



# Shropshire and Staffordshire Local Flood Risk Management Strategy

## Part 1

Final Report, December 2015



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## Executive Summary

This Strategy is about managing flooding in Shropshire and Staffordshire. As Lead Local Flood Authorities, we are required by law to produce a strategy for the management of local flood risk.

Flooding can come from larger rivers, smaller watercourses, groundwater, overland runoff following heavy rain (surface water), reservoirs and sewers. In Staffordshire there are over 10,600 properties that could flood from rivers and 11,700 properties that could flood from surface water in an event with a 1% chance of happening in any one year. In Shropshire there are over 4,800 properties that could flood from rivers and 6,800 properties at risk of surface water flooding in an event with a 1% chance of happening in any one year.

The main role the Councils have is to co-ordinate local flood risk management and by this we mean flooding from smaller watercourses, surface water and groundwater. However, so that we can manage flood risk in a joined up way we work in partnership with District and Borough Councils, the Environment Agency, Water Companies, Internal Drainage Boards, surrounding local authorities and the Peak District National Park Authority as applicable to each County.

The Local Flood Risk Management Strategy sets out roles and responsibilities for flood risk management, assesses the risk of flooding in the Counties, where funding can be found to manage flood risk, what our policies are as a Lead Local Flood Authority and what our objectives and actions are to manage flood risk.

The Local Flood Risk Management Strategy consists of:

- Part 1: Group Strategy: roles and responsibilities for flood risk management, objectives and funding
- Part 2: Policies and actions specific to Staffordshire/ Shropshire
- Part 3: Strategic Environmental Assessment
- A supporting summary

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 Flood and Coastal Erosion Risk Management Strategy* published by the Environment Agency and aligns with Shropshire Council and Staffordshire County Council's strategic plans.

## 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<sup>1</sup>. 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.

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. Shropshire Council and Staffordshire County Council administrative area boundary maps are presented in Appendix A.

In doing this, the Shropshire and Staffordshire Local Flood Risk Management Strategy is in 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, Action Plan and Flood Risk Assessment Specific to:**
  - Shropshire, and;
  - Staffordshire.
- **Part 3: Strategic Environmental Assessment Specific to:**
  - Shropshire, and;

<sup>1</sup> Flooding in England: A National Assessment of Flood Risk. 2009. Environment Agency.

- 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.

All parts of the Strategy were open for public consultation for 6 months, during which time all town and parish councils were contacted, as were all County Councillors and members of the relevant Flood Forum contact lists. The Strategy had a press release, along with a mention on local radio stations.

This Strategy 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 an overview of the management of other forms of flooding, such as main rivers and sewers.

### 1.1. 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 seeks to balance the needs of communities, the economy and the environment. The National Strategy has six guiding principles, which are:

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

The Local Flood Risk Management Strategy is a key document because it draws together existing flood risk studies and related plans into a single document that outlines how we will manage local flood risk in the future.

## 2. Roles and Responsibilities for Flood Risk Management

### 2.1. Lead Local Flood Authorities

There are both strategic and operational elements to the role of Lead Local Flood Authority and these are set out in Table 2-1.

Our new responsibilities complement the work that we and our partner organisations already do on flood risk management. This includes highways drainage, land drainage, development planning and management, regeneration, emergency planning and response, environmental management and local investment.

The Councils have no legal responsibility for clearing out drains, ditches and watercourses that are on private land in private ownership. They will seek to work with relevant landowners to promote suitable action where these have the potential to cause flooding (see Part 2 of the Strategy for our policy on where we will take action).

**Table 2-1 Roles and responsibilities as Lead Local Flood Authority**

Strategic	Operational
<p>Develop, maintain, apply and monitor a Local Flood Risk Management Strategy.</p> <p>Co-ordinate partnership working between relevant organisations.</p> <p>Represent Staffordshire/ Shropshire on the River Trent/ English Severn and Wye Regional Flood and Coastal Committee.</p> <p>To comply with the European Floods Directive, produce a Preliminary Flood Risk Assessment and for nationally significant Flood Risk Areas, surface water mapping and a Flood Risk Management Plan (on a six year cycle).*</p>	<p>Investigate flooding incidents and set out who has responsibilities and what actions can be taken.</p> <p>Hold a register of significant drainage/ flood alleviation assets.</p> <p>Power to designate third party assets acting as flood defences so they cannot be altered or removed.</p> <p>Powers to enforce land drainage legislation to ensure ordinary watercourses flow properly and a duty to consent to certain works on these watercourses.</p> <p>Powers to build new flood alleviation schemes for local sources of flooding.</p> <p>Statutory Consultee for Planning Applications for surface water drainage on major developments</p>

*\*Both Staffordshire and Shropshire Councils produced Preliminary Flood Risk Assessments (PFRAs) in 2011, the purpose of which was to identify if any areas of the two Counties had*

30,000 or more people at risk of surface water flooding in any one location. Part of Staffordshire was shown to be in the West Midlands Flood Risk Area, where there are over 30,000 people at risk. The Environment Agency has since, on behalf of Staffordshire County Council and the other authorities in the West Midlands Flood Risk Area produced a surface water flood map and the Humber Flood Risk Management Plan.

## 2.2. Partnership Working

There are a number of different organisations in and around Staffordshire and Shropshire that have responsibilities for flood risk management, known as Risk Management Authorities (RMAs). These are shown on Table 2-2, with a summary of their responsibilities. There is a detailed table of flood risk management functions that different organisations can undertake in Appendix C.

We also liaise regularly with internal stakeholders in each Council and we meet regularly with the other LLFAs in the West and East Midlands and further afield to share emerging approaches and best practice.

It is important to note that land and property owners are responsible for the maintenance of watercourses either on or next to their properties. Property owners are also responsible for the protection of their properties from flooding. When it comes to undertaking works to reduce flood risk, LLFAs do have powers but limited resources must be prioritised and targeted to where they can have the greatest effect.

**Table 2-2 Summary of roles and responsibilities for flood risk management**

Risk Management Authority	Strategic Level	Operational Level
Environment Agency	<ul style="list-style-type: none"> <li>Strategic overview for all sources of flooding</li> <li>National Strategy</li> <li>Reporting and general supervision</li> </ul>	<ul style="list-style-type: none"> <li>Main rivers (e.g. Trent, Severn)</li> <li>Sea</li> <li>Reservoirs</li> </ul>
Lead Local Flood Authority <ul style="list-style-type: none"> <li>Shropshire Council</li> <li>Staffordshire County Council</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary Flood Risk Assessment</li> <li>Local Flood Risk Management Strategy</li> </ul>	<ul style="list-style-type: none"> <li>Surface Water</li> <li>Groundwater</li> <li>Ordinary Watercourses (consenting and enforcement)</li> </ul>
District and Borough Councils in Staffordshire: <ul style="list-style-type: none"> <li>Tamworth Borough Council</li> <li>Lichfield District</li> </ul>	<ul style="list-style-type: none"> <li>Local Plans as Local Planning Authorities</li> </ul>	<ul style="list-style-type: none"> <li>Ordinary watercourses (works)</li> <li>Determination of Planning</li> </ul>

