

Preston City Council, South Ribble Borough Council & Chorley
Borough Council

Central Lancashire

Strategic Flood Risk Assessment

Level 1

Executive Summary

December 2007



Prepared for:



Glossary

Term	Definition
Aquifer	A source of groundwater comprising water-bearing rock, sand or gravel capable of yielding significant quantities of water.
Catchment Flood Management Plan	A high-level planning strategy through which the Environment Agency works with their key decision makers within a river catchment to identify and agree policies to secure the long-term sustainable management of flood risk.
Climate Change	Both natural and human actions causing long term variations in global temperature and weather patterns.
Culvert	A channel or pipe that carries water below the level of the ground.
DG5	Data collected by Water Companies regarding flooding from sewers. OFWAT use this data as a performance indicator.
Exception Test	Required where the vulnerability of a development type is not entirely compatible with the level of flood risk at a particular site, i.e., following application of the Sequential Test. In order to qualify for development, it must be demonstrated that the development passes all elements of the Exception Test.
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 storage	A temporary area that stores excess runoff or river flow often ponds or reservoirs.
Flood Outline	The extent of the area that is determined to be at a potential risk of flooding during a flood event of a given magnitude.
Fluvial flooding	Flooding by a river or a watercourse.
Fluvial Reaches	A stretch of river that is not influenced by the tide.
Functional Floodplain	Land where water has to flow or be stored in times of flood. Specifically, this land would flood with an annual probability of 1 in 20 (5 %) or greater in any year and is designed to flood in an extreme (0.1 %) event. The functional floodplain includes water conveyance routes and flood storage areas. Developed areas are not generally considered to comprise functional floodplain.
GIS Layers	Data that is presented in a spatial manner. Normally, each dataset constitutes one GIS layer. A number of GIS layers can be presented on a single map.
Groundwater	Water that is in the ground, this is usually referring to water in the saturated zone below the water table.
Indicative floodplain map	A map that delineates the areas that have been predicted to be at risk of being flooded during an event of specified probability.
Internal Drainage Board	Independent bodies with responsibility of ordinary watercourses within a specified District.
Inundation	Flooding.
Isohyet	A line drawn through geographical points recording equal amounts of precipitation during a specific.

LiDAR	An airbourne mapping technique that creates topographic data by using a laser device to measure the distance between the aircraft and the ground below.
Local Development Framework (LDF)	The core of the updated planning system (introduced by the Planning and Compulsory Purchase Act 2004). The LDF comprises the Local Development Documents, including the Development Plan Documents that expand on policies and provide greater detail. The development plan includes a core strategy, site allocations and a proposals map.
Local Planning Authority	Body that is responsible for controlling planning and development through the planning system.
Mitigation measure	An element of development design that may be used to manage flood risk or avoid an increase in flood risk elsewhere.
Pluvial Flooding	Flooding that results from rainfall generated overland flow, before runoff enters any watercourse or sewer. Also referred to as surface water flooding.
Risk	The probability or likelihood of an event occurring.
SAR	A high-resolution microwave imaging system.
Sequential Test	A risk-based approach to assess flood risk, which gives priority in ascending order of flood risk, i.e. lowest risk first.
Sewer flooding	Flooding caused by a blockage or overflowing in a sewer or urban drainage system.
Stakeholder	A person or organisation that has an interest in, or could be affected by the decisions made within a site.
Sustainability Appraisal	A process used to identify whether policies, strategies or plans promote sustainable development and also for improving policies. It is a requirement for Regional Spatial Strategies under the <i>Planning and Compulsory Purchase Act 2004</i> .
Sustainable Drainage Systems	Methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Tidal Outline	The extent of the area that is determined to be at a potential risk of flooding during a tidal flood event of a given magnitude.
Tidal Reach	A stretch of river that is influenced by tidal cycles.
1 in 100 year event	An event that has a probability of occurring once every 100 years. Also expressed as an event, which has a 1% probability of occurring in any one year.
1 in 100 year design standard	Flood defence that is designed for an event, which has an annual probability of 1%. In events more severe than this the defence would be expected to fail or to allow flooding.

