

		greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Floodplain		Any area of land over which water flows or is stored during a flood event or would flow but for the presence of defences
Fluvial Flooding		Flooding caused by high flows in rivers or streams exceeding the capacity of the normal river channel.
Formal Defence		A flood risk asset which is maintained by any party to fulfil a flood defence function in agreement with the Environment Agency.
Freeboard		A 'safety margin' to account for residual uncertainties in water level prediction and/or structural performance, expressed in mm
Functional Floodplain		An area of land where water has to flow or be stored in times of flood.
Greenfield		Greenfield (sites or land) is a term in common usage that may be defined as 'development sites or land that has not previously been developed'.
Historic Flood Map	HFM	National map produced by the Environment Agency showing historical flood extents.
Informal Defence		An asset which was not designed for flood defence and is not maintained for this purpose, but forms some flood defence function.
ISIS		One-dimensional river modelling software developed by Halcrow. Capable of steady and unsteady state simulation.
Lead Local Flood Authority	LLFA	Body responsible for managing flood risk from localised sources across the County and for developing a strategy for local flood risk management that encompasses all sources of flooding (Gloucestershire County Council)
LIDAR		Light Detection and Ranging. An airborne laser mapping technique producing precise elevation data.
Local Development Framework	LDF	This term has been replaced by the term 'Local Plan'. It was used to describe a portfolio of Local Development Documents that provide a framework for delivering the spatial planning strategy for the area.
Local Plan	LP	The plan for the future development of the local area, drawn up by the local planning authority in consultation with the community. In law this is described as the development plan documents adopted under the Planning and Compulsory Purchase Act 2004. Current core strategies or other planning policies, which under the regulations would be considered to be development plan documents, form part of the Local Plan. The term includes old policies which have been saved under the 2004 Act.
Local Planning Authority	LPA	
Main River		All watercourses shown as such on the statutory main river maps held by the Environment Agency and the Department of Environment, Food and Rural Affairs, and can include any structure or appliance for controlling or regulating the flow of water into, in or out of the channel. The Environment Agency has permissive powers to carry out works of maintenance and improvement on these rivers.
Measure		A deliverable solution that will assist in the effective management (reduction) of risk to property and life as a result of flooding, e.g. flood storage, raised defence, effective development control and preparedness, and flood warning
Mitigation		The management (reduction) of flood risk
National Flood and Coastal Defence Database	NFCDD	A database, maintained by the Environment Agency, of fluvial and coastal assets. Flood defence assets are included, as are other assets with other functions such as footbridges on towpaths.
National Planning Policy Framework	NPPF	The NPPF sets out the Government's planning policies for England and how these are expected to be applied at a local level.
OfWAT		The Water Services Regulation Authority. The economic regulator of the Water Industry in England and Wales.
Ordinary Watercourses		All watercourses other than Main Rivers. The Lead Local Flood Authority is the designated body responsible for flood risk management.
Probability	1%	A measure of the chance that an event will occur. The probability of an event is typically defined as the relative frequency of occurrence of that event, out of all possible events. Probability can be expressed as a fraction, % or a decimal. For example, the probability of obtaining a six with a shake of a fair dice is 1/6, 16% or 0.166. Probability is often expressed with reference to a time period, for example, annual exceedance probability
Property Level Protection	PLP	Schemes that protect property from flooding at the property scale, for example installing flood barriers on doors, air brick covers etc.
Rapid Inundation Zone		An area immediately behind defences which, should they fail, will generate a combination of high velocities and flood depths that would cause a risk to life.