Risk Management Authority	Strategic Level	Operational Level
<ul style="list-style-type: none"> <li>• Cannock Chase District</li> <li>• South Staffordshire District</li> <li>• Stafford Borough</li> <li>• Newcastle Borough</li> <li>• East Staffordshire Borough</li> <li>• Staffordshire Moorlands District</li> </ul> <p><i>Note that Shropshire Council, as a unitary council, also has these responsibilities</i></p>		<p>Applications as Local Planning Authorities</p> <ul style="list-style-type: none"> <li>• Managing open spaces under District / Unitary Council ownership</li> </ul>
<p>Internal Drainage Boards:</p> <ul style="list-style-type: none"> <li>• Sow and Penk (Staffordshire)</li> <li>• Meverley (Shropshire)</li> <li>• Rea (Shropshire)</li> </ul>	<ul style="list-style-type: none"> <li>• Water Level Management Plans</li> </ul>	<ul style="list-style-type: none"> <li>• Ordinary Watercourses within Internal Drainage Districts</li> </ul>
<p>Water Companies</p> <ul style="list-style-type: none"> <li>• Severn Trent Water</li> <li>• United Utilities</li> <li>• Welsh Water Dwr Cymru (Shropshire only)</li> </ul>	<ul style="list-style-type: none"> <li>• Asset Management Plans, supported by Periodic Reviews (business cases)</li> </ul>	<ul style="list-style-type: none"> <li>• Public sewers</li> </ul>
<p>Highways Authorities</p> <ul style="list-style-type: none"> <li>• Highways Agency (motorways and trunk roads)</li> <li>• Staffordshire County and Shropshire Councils (other adopted roads)</li> </ul>	<ul style="list-style-type: none"> <li>• Highway drainage policy and planning</li> </ul>	<ul style="list-style-type: none"> <li>• Highway drainage</li> </ul>
<p>County Planning Authorities (Shropshire and Staffordshire County Councils)</p> <p><i>Minerals and waste and County developments, such as new roads and</i></p>	<ul style="list-style-type: none"> <li>• Local Plans as Local Planning Authorities</li> </ul>	<ul style="list-style-type: none"> <li>• Determination of Planning Applications as Local Planning Authorities</li> </ul>

Risk Management Authority	Strategic Level	Operational Level
schools		

*Stoke City Council and Telford and Wrekin Councils are Unitary Authorities which means they are responsible for all local government services within their areas and so are both Lead Local Flood Authority themselves. Both Shropshire and Staffordshire County Councils work in partnership with all neighbouring authorities (including for Shropshire those in Wales) to promote joined up flood risk management on shared watercourses and catchments.*

### 2.3. Arrangements for Collaborative Working between Shropshire and Staffordshire

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.

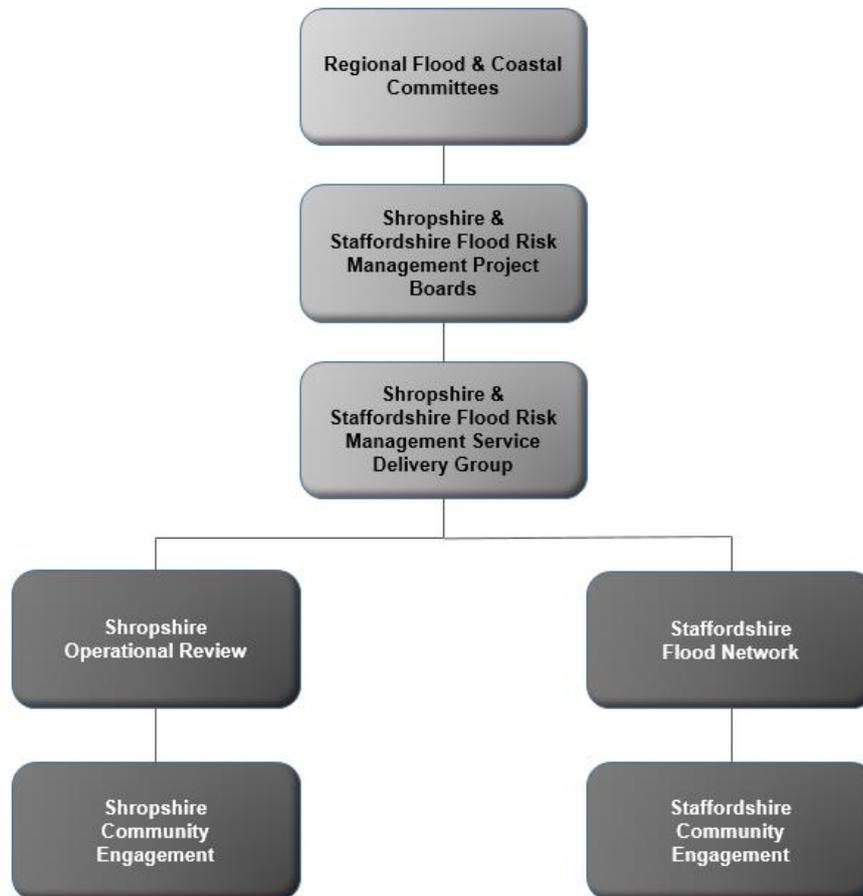
To support the collaborative working approach, a new governance structure has been established to provide appropriate scrutiny of the progress of this strategy and effective engagement between Regional Flood and Coastal Committee`s (RFCCs), partner organisations and community groups (see Figure 2-1).

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 with Council Management and Elected Members. This will provide the overall strategic management and direction to flood risk management activities.

The Shropshire and Staffordshire Flood Risk Management Service Delivery Group includes the key Risk Management Authorities. It has an overview of respective programmes of works and seeks to coordinate public awareness and community engagement initiatives across Shropshire and Staffordshire.

At an operational level day to day communications and meetings on an as needs basis will be held. At this level, those with an involvement in flood risk management in Staffordshire form the Staffordshire Flood Network.

At a community level, we recognise that every community is unique and we will work with all affected communities and their elected representatives to listen to local concerns, support communities to encourage resilience to flooding and work with communities, using local knowledge, in the development of flood alleviation schemes, where these are proven to be feasible.



**Figure 2-1: Shropshire and Staffordshire Flood Risk Management Governance Structure**

#### 2.4. 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 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 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 both Shropshire and Staffordshire, with no member representation.

## 2.5. Emergency Planning, Response and Recovery

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. Responsibilities 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.

Shropshire and Staffordshire County Councils and the Environment Agency are Category 1 Responders under the Act with key responsibilities for emergency planning, response and preparedness. In Staffordshire, emergency planning is undertaken by the Staffordshire Civil Contingencies Unit, which is a multi-agency partnership.

## 2.6. 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'.

### **Common Law – Responsibilities for Watercourses and Roadside Ditches**

The Highway Authority has permissive 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 2-3).

**Figure 2-3: Responsibilities for Roadside Ditches and Watercourses**

### 3. Overview of Flood Risk in Shropshire and Staffordshire

Floods that affect Shropshire and Staffordshire come from different and often multiple sources including main rivers (including the Rivers Severn and Trent), ordinary watercourses, surface water runoff, groundwater, sewers and reservoirs. Ordinary Watercourses tend to be smaller tributaries of the larger river systems that are not legally designated as Main Rivers.

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

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 (a key land use in the study area) and green open space with the potential, where appropriate, 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. Table 4-3 shows some of the historical major flood events that have affected Staffordshire and Shropshire.

**Table 4-3: Selected Historical Flooding 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.

Flooding, as a natural process, has a major influence in shaping the environment and has been a major challenge to mankind by affecting 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, particularly as part of historic urban development practices, have in many cases 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, particularly relating to the location or design of designated heritage assets;
- 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.

### 3.1. What do we mean by Flood Risk?

Flood Risk is the combination of the probability of flooding occurring (which is often expressed as a return period or Annual Exceedance Probability) and the potential consequences should that flooding occur (for example on people, homes, business, critical infrastructure and services and the environment).

The likelihood of flooding is often expressed in different ways. For example, a flood with a 1% Annual Exceedance Probability (AEP) has a 1 in 100 chance of happening in any one year or a return period of 100 years (meaning it might flood on average once every 100 years). Return periods can be misleading, however, as in this example it can be incorrectly interpreted that such a flood might not happen again for another 100 years.

