts of future growth on water resources, water quality and flood risk.
Water Framework Directive	The European Water Framework Directive (WFD) came into force in December 2000 and became part of UK law in December 2003. It provides an opportunity to plan and deliver a

Term	Definition
	better water environment, focussing on ecology.
1 in 30 year event	Event that on average will occur once every 30 years. Also expressed as an event which has a 3.33% probability of occurring in any one year.
1 in 100 year event	Event that on average will occur once every 100 years. Also expressed as an event which has a 1% probability of occurring in any one year.
1 in 200 year event	Event that on average will occur once every 200 years. Also expressed as an event which has a 0.5% probability of occurring in any one year.
1 in 1000 year event	Event that on average will occur once every 1000 years. Also expressed as an event which has a 0.1% probability of occurring in any one year.