Residual Risk		The risk that inherently remains after implementation of a mitigation measure (option)
Return Period		The expected (mean) time (usually in years) between the exceedance of a particular extreme threshold. Return period is traditionally used to express the frequency of occurrence of an event, although it is often misunderstood as being a probability of occurrence.
Risk		The threat to property and life as a result of flooding, expressed as a function of probability (that an event will occur) and consequence (as a result of the event occurring)
Sewage Treatment Works	STW	
Sewer		A pipeline, usually underground, designed to carry foul sewage and/or surface water from buildings and paved areas associated with buildings in more than one curtilage (plot of land).
Site Specific Allocations	SSAs	Allocation of sites for specific or mixed-use development.
Standard of Protection	SoP	The return period to which properties are protected against flooding
Strategic Flood Risk Assessment	SFRA	The assessment of flood risk on a catchment-wide basis for proposed development in a District
Strategic Housing Land Availability Assessment	SHLAA	A technical planning document that helps to identify a supply of potentially suitable sites for housing
Strategic Employment Land Availability Assessment	SELAA	A technical planning document that helps to identify a supply of potentially suitable sites for employment
Supplementary Planning Documents	SPD	Supplementary Planning Documents or SPD support DPDs in that they may cover a range of issues, both thematic and site specific. Examples of SPD may be design guidance or development briefs. SPD may expand policy or provide further detail to policies in a DPD. They will not be subject to independent examination.
Surface Water Management Plan	SWMP	Projects to investigate local flooding issues such as flooding from sewers, drains, groundwater, and runoff from land, small watercourses and ditches that occurs as a result of heavy rainfall. Carried out through a partnership of all relevant stakeholders including local authorities, internal drainage boards, sewerage undertakers and the Environment Agency.
Sustainability Appraisal	SA	A Sustainability Appraisal is a systematic process to predict and assess the economic, environmental and social effects likely to arise from DPDs and SPDs, enabling each document to be tested and refined, ensuring that it contributes towards sustainable development.
Sustainable (Urban) Drainage System	SuDS	Current 'best practice' for new urban development that seeks to minimise the impact upon the localised drainage regime, e.g. through the use of pervious areas within a development to reduce the quantity of runoff from the site
Uncertainty		A reflection of the (lack of) accuracy or confidence that is considered attributable to a predicted water level or flood extent
updated Flood Maps for Surface Water	uFMfSW	In 2013, the Environment Agency produced the updated Flood Map for Surface Water (uFMfSW). The aim of the uFMfSW is to provide the best single source of information on surface water flooding for England and Wales that includes local information and knowledge. To meet the requirements of the Flood Risk Regulations, the uFMfSW assesses a flooding scenario as a result of rainfall with the following chance of occurring in any given year: 1 in 30 1 in 100 1 in 1000
Water Framework Directive	WFD	European Union directive designed to improve and integrate the way water bodies are managed throughout Europe

1 Introduction

1.1 Background

The existing SFRA for Cotswold District Council (CDC) was published in 2008 and is a "Level 1 SFRA". The Level 1 SFRA was prepared as a component of a wider assessment for the County of Gloucestershire. JBA was commissioned to review and amend the Level 1 SFRA and to increase the scope of the SFRA to provide further flood risk evidence to support the preparation of the Local Plan (Development Plan Document). This document replaces the Level 1 SFRA and includes, as per the Environment Agency's recommendation, further analysis of the data within the Level 1 assessment and has been supplemented where necessary with more detailed investigations.

The increased scope SFRA also includes updates with reference to the following key changes that have occurred since the Level 1 SFRA was completed (2008):

- Changes to legislation, both relating to flood risk and planning policy, including the Flood and Water Management Act (2010), the National Planning Policy Framework (NPPF) (2012), and the Localism Act (2011); and new powers and responsibilities bestowed on Gloucestershire County Council as the Lead Local Flood Authority under the Flood and Water Management Act (2010) and their dependencies therefore with the District Council's local development and forward planning role.
- Changes to technical guidance, for example the Consultation on SuDS Regulations and Standards (2011), National SuDS Guidance (Defra, pending), and recently updated NPPF Planning Practice Guidance (March 2014) replacing the PPS25 Technical Guidance.
- Progression of the District Local Plan, e.g. consultation on the second issues and options Paper (December 2010) and Preferred Development Strategy Consultation Paper (May 2013).
- Potentially improved knowledge of flood risk through modelling studies e.g. of the upper River Thames, River Churn defence assessments, the availability of the updated Flood Map for Surface Water; and flood events that have occurred since 2008.