Flooding can occur from different sources, at different times and for different reasons. Often more than one source will contribute towards it, such as high water levels in a receiving watercourse combined with overland flows. It is also complicated by preceding weather conditions and can be particularly exacerbated when the ground is waterlogged following earlier rainfall, or in long dry summers when the earth has been 'baked' dry and becomes hard and impermeable.

**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. 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.

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.

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.

**Sewer / highway flooding**



During heavy rainfall flooding from sewers or highway drains may occur if the rainfall event exceeds the design capacity of the drainage system, the system becomes blocked and/or the system cannot discharge due to high water levels in receiving watercourses. Sewer and highway flooding typically results in localised short term flooding.

<p style="text-align: center;"><b>Groundwater Flooding</b></p>	<p>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.</p> <p>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.</p>
<p style="text-align: center;"><b>Artificial Sources</b></p>	<p>Artificial sources include any water bodies not covered under other categories, such as canals, lakes and reservoirs.</p> <p>The Canal and River Trust (CART) keeps records of flooding incidents associated with the canal network. Particularly vulnerable stretches of canal to breach are closely monitored by the CART, who have plans in place to respond to incidents and minimise water loss from the canal network as soon as possible.</p> <p>The Environment Agency oversees the management of large raised reservoirs. 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.</p>

**Table 4-2: Sources of Flood Risk**

## 3.2. Future Changes in Flood Risk

### Climate Change

We can consider climate change in the context of how this will influence future flooding, how we can act to mitigate the effects of climate change and how we can adapt to changes in flood risk over time.

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.

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. The UK is likely to experience more severe weather events than at present, with a higher risk of flash flooding and storms all year round.

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.

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 typically increased by 30% to represent the increased surface water runoff anticipated during the expected life of the development.

## **New Development**

New development has the potential to increase flood risk by increasing the amount of hard surfacing and causing rainwater to runoff faster and at increased quantities towards local sewers and watercourses. It can also affect where floodwaters flow to if new buildings or earth works affect existing watercourse floodplains or surface water flow paths.

The Environment Agency and Lead Local Flood Authorities are Statutory Consultees to the planning process. They work closely with Local Planning Authorities to ensure that the users of new development are safe from flooding and that new development does not increase flood risk elsewhere, in line with the National Planning Policy Framework (2012). This should help to ensure that there is no increase in flood risk from new development.

## **Changes in Land Management**

Changes in the way that land is managed have the potential to affect flood risk. These are largely affected by the economy, availability of and access to regional, national or international subsidies and payments and environmental initiatives. For example, changes to the payments farmers receive could encourage more intensive agriculture or conversely less intensive production and more environmental stewardship. Mining and quarrying can have a key impact on flood risk. Mines that are being reclaimed and restored have the potential to reduce flood risk in the surrounding areas. Quarries in the River Trent floodplain are known to be beneficial for storing excess floodwaters and releasing these slowly over time. Such changes are inherently difficult to forecast, but will be monitored over time and taken into account when developing flood risk management actions.

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 requires consent) and soil compaction from grazing. Agriculture is a major industry throughout Staffordshire and Shropshire, so 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.

### **3.3. 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.

## 4. Objectives for Managing Local Flood Risk

### 4.1. Guiding Principles

The *National Strategy for Flood and Coastal Erosion Risk Management* provides the overarching framework for future action by all Risk Management Authorities to address flooding and coastal erosion in England. The National Strategy for Flood and Coastal Erosion Risk Management encourages more effective risk management by enabling people, communities, business, infrastructure operators and the public sector to work together.

The following diagram, demonstrates how flood risk organisations can seek to work with individuals, communities and organisations to reduce the risk of flooding:



**Figure 4-1: Managing Flood and Coastal Erosion Risks**

### 4.2. Objectives

Our Local Flood Risk Management Strategy objectives have been developed taking into account:

- historic and predicted flood risk;
- the National Flood and Coastal Erosion Risk Management Strategy;
- the corporate priorities of Staffordshire County and Shropshire Councils
- 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).

Our objectives are:

**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, 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 (including information concerning courses of action) so that they can increase their understanding and allow them to make informed decisions on how they can protect themselves.

**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, ensure that opportunities to reduce flood risk are taken through early engagement with developers.

**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 and 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.

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.

#### **4.3. Complimentary Strategies and Plans**

In addition to the flood risk studies and reports referred to in Section 4 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 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 in these to ensure that our Local Flood Risk Management Strategy compliments and seeks to deliver these through local flood risk management.

## 5. How Flood Risk Management is Funded

### 5.1. 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. 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.

### 5.2. Funding for Flood Alleviation Schemes

Traditionally, flood defence schemes were often built as a reactive response to past flooding and funding decisions made by government were largely made based on the relative costs and benefits (in terms of damages from flooding avoided) of a scheme. This led to an 'all or nothing' approach: those schemes that scored highly in terms of the benefits outweighing the costs went forward with central government funding and those that didn't waited on a list to be taken forward when and if the cost to benefit ratio needed to secure funding changed unless funding from other local sources could be found.

Recently there has been a step change in direction, from the 'all or nothing' situation to one where securing local contributions and achieving multiple benefits through schemes will help to secure central government funding (known as Flood and Coastal Risk Management Grant in Aid) and/ or regional Local Levy funding.

The Pitt Review (2008) into the 2007 floods recommended that 'The Government should develop a scheme which allows and encourages local communities to invest in flood risk management measures'. This approach has been taken forward and in 2011 Defra published their new funding policy on Partnership Funding, which is based on payments for the benefits that a scheme delivers. If this payment for the benefits does not cover the cost of the scheme, then the scheme cost will need to reduce and/ or local contributions will need to be found.

The government's approach to Partnership Funding means that the more external funds that can be found, the better a scheme 'scores' and the more likely it is to be delivered and prioritised against other schemes nationally. Schemes are approved by the relevant Regional Flood and Coastal Committee (RFCC).

Flood Risk Management Authorities, including Staffordshire County Council and Shropshire Council, can submit bids for Grant in Aid. Traditionally, the Environment Agency invited bids on an annual basis each summer. Following the winter floods of 2014/15, a six year programme of bids has been developed, with

new bids invited every 6 months to ensure a continuous six year pipeline of schemes.

The approach of others is also changing. Traditionally the water companies, through the regulator OFWAT, were required to invest to remove properties from their DG5 Register (which is where the property owner had specifically notified the water company that they had been flooded). Water companies are now moving towards a more proactive approach to solving flooding problems, working in partnership with other organisations and with the support of OFWAT. Severn Trent Water, for example, now have a reportable target to deliver partnership schemes with others to reduce flood risk from multiple sources.

Neither Staffordshire County Council nor Shropshire Council have a specific budget for building flood alleviation schemes. This means we need to build up packages of funds to be able to build such schemes.

Flooding rarely comes from one source and we have been working closely with partner organisations to deliver schemes both led by ourselves and others at locations across Shropshire and Staffordshire.

**Table 5-1 sets out potential sources of funding for schemes**

Funding Source	Description
<b>Flood and Coastal Risk Management Grant in Aid</b>	National flood alleviation funds administered by the Environment Agency and approved as a rolling six year programme by the RFCCs. Grant in Aid is weighted towards the protection of residential properties.
<b>Local Levy</b>	An annual charge on County and Unitary Councils forms a regional fund known as Local Levy, administered by the RFCCs.
<b>Private contributions</b>	Contributions from private organisations/ businesses / individuals who benefit from flood risk management projects.
<b>Community fundraising</b>	Collective fundraising can be undertaken by Flood Action Groups/ Parish or Town Councils. Community Foundations can assist in administering such fundraising.
<b>Water Company investment</b>	Water companies may be able to contribute to flood risk management projects where there is benefit to their customers and the investment is in line with their 5 year business plan.
<b>Local Authority contributions</b>	These may be financial or contributions in kind. Major financial contributions are likely to need specific approval by Elected Members.

Funding Source	Description
<b>Parish/ Town Precepts</b>	A local Parish or Town Council can choose to collectively make a contribution towards a scheme by charging a precept to properties within their area.
<b>Developer contributions</b>	<p>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. For Shropshire, all local FRM schemes are inserted into the relevant place plan such that they can attract CIL. In Staffordshire, individual LPAs (District Councils) Infrastructure Delivery Plans will set out schemes that can attract CIL.</p> <p>Section 106 Agreements/ Planning Obligations can be used for up to 5 developments where a direct link can be made to the need for the scheme</p> <p>By planning condition: these could be used to secure contributions in kind, for example, where a developer would construct a flood defence forming part of a wider community scheme and/ or protecting the wider community. It would need to be shown to be necessary for the site to be developed such that its occupants were 'safe' from flooding.</p>
<b>Regeneration funds</b>	Where a scheme could be shown to be necessary to facilitate further growth, funding from Local Enterprise Partnerships/ EU funds may be available.
<b>Land management funds</b>	Countryside Stewardship provides incentives for land managers to look after their environment. Funding from these funds, especially where natural flood management or wider measures to reduce diffuse water pollution are preferred could help to reduce flood risk locally through changes to land management.
<b>Environmental scheme funds</b>	Funds may be available to assist in delivering Water Framework Directive objectives, where a scheme helps to improve water quality and/ or through other catchment based initiatives.
<b>Other</b>	There are a multitude of alternative funding sources available depending on the type of activity or scheme being proposed.

## 6. Wider Environmental Objectives

### 6.1. Environmental Legalisation

Various EU legislation is relevant to flood risk management and Part 3 of the Strategy explores this in more detail:

- Habitats Directive: this aims to help maintain and enhance biodiversity throughout the EU, by conserving natural habitats. It does this by establishing a coherent network of protected areas and strict protection measures for particularly rare and threatened species.
- Strategic Environmental Assessment Directive: this sets out how significant environmental effects that are likely to result due to the implementation of a plan, programme or strategy, should be considered.
- Water Framework Directive: this is designed to improve and integrate the way water bodies are managed throughout Europe. Member States must aim to reach “good” chemical and ecological status in inland and coastal waters by 2015. To address this, the Environment Agency produces River Basin Management Plans (RBMPs) to develop new and better ways of protecting and improving the water environment. The relevant documents setting the local objectives in the Shropshire and Staffordshire counties are the Humber RBMP, the Severn RBMP and the North West RBMP (Appendix C).

### 6.2. Identification of Environmental Opportunities

The implementation of the Local Flood Risk Management Strategy 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 consists of documents specific to Shropshire and Staffordshire.

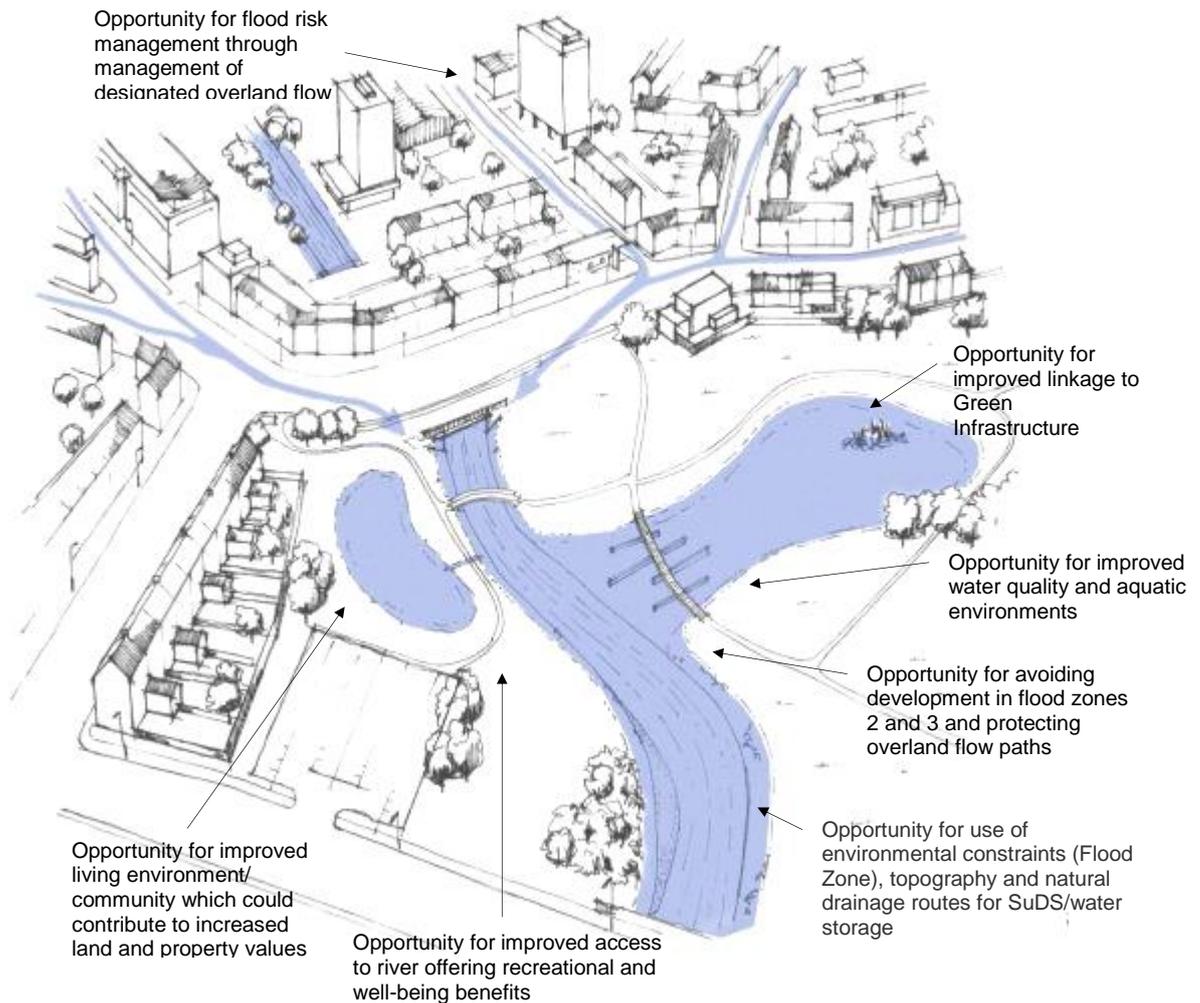
Shropshire Council and Staffordshire County Council are committed to the protection and enhancement of locally, nationally and internationally recognised environmental sites. Whilst a Strategic Environmental Assessment (SEA) has been undertaken, there is considerable uncertainty involved in strategic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

The following Environmental Objectives of the LFRMS apply to all Part 1 Objectives and Part 2 Policies and Actions and to Shropshire Council and Staffordshire County Council exercise of flood risk management functions including responding to planning applications as a Statutory Consultee on Sustainable Drainage Systems, designation of features, consent of works and use of permissive land drainage powers to manage the ordinary watercourse network:

- 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;
- encouraging opportunities for targeted new woodland creation to help mitigate water flow issues, at the same time as contributing to biodiversity enhancement and green infrastructure provision;
- 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. Some of those which are relevant 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.
- seeking opportunities to promote hydromorphological improvements to watercourses (i.e. de-culverting or re-naturalising);
- 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, 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 SSSIs;
- ensuring no loss or degradation of habitat through flood risk management works to comply with the Biodiversity Action Plan (BAP). 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;
- ensuring the protection and (where appropriate) enhancement of designated heritage assets and undesignated heritage assets of national importance impacted by proposed schemes, 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 Strategy 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 6-1: Delivery of Multiple Benefits as part of Flood Risk Management Activities**

### 6.3. Environmental Sites in Shropshire and Staffordshire

Throughout Shropshire and Staffordshire there are a number of Sites of Special Scientific Interest (SSSIs). Such 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 SSSIs in England covering 8% of the country's land area. This includes approximately 110 sites in Shropshire and 65 sites in Staffordshire. In Staffordshire, these include eight Special Areas of Conservation (SAC), one Special Protection Area (for birds) (SPA) and five Ramsar sites.