The purpose of this SFRA is to provide detail on flood risk for 19 settlements, in order to carry out the sequential risk based approach on a site basis and provide an evidence base for the Exception Test. This SFRA has been completed to aid the preparation of the emerging Local Plan documents and exercises (e.g. Development Strategy Paper, Strategic Housing and Land Availability Assessment (SHLAA) and Strategic Employment and Land Availability Assessment (SELAA)).

1.2 Objectives

The SFRA is a planning tool that will assist the councils in their selection and development of sustainable site allocations away from vulnerable flood risk areas. The assessment focuses on the current potential housing and economic development sites as identified by the SHLAA and SELAA, but also contains mapping and guidance for assessing additional/windfall sites for development in the future. The SFRA will assist the council to make the spatial planning decisions required to inform the forthcoming Local Plan.

The National Planning Policy Framework (NPPF) reinforces the responsibility of Local Planning Authorities (LPAs) to ensure that flood risk is managed effectively and sustainably as an integral part of the planning process, balancing socio-economic needs, existing framework of landscape and infrastructure, and flood risk. To this end, the key objectives of the SFRA are:

- To investigate and identify the extent and severity of flood risk from all sources to the area at present and in the future.
- To present data on flood risk for potential new developments, as an evidence base for use in the Local Plan.
- To provide a planning tool with a straightforward 'risk-based' approach to development control within the LPAs, providing clarity to both planners and developers.
- To take an interactive approach with stakeholders to present technical data in a clear and useable manner.

1.3 Study area

The study area comprises the whole of the administrative area of Cotswold District Council. The study area is illustrated in Figure 1-1.

Cotswolds is a large rural district covering 450 square miles. The largest town is Cirencester and is home to 25% of the population of the District. The District is rural and sparsely populated, with numerous villages and hamlets. The landscape is exceptionally distinctive. The Cotswolds Area of Outstanding Natural Beauty (AONB) is a national designation which affords the highest level of landscape protection, and covers nearly three quarters of the District. In addition there are locally designated Special Landscape Areas and the Cotswold Water Park (internationally important for its nature conservation). Coupled with this natural beauty the District has an abundance of built heritage and archaeology, creating a unique 'Cotswold Character'. The District has a large number of listed buildings and a significant number of conservation areas. A number of parks are listed on the English Heritage list of historic parklands. The District also has 266 scheduled ancient monuments. The challenge for the Council is to ensure growth is managed in a sustainable way, whilst protecting the areas natural and built environment.

The existing adopted Local Plan (2006) applies a strategy of restraint with a presumption against new build open market housing beyond Cirencester and the nine most sustainable settlements in the District. The area has an aging and overall increasing population, and high property values. A suitable level of growth is needed to strengthen employment functions at key settlements and support the provision of workspace in rural locations. Due to the District's environmental and heritage constraints it can be difficult to find sites for future development; and adds pressure to CDC to provide viable locations for development.

1.3.1 Geology

The geology of the Cotswold District is complex and is dominated by limestones of the Jurassic age. The limestones within the Great Oolite Group and Inferior Oolite Group cover the majority of the District towards the north-western and central extents and have a significant influence on the topography, drainage and soils of the Cotswolds. Geology information can be viewed on the British Geological Society website (<http://mapapps2.bgs.ac.uk/geoindex/home.html>).

Much of the upland areas of the Cotswolds comprises of the Great Oolite Group and demonstrates a greater variety in formations than the Inferior Oolite Group. An area of Lias Group mudstones dominates to the north east. Towards the south and east of the District in the Upper Thames Valley, the Jurassic limestones of the Great Oolite Group are succeeded by a succession of mudstones including the Oxford clay. These form the broad valleys around the main rivers and streams which flow eastwards.