Within Staffordshire and Shropshire there are approximately 43 Local Nature Reserves (LNRs), some of which are also considered as SSSIs. These Local Nature Reserves 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.

Furthermore, key to ecological networks are the preservation of Local Wildlife Sites; in Staffordshire these are named as Sites of Biological Importance (SBIs) at county level and Biodiversity Alert Sites (BAS) at parish/district level. There are 894 SBIs, 476 BASs and 71 GeoSites (geodiversity of regional to county significance) in Staffordshire. SCC maintains a database of these sites on GIS, using data from Staffordshire Ecological Record (SER).

Additionally, a number of Conservation Areas, Registered Parks and Gardens and Registered Battlefields are located within the counties. These designated or registered sites are important for preserving the local historic character of an area, by providing a rich and varied contribution to the landscape.

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

#### **6.4. Complimentary Environmental Plans and Strategies**

A number of environmental plans and strategies will be drawn on through the delivery of local flood risk management to ensure consistency with and achievement of wider environmental objectives. Such plans and strategies include the Staffordshire Biodiversity Action Plan, Biodiversity Opportunity Mapping, and area-based strategies such as the Meres and Mosses Natural Improvement Area, Central River Initiative, Churnet Valley Living Landscapes Project, Tame Valley Wetlands Partnership Scheme, Cannock Chase Area of Outstanding Natural Beauty (AONB) Management Plan, and Basement and Catchment Management Plans. 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).

## 7. Advice for Property Owners and Residents

Unfortunately we will never be able to prevent flooding in Shropshire and Staffordshire. Risk Management Authorities work hard with limited resources to plan for and reduce flood risk across the Counties but there is no substitute for flood preparedness at a business and household level.

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, advice and guidance on how to protect your property is available on the [\*National Flood Forum's\*](#) website.

### 7.1. Voluntary Organisations

Voluntary organisations, such as the [\*National Flood Forum\*](#), have proven to play an important role in giving advice to individuals. 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. They provide support to communities as a whole during the creation of Flood Action Groups.

#### What is a Flood Action Group?

The role of a local community-based Flood Action Group is to work towards reducing flood risk at a local scale, on behalf of the wider community. Their aim is to provide a representative voice for a community, by working in partnership with the Agencies and Authorities on issues relating to flood risk. In recent times, their creation across England and Wales has proved very effective.

Through these 'grass-roots' groups, communities are able to:

- address their concerns over flood risk;
- be constantly in touch with what is intended for their community;
- know procedures that are already in place with regard to managing flood risk;
- have a voice as to the future flood risk of their community through consultation;
- source funding;
- provide input into future schemes and developments;
- feed local issues to authorities through a single line of communication;
- receive regular updates through multi-agency meetings;

- create their own resilience plan;
- instigate 'flood watchers'/ 'flood wardens';
- create awareness of flood risk to the wider community, and;
- prepare to reduce the impact on the community should a flood event occur.

For further information on setting up a flood group or for links to other, established, flood groups, you should contact either Shropshire or Staffordshire County Council.

## 8. Implementation, Monitoring and Review

### 8.1. How will the Strategy be Implemented?

This Local Flood Risk Management Strategy provides 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 Action Plan.

### 8.2. 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 (if necessary) with the agreement of the Shropshire and Staffordshire Flood Risk Management Project Board. An annual statement will be produced by the Service Delivery Group reporting on how the Strategy is being implemented.

A major review of the Shropshire and Staffordshire Local Flood Risk Management Strategy is programmed for 2020. However, the 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;
- the annual monitoring identifies that the Local Flood Risk Management Strategy is not achieving its objectives, or;
- there is a change in funding availability which has a significant effect on the actions proposed

## Appendix A – Informative Maps

Reference	Title	Authority
A1	Flood Forum Areas (SC) and District Boundaries (SCC)	Shropshire & Staffordshire
A2	IDB Boundaries	Shropshire & Staffordshire
A3	Water Company Boundaries	Shropshire & Staffordshire
A4	Environment Agency Area Boundaries	Shropshire & Staffordshire
A5	RFCC Boundaries	Shropshire & Staffordshire
A6	Main Rivers, Ordinary Watercourses, IDBs	Shropshire & Staffordshire
A7	Top 10 Rural Communities at Risk	Shropshire
A8	Top 10 Urban Communities at Risk	Shropshire
A9	Top 10 Rural Communities at Risk	Staffordshire
A10	Top 10 Urban Communities at Risk	Staffordshire

## Appendix B – Legislation and Guidance

Legislation			
Reference	Date	Author	Web-Link
Flood and Water Management Act	2010	HM Government	<a href="http://www.legislation.gov.uk/ukpga/2010/29/contents">http://www.legislation.gov.uk/ukpga/2010/29/contents</a>
Land Drainage Act	1991	HM Government	<a href="http://www.legislation.gov.uk/ukpga/1991/59/contents">http://www.legislation.gov.uk/ukpga/1991/59/contents</a>
Highways Act	1980	HM Government	<a href="http://www.legislation.gov.uk/ukpga/1980/66/contents">http://www.legislation.gov.uk/ukpga/1980/66/contents</a>
Flood Risk Regulations	2009	HM Government	<a href="http://www.legislation.gov.uk/uksi/2009/3042/pdfs/uksi_20093042_en.pdf">http://www.legislation.gov.uk/uksi/2009/3042/pdfs/uksi_20093042_en.pdf</a>
Reservoirs Act	1975	HM Government	<a href="http://www.legislation.gov.uk/ukpga/1975/23">http://www.legislation.gov.uk/ukpga/1975/23</a>
The Natural Environment and Rural Communities Act	2006	HM Government	<a href="http://www.legislation.gov.uk/ukpga/2006/16/contents">http://www.legislation.gov.uk/ukpga/2006/16/contents</a>
Civil Contingencies Act	2004	HM Government	<a href="http://www.legislation.gov.uk/ukpga/2004/36/contents">http://www.legislation.gov.uk/ukpga/2004/36/contents</a>
Strategic Environmental Assessment Directive	2001	HM Government	<a href="https://www.gov.uk/government/collections/strategic-environmental-assessments">https://www.gov.uk/government/collections/strategic-environmental-assessments</a>
Water Frameworks Directive	2000	European Union	<a href="http://ec.europa.eu/environment/water/water-framework/">http://ec.europa.eu/environment/water/water-framework/</a>
Conservation of Habitats and Species Regulations	2010	HM Government	<a href="http://www.legislation.gov.uk/uksi/2010/490/contents/made">http://www.legislation.gov.uk/uksi/2010/490/contents/made</a>
Climate Change Act	2008	HM Government	<a href="http://www.legislation.gov.uk/ukpga/2008/27/contents">http://www.legislation.gov.uk/ukpga/2008/27/contents</a>
Water Act	2014	HM Government	<a href="http://www.legislation.gov.uk/ukpga/2014/21/contents/enacted">http://www.legislation.gov.uk/ukpga/2014/21/contents/enacted</a>

Other Pieces of Legislation and Guidance			
Reference	Date	Author	Web-Link
Sir Michael Pitt Report 'Learning Lessons from the 2007 Floods'	2008	Cabinet Office	<a href="http://webarchive.nationalarchives.gov.uk/20100807034701/http://archive.cabinetoffice.gov.uk/pittreview/thepittreview/final_report.html">http://webarchive.nationalarchives.gov.uk/20100807034701/http://archive.cabinetoffice.gov.uk/pittreview/thepittreview/final_report.html</a>
National Flood and Coastal Erosion Risk Management (FCERM) Strategy for England	2011	Environment Agency	<a href="http://www.environment-agency.gov.uk/research/policy/130073.aspx">http://www.environment-agency.gov.uk/research/policy/130073.aspx</a>
National Planning Policy Framework	2012	Communities and Local Government	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>
Flood Risk and Coastal Change – Planning Practice Guidance	2014	Communities and Local Government	<a href="http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/">http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/</a>
Developing Urban Blue Corridors, Scoping Study	2011	Department for Environment, Food and Rural Affairs (Defra)	<a href="http://randd.defra.gov.uk/Document.aspx?Document=FD2619_10152_FRP.pdf">http://randd.defra.gov.uk/Document.aspx?Document=FD2619_10152_FRP.pdf</a>
Drainage Strategy Framework	2013	Environment Agency and OFWAT	<a href="http://webarchive.nationalarchives.gov.uk/20140328084622/http://cdn.environment-agency.gov.uk/LIT_8210_5081b1.PDF">http://webarchive.nationalarchives.gov.uk/20140328084622/http://cdn.environment-agency.gov.uk/LIT_8210_5081b1.PDF</a>
Surface Water Management: Interim Guidance for Developers		Shropshire Council	<a href="http://www.shropshire.gov.uk/media/161818/surface-water-management-interim-guidance-for-developers.pdf">http://www.shropshire.gov.uk/media/161818/surface-water-management-interim-guidance-for-developers.pdf</a>
Natural England Sites of	2013	Natural England	<a href="http://www.naturalengland.org.uk/ourwork/c">http://www.naturalengland.org.uk/ourwork/c</a>

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Special Scientific Interest			<a href="#">onservation/designations/sssi/default.aspx</a>
Living on the Edge	2012	Environment Agency	<a href="http://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx">http://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx</a>
Private Sewers Information	2013	Severn Trent Water Website	<a href="http://www.stwater.co.uk/households/waste-water-and-sewers/responsibility-for-sewer-pipes/">http://www.stwater.co.uk/households/waste-water-and-sewers/responsibility-for-sewer-pipes/</a>
Non Statutory Technical Standards for SUDS	2015	Defra	<a href="https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards">https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards</a>

## Appendix C Flood Risk Management Functions

	Lead Local Flood Authority	District or Borough Council/ Shropshire Council	Environment Agency	Water Company	Highways Authority	Internal Drainage Board
<b>Flood Risk Management Functions</b>						
National Flood Risk Management Strategy	Act consistently for flood risk management functions and with regard to for other functions	Act consistently for flood risk management functions and with regard to for other functions	Develop, maintain, apply and monitor	Act consistently for flood risk management functions and with regard to for other functions	Act consistently for flood risk management functions and with regard to for other functions	Act consistently for flood risk management functions and with regard to for other functions
Local Flood Risk Management Strategy	Develop, maintain, apply and monitor	Act consistently for flood risk management functions and with regard to for other functions	Act consistently for flood risk management functions and with regard to for other functions	Act with regard to	Act consistently for flood risk management functions and with regard to for other functions	Act consistently for flood risk management functions and with regard to for other functions
Flood investigations	Undertake where considered necessary and appropriate	No	No	No	No	No
Register and record of structures and features	Hold those that are considered significant	No	No	No	No	No
Duty to co-operate	Yes, applies to all flood risk management functions listed	Yes, applies to all flood risk management functions listed	Yes, applies to all flood risk management functions listed	Yes, applies to all flood risk management functions listed	Yes, applies to all flood risk management functions listed	Yes, applies to all flood risk management functions listed

	Lead Local Flood Authority	District or Borough Council/ Shropshire Council	Environment Agency	Water Company	Highways Authority	Internal Drainage Board
Power to request information	Yes	No	Yes	No	No	No
Designation of third-party assets	Yes	Yes	Yes	No	No	Yes
Works powers	Surface water and groundwater	Ordinary watercourses outside IDB areas	Main River	Relating to the sewer network (not technically a flood risk management function)	Relating to highways drainage and works	Ordinary watercourses inside IDB areas
Consenting and enforcement	Ordinary watercourses outside IDB areas	No	Main River	No	No	Ordinary watercourses inside IDB areas
Scrutiny of Risk Management Authorities	Yes	Duty to be subject to scrutiny	Duty to be subject to scrutiny	Duty to be subject to scrutiny	Duty to be subject to scrutiny	Duty to be subject to scrutiny

	Lead Local Flood Authority	District or Borough Council/ Shropshire Council	Environment Agency	Water Company	Highways Authority	Internal Drainage Board
Flood Risk Regulations (2009)	In relation to largely local sources, undertake:  Preliminary Flood Risk Assessment  Identification of 'significant' Flood Risk Areas  Flood Risk and Hazard Mapping and Flood Risk Management Plans for Flood Risk Areas	No	In relation to Main Rivers, the sea and reservoirs, undertake:  Preliminary Flood Risk Assessment  Identification of 'significant' Flood Risk Areas  Flood Risk and Hazard Mapping and Flood Risk Management Plans for Flood Risk Areas	No	No	No
<b>Other functions that could affect flood risk (not intended to be exhaustive)</b>						
Development management	Statutory consultee as LLFA for surface water drainage  County Council development, highways and Minerals and Waste	Most development management functions	Currently a statutory consultee for river flooding	Not currently a statutory consultee	Highways development control	Not currently a statutory consultee

	<b>Lead Local Flood Authority</b>	<b>District or Borough Council/ Shropshire Council</b>	<b>Environment Agency</b>	<b>Water Company</b>	<b>Highways Authority</b>	<b>Internal Drainage Board</b>
Development (policy) planning	Minerals and Waste Local Plan  Support development of Local Plans	Local Plans	Support development of Local Plans	Support development of Local Plans	Support development of Local Plans	Support development of Local Plans
Emergency Planning	Category 1 responder under the Civil Contingencies Act (2004) (preparing for, responding to and helping communities to recover from flooding)	Category 1 responder under the Civil Contingencies Act (2004) (preparing for, responding to and helping communities to recover from flooding)	Category 1 responder under the Civil Contingencies Act (2004)	Category 2 responder under the Civil Contingencies Act (2004)	Category 1 responder under the Civil Contingencies Act (2004) (County Council)  Category 2 responder under the Civil Contingencies Act (2004) (Highways Agency)	Not a Category 1 or 2 responder but are involved for example in emergency response to pumping stations
Other	Climate change adaptation  Conservation  Infrastructure provision and investment	Climate change adaptation  Parks and open spaces  Street maintenance  Environmental management inc environmental health  Infrastructure provision and investment	Climate change adaptation  Environmental management  Infrastructure provision and investment	Climate change adaptation  Wastewater treatment and water quality  Infrastructure provision and investment	Climate change adaptation  Infrastructure provision and investment	Climate change adaptation  Environmental management  Infrastructure provision and investment