Sand and gravel drift deposits are mainly associated with the tributaries of the River Thames including the Rivers Churn, Coln, Leach, Windrush and Evenlode and within the Cotswold Water Park towards the south. Here, superficial deposits are thick and extensive. Further drift deposits can be found towards the north east of the District, overlying the Lias Group mudstones.

Away from the escarpment the drainage is almost entirely south eastwards via the tributaries of the Thames; namely the Rivers Churn, Coln, Leach, Windrush and Evenlode. Where they join the Thames, superficial deposits are thick and extensive. The valleys of the Churn, Coln, Leach and their tributaries tend to be narrow and meandering because they are incised into the limestones of the Inferior Oolite and Great Oolite. They contain narrow tracts of superficial deposits. In contrast, the Windrush and the Evenlode lie in broader shallow valleys cut into soft Lias mudstones, and may be flanked by more substantial expanses of terrace deposits and alluvium. In addition, in the case of the Evenlode, which drains the Vale of Moreton, there are broad tracts of till and associated sand and gravel deposits left behind by an ice sheet during the last Ice Age.

There are aquifers within the District (Great Oolite) that are confined by overlying geology (Oxford Clay). Groundwater levels within these confined aquifers may be artesian (above ground level) however the groundwater is prevented from reaching the surface by the overlying impermeable geology.

1.3.2 Topography

The topography of the District is influenced by the interbedded nature of the limestones and clays of the Inferior and Great Oolite Group. Towards the western extent of the District the



landscape is characterised by a steep scarp face with incised valleys marking the edge of the Cotswold Hills. Here, elevations are in excess of 300m AOD with the Inferior Oolite rocks forming the main upland area. To the east and south west of the escarpment, the topography of the District becomes rather more undulating, reflecting the regional dip of the Inferior and Great Oolite beds. Towards the south and south eastern extents of the District, valleys of those such as the Evenlode, Windrush and Coln are typically much broader and shallower cut into the underlying softer Lias mudstones. Here, elevations ranging from approximately 165m AOD in the headwaters to 82m AOD as the watercourses approach the flatter, wider floodplains of the River Thames.