## Appendix D - Flood Risk Studies and Reports

Flood Risk Studies and Reports			
Reference	Date	Author	Description and Web-Link
<b>National Flood Management Plans</b>			
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. <a href="http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geho0609bqds-e-e.pdf">http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geho0609bqds-e-e.pdf</a>
<b>Catchment Flood Management Plans</b>			
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 Trent Catchment Flood Management Plan (CFMP)	2010	Environment Agency	River Severn CFMP - <a href="https://www.gov.uk/government/publications/river-severn-catchment-flood-management-plan">https://www.gov.uk/government/publications/river-severn-catchment-flood-management-plan</a> River Trent CFMP <a href="https://www.gov.uk/government/publications/river-trent-catchment-flood-management-plan">https://www.gov.uk/government/publications/river-trent-catchment-flood-management-plan</a>
<b>River Basin Management Plans</b>			
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 - <a href="https://www.gov.uk/government/publications/river-basin-management-plan-humber-district">https://www.gov.uk/government/publications/river-basin-management-plan-humber-district</a> Severn RBMP - <a href="https://www.gov.uk/government/publications/river-basin-management-plan-severn-river-basin-district">https://www.gov.uk/government/publications/river-basin-management-plan-severn-river-basin-district</a> North West RBMP - <a href="https://www.gov.uk/government/publications/north-west-district-river-basin-management-plan">https://www.gov.uk/government/publications/north-west-district-river-basin-management-plan</a>
Severn River Basin Management Plan (RBMP)	2009	Environment Agency	
North West River Basin Management Plan (RBMP)	2009	Environment Agency	
<b>Preliminary Flood Risk Assessments</b>			
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 - <a href="https://www.shropshire.gov.uk/media/161797/shropshire-council-PFRA.pdf">https://www.shropshire.gov.uk/media/161797/shropshire-council-PFRA.pdf</a> Staffordshire PFRA –
Staffordshire Preliminary Flood Risk Assessment (PFRA) (2011)		Staffordshire County Council	

Flood Risk Studies and Reports			
Reference	Date	Author	Description and Web-Link
			<a href="http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.environment-agency.gov.uk/research/planning/135526.aspx">http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.environment-agency.gov.uk/research/planning/135526.aspx</a>
Level 1 Strategic Flood Risk Assessments			
Shropshire Strategic Flood Risk Assessment (SFRA) Level 1 Update	2012	Shropshire Council	<p>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).</p> <p>Shropshire Level 1 SFRA Update: <a href="https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/planning-policy-with-regard-to-flood-risk/">https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/planning-policy-with-regard-to-flood-risk/</a></p>
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	<p>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.</p> <p><a href="http://www.staffordshire.gov.uk/environment/planning/policy/StrategicFloodRiskAssessment.aspx">http://www.staffordshire.gov.uk/environment/planning/policy/StrategicFloodRiskAssessment.aspx</a></p>
Cannock Chase DC Strategic Flood Risk Assessment (SFRA) Level 1	2008	Cannock Chase District Council	<p>A Strategic Flood Risk Assessment (SFRA) gives an overview of flood risk in a given area to guide development to areas of lower risk.</p> <p>Cannock Chase Level 1 SFRA:</p>
East Staffordshire BC Strategic Flood Risk Assessment (SFRA) Level 1	2008	East Staffordshire Borough Council	<p>Documents available from Cannock Chase District Council upon request.</p> <p>East Staffordshire Level 1 SFRA:</p>
Lichfield DC Strategic Flood Risk Assessment (SFRA) Level 1	2008	Lichfield District Council	<p><a href="http://www.eaststaffsbc.gov.uk/planning/planning-policy/evidence-base/environment-evidence-base-documents">http://www.eaststaffsbc.gov.uk/planning/planning-policy/evidence-base/environment-evidence-base-documents</a></p>
Newcastle-under-Lyme Strategic Flood Risk Assessment (SFRA) Level 1	2008	Newcastle Borough Council	<p>Lichfield Level 1 SFRA: <a href="https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Resource-centre/Evidence-base/Sustainable-communities/Strategic-flood-risk-assessment-SFRA.aspx">https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Resource-centre/Evidence-base/Sustainable-communities/Strategic-flood-risk-assessment-SFRA.aspx</a></p>
South Staffordshire DC Strategic Flood Risk Assessment (SFRA) Level 1	2008	South Staffordshire District Council	<p>Newcastle-under-Lyme Level 1 SFRA: <a href="https://www.newcastle-staffs.gov.uk/all-services/planning/planning-policy/newcastle-under-lyme-strategic-flood-risk-assessment-sfra">https://www.newcastle-staffs.gov.uk/all-services/planning/planning-policy/newcastle-under-lyme-strategic-flood-risk-assessment-sfra</a></p>
Stafford BC Strategic Flood Risk Assessment (SFRA) Level 1	2008	Stafford Borough Council	<p>South Staffordshire Level 1 SFRA: <a href="http://www.sstaffs.gov.uk/your_services/strategic_services/planning_policy_-_local_plans/the_evidence_base.aspx">http://www.sstaffs.gov.uk/your_services/strategic_services/planning_policy_-_local_plans/the_evidence_base.aspx</a></p>
Staffordshire Moorlands DC Strategic Flood Risk	2008	Staffordshire Moorlands District	

Flood Risk Studies and Reports			
Reference	Date	Author	Description and Web-Link
Assessment (SFRA) Level 1 (being revised in 2015)		Council	Stafford Level 1 SFRA: <a href="http://www.staffordbc.gov.uk/water-management-and-flooding">http://www.staffordbc.gov.uk/water-management-and-flooding</a>
Tamworth BC Strategic Flood Risk Assessment (SFRA) Level 1	2008	Tamworth Borough Council	Staffordshire Moorlands Level 1 SFRA: <a href="http://www.staffsmoorlands.gov.uk/sm/council-services/evidence-base/strategic-flood-risk-assessment">http://www.staffsmoorlands.gov.uk/sm/council-services/evidence-base/strategic-flood-risk-assessment</a>  Tamworth Level 1 SFRA: <a href="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">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</a>
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.
Rugeley Strategic Flood Risk Assessment (SFRA) Level 2	2009	Cannock Chase District Council	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.
Burton upon Trent and Uttoxeter Strategic Flood Risk Assessment (SFRA) Level 2	2008	East Staffordshire Borough Council	Shrewsbury Level 2 SFRA: <a href="https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/shrewsbury-level-2-strategic-flood-risk-assessment/">https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/shrewsbury-level-2-strategic-flood-risk-assessment/</a>  Rugeley Level 2 SFRA: Documents available from Cannock Chase District Council upon request.  Burton upon Trent and Uttoxeter Level 2 SFRA: <a href="http://www.eaststaffsbc.gov.uk/planning/planning-policy/evidence-base/environment-evidence-base-documents">http://www.eaststaffsbc.gov.uk/planning/planning-policy/evidence-base/environment-evidence-base-documents</a>
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
Church Stretton Surface Water Management Plan	2011	Shropshire Council	

Flood Risk Studies and Reports			
Reference	Date	Author	Description and Web-Link
Shifnal Surface Water Management Plan	2011	Shropshire Council	<p>modelled with recommendations provided.</p> <p>Craven Arms SWMP: <a href="https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/craven-arms-surface-water-management-plan/">https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/craven-arms-surface-water-management-plan/</a></p> <p>Church Stretton SWMP: <a href="https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/church-stretton-surface-water-management-plan/">https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/church-stretton-surface-water-management-plan/</a></p> <p>Shifnal SWMP: <a href="https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/shifnal-surface-water-management-plan/">https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/shifnal-surface-water-management-plan/</a></p>
Much Wenlock Integrated Urban Drainage Management Plan	2011	Shropshire Council	<p>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.</p> <p>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.</p> <p>Much Wenlock IUDMP: <a href="https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/much-wenlock-iudmp/">https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/much-wenlock-iudmp/</a></p>
Oswestry Surface Water Management Plan	2013	Shropshire Council	<p>Due to the nature of the watercourses that run through Oswestry, Shropshire Council is undertaking a detailed assessment to better understand the flooding mechanisms that can affect the town.</p> <p>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.</p> <p>Oswestry SWMP: <a href="https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/oswestry-surface-water-management-plan/">https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/oswestry-surface-water-management-plan/</a></p>

Flood Risk Studies and Reports			
Reference	Date	Author	Description and Web-Link
Shrewsbury Surface Water Management Plan Intermediate Report	2012	Shropshire Council	<p>Due to the severity of past flood events in Shrewsbury, from both the larger watercourses and other local sources, Shropshire Council is undertaking a detailed assessment of flood risk to allow us to better understand the various flooding mechanisms that affect the town.</p> <p>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.</p> <p>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.</p> <p>Shrewsbury SWMP Intermediate Report:  <a href="https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/shrewsbury-surface-water-management-plan/">https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/surface-water-management-plans/shrewsbury-surface-water-management-plan/</a></p>
Kidsgrove & Church Lawton Surface Water Management Plan	2013	Staffordshire County Council and Cheshire East Council	<p>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 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</p>
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	<p>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.</p> <p>SWMP Documents available from Cannock Chase District Council upon request</p> <p>Lichfield District Council link to SWMP documents  <a href="https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Resource-centre/Evidence-base/Sustainable-communities/Surface-water-management-plan.aspx">https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Resource-centre/Evidence-base/Sustainable-communities/Surface-water-management-plan.aspx</a></p> <p>South Staffordshire District Council link to SWMP documents  <a href="http://www.sstaffs.gov.uk/your_services/strategic_services/planning_policy_-_local_plans/the_evidence_base.aspx">http://www.sstaffs.gov.uk/your_services/strategic_services/planning_policy_-_local_plans/the_evidence_base.aspx</a></p> <p>Stafford Borough Council SWMP link to documents  <a href="http://www.staffordbc.gov.uk/live/Documents/Forward%20PI">http://www.staffordbc.gov.uk/live/Documents/Forward%20PI</a></p>

Flood Risk Studies and Reports			
Reference	Date	Author	Description and Web-Link
			<p><a href="#">anning/Examination%20Library%202013/D40--SOUTHERN-STAFFORDSHIRE-SURFACE-WATER-MANGEMENT-PLAN-PHASE-2.pdf</a></p> <p>Tamworth Borough Council SWMP link to documents  <a href="http://www.tamworth.gov.uk/sites/default/files/planning_docs/G-Natural%20Environment%20Climate%20Change%20A/G7%20Surface%20Water%20MP%20Phase1%20final..pdf">http://www.tamworth.gov.uk/sites/default/files/planning_docs/G-Natural Environment Climate Change A/G7 Surface Water MP Phase1 final..pdf</a></p>
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 climate change scenarios have been produced.
Lichfield Town Surface Water Management Plan – Phase 2	2011	Lichfield District Council,	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.
Penkridge Village Surface Water Management Plan – Phase 2	2011	South Staffordshire District Council,	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.
Stafford Town Surface Water Management Plan – Phase 2	2011	Stafford Borough Council	SWMP Documents available from Cannock Chase District Council upon request
Tamworth Town Surface Water Management Plan – Phase 2	2011	Tamworth Borough Council	<p><a href="#">Lichfield District Council link to SWMP documents</a>  <a href="https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Resource-centre/Evidence-base/Sustainable-communities/Surface-water-management-plan.aspx">https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Resource-centre/Evidence-base/Sustainable-communities/Surface-water-management-plan.aspx</a></p> <p>South Staffordshire District Council link to SWMP documents  <a href="http://www.sstaffs.gov.uk/your_services/strategic_services/planning_policy_-_local_plans/the_evidence_base.aspx">http://www.sstaffs.gov.uk/your_services/strategic_services/planning_policy_-_local_plans/the_evidence_base.aspx</a></p> <p><a href="http://www.staffordbc.gov.uk/live/Documents/Forward%20Planning/Examination%20Library%202013/D40--SOUTHERN-STAFFORDSHIRE-SURFACE-WATER-MANGEMENT-PLAN-PHASE-2.pdf">http://www.staffordbc.gov.uk/live/Documents/Forward%20Planning/Examination%20Library%202013/D40--SOUTHERN-STAFFORDSHIRE-SURFACE-WATER-MANGEMENT-PLAN-PHASE-2.pdf</a></p> <p>Tamworth Borough Council link to SWMP documents  <a href="http://www.tamworth.gov.uk/core-documents-local-plan#A">http://www.tamworth.gov.uk/core-documents-local-plan#A</a></p>

## Appendix E – 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. <a href="http://shropshire.gov.uk/media/141756/Shropshire-Council-Plan.pdf">http://shropshire.gov.uk/media/141756/Shropshire-Council-Plan.pdf</a>
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. <a href="https://www.staffordshire.gov.uk/yourcouncil/strategicplan/Strategic-Plan-2013--2018.pdf">https://www.staffordshire.gov.uk/yourcouncil/strategicplan/Strategic-Plan-2013--2018.pdf</a>
Multi-Agency Flood Plans (MAFPs)	-	Staffordshire Civil Contingencies Unit	Outline the multi-agency response to flood incidents, including a community-level assessment of flood risk from rivers, defence failures and extreme rainfall events
Local Flood Plans	-	Newcastle Under Lyme; Stafford; South Staffordshire, and; East Staffordshire Borough/ District Councils.	Outline local responses to flood incidents, to be used in tandem with the Multi-Agency Flood Plans.
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	2009	Shropshire Biodiversity	<a href="http://www.shropshire.gov.uk/environment/biodiversity-">http://www.shropshire.gov.uk/environment/biodiversity-</a>

Plan		Partnership for Shropshire Council	<a href="https://new.shropshire.gov.uk/environment/biodiversity-ecology-and-planning/biodiversity-action-plan/">and-ecology/shropshire-biodiversity-action-plan/</a> <a href="https://new.shropshire.gov.uk/environment/biodiversity-ecology-and-planning/biodiversity-action-plan/">https://new.shropshire.gov.uk/environment/biodiversity-ecology-and-planning/biodiversity-action-plan/</a>
Staffordshire Biodiversity Action Plan, Third Edition	2011	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. <a href="http://www.sbap.org.uk/">http://www.sbap.org.uk/</a>
Shropshire Local Flood Risk Management Strategy Supporting Documents	2013	Shropshire Council	<a href="https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/">https://www.shropshire.gov.uk/environmental-maintenance-and-enforcement/drainage-and-flooding/</a>
Staffordshire Local Flood Risk Management Strategy Supporting Documents	2013	Staffordshire County Council	<a href="http://www.staffordshire.gov.uk/environment/Flood-Risk-Management/Flood-Risk-Management-Strategy.aspx">http://www.staffordshire.gov.uk/environment/Flood-Risk-Management/Flood-Risk-Management-Strategy.aspx</a>
<b>Water Cycle Studies</b>			
Shropshire Outline Water Cycle Study	2010	Halcrow	<a href="http://www.shropshire.gov.uk/media/161806/shropshire-outline-water-cycle-study-report.pdf">http://www.shropshire.gov.uk/media/161806/shropshire-outline-water-cycle-study-report.pdf</a>
Southern Staffordshire LPA's Water Cycle Study	2011	Royal Haskoning	<a href="http://www.sstaffs.gov.uk/PDF/WCS_Final.pdf">http://www.sstaffs.gov.uk/PDF/WCS_Final.pdf</a>

## Appendix F – Glossary

Term	Definition
Attenuation	In the context of this report - the storing of water to reduce its peak discharge.
Breach	An accidental opening/ failure – 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)
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.
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 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

Term	Definition
	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.
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.
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" 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

Term	Definition
	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.
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 better water environment, focussing on ecology.