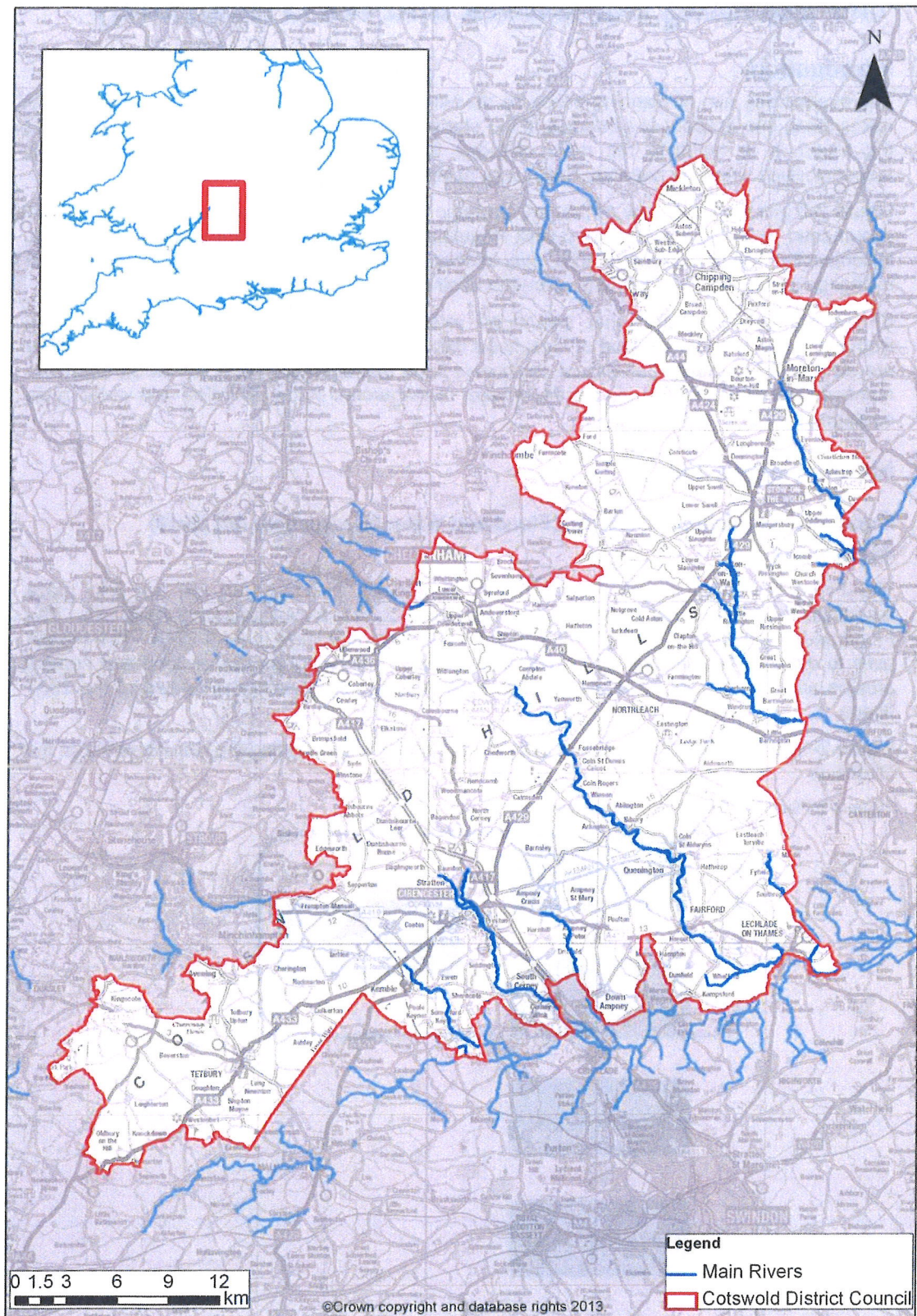


Figure 1-1: Study Area

2 The planning framework and flood risk policy

2.1 Introduction

The overarching aim of planning policy on development and flood risk is to ensure that flood risk is taken into account at all stages of the planning process. The purpose of this section of the report is to highlight the main changes to the planning framework and flood risk responsibilities since the previous SFRA was published in 2009.

Figure 2-2 gives an overview of the key strategic planning links for flood risk and associated documents. It shows how the Flood Risk Regulations and Flood and Water Management Act, in conjunction with the Localism Act's "duty to cooperate", introduce a wider requirement for the exchange of information and the preparation of strategies and management plans.

SFRAs contain information that should be referred to in responding to the Flood Risk Regulations and the formulation of local flood risk management strategies and plans. SFRAs are also linked to the preparation of catchment flood management plans (CFMPs), shoreline management plans (SMPs), and surface water management plans (SWMPs) and water cycle strategies.

2.2 National legislation

2.2.1 Flood Risk Regulations (2009) and Flood and Water Management Act (2010)

Background

The Flood Risk Regulations transpose the EC Floods Directive into UK law and place responsibility upon all Lead Local Flood Authorities (LLFAs) to manage local flood risk. The Flood and Water Management Act (FWMA) received Royal Assent in April 2010. The FWMA aims to create a simpler and more effective means of managing the risk of flood and coastal erosion and implements Sir Michael Pitt's recommendations following his review of the 2007 floods.

Figure 2-1 sets out the requirements and timescales for implementing the requirements of the Directive.

Figure 2-1: Flood Risk Regulation Requirements