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Local Planning Authorities are required to produce Local Development Frameworks (LDFs), which are a portfolio of Local Development Documents (LDDs) that collectively deliver the spatial planning strategy for the authority area. The LDDs undergo a Sustainability Appraisal (SA) which assists Planning Authorities in ensuring their policies fulfil the principles of sustainability. Strategic Flood Risk Assessments (SFRAs) are one of the documents to be used as the evidence base for planning decisions and are a component of the SA process. Therefore, SFRAs should be used in the review or production of LDDs.

Planning Policy Statement 25: Development and Flood Risk (PPS25; Communities and Local Government, December 2006) and its Practice Guide Companion (February 2007) recommends that SFRAs are completed in two consecutive stages. The Level 1 SFRA enables application of the Sequential Test, and the Level 2 SFRA increases the scope of an SFRA for development sites where the Exception Test is required. The Sequential Test is a simple decision-making tool designed to ensure that sites at little or no risk of flooding are developed in preference to areas at higher risk. Where it is not possible, due to wider sustainable development issues, to locate the development in a low flood risk area, the Exception Test must be applied. This Executive Summary and the accompanying Level 1 SFRA report constitute Level 1 of the Central Lancashire SFRA, which has been commissioned by Preston City, South Ribble Borough and Chorley Borough Councils.

Flood related planning policy at national, regional and district levels was collated and tabulated. This serves to highlight the fact that flood risk is taken into account at every hierarchical level within the planning process and also helps to demonstrate how the SFRA will feed into the three Council's LDF process. The Councils have not yet identified specific strategic development locations and the SFRA is designed to inform this decision-making process.

The main source of flood risk policy and strategy within the sub-region are Catchment Flood Management Plans (CFMPs). The three relevant CFMPs shaping flood risk management, guidance and strategy covering the Central Lancashire study area are the River Douglas CFMP, the River Ribble CFMP and the River Wyre CFMP (scoping stage). As well as highlighting the flood risks within a catchment, CFMPs also outline policies for dealing with flood risk management at various locations within a catchment.

PPS25 requires that, as part of any SFRA, all sources of flooding are identified. In order to assess the risk of flooding, the Environment Agency (EA) has provided data and has been closely involved with the Central Lancashire SFRA. In addition, other key stakeholders that have been consulted and that have provided data include United Utilities, Lancashire County Council, British Waterways and the Highways Agency. Parish Councils have also been consulted. From historical flood records, and using other sources of flood risk information, six main sources of flood risk were identified: fluvial flooding, tidal flooding, sewer flooding, surface water flooding, groundwater flooding and flooding from artificial sources.

The catchments of the River Wyre, River Ribble and River Douglas define the main hydrological influences of the study area (from north to south respectively). Parts of these catchments in the west of the study area are tidally influenced.

In order to present the best available flood information, SFRA Flood Zones were derived using a variety of existing sources of data. Where detailed numerical modelling of rivers has been undertaken and the flood outlines mapped, these have been used in preference to broad-scale modelled flood outlines. The result is a single map for each flood zone using a variety of data. Information regarding the relative confidence and source of the data accompanies the electronic versions of this data. All SFRA Flood Zones are based on information provided by the EA and prescribed methodologies in PPS25. All SFRA Flood

Zones are based on the best available information provided by the EA. The methodology for deriving each of the SFRA Flood Zones is described below.

Flood Zone 1 refers to all areas that are not considered to be at risk of fluvial or tidal flooding. Flood Zone 1 consists of everything that falls outside of areas shown to be within Flood Zones 2 and 3. Whilst fluvial and tidal flooding is not a concern in these areas, the risk of flooding from other sources, such as surface water, groundwater, sewers and artificial sources may still be an issue.

Flood Zone 2 is the extreme flood event outline. This is the flood outline for the 1 in 1000 year flood event and is entirely based upon coarse modelling provided by the EA as none of the hydraulic models used for this study modelled the 1000 year scenario.

Flood Zone 3a is the combined outline for tidal and fluvial flooding and is the part of Flood Zone 3 that is outside Flood Zone 3b (the functional floodplain). The 1 in 200 year tidal flood event outline and the 1 in 100 year fluvial event outline have been merged to create one outline. For tidally influenced reaches, the 200 year tide levels and topographic data have been used to create an outline and this has substituted the 100 year fluvial flood outline in tidally influenced reaches.

Flood Zone 3b is defined as the functional floodplain (FFP). FFP only applies to undeveloped areas. The 1 in 20 or 1 in 25 year flood outlines have been used to define the FFP where available. For reaches where this is not available, the 100 year flood outline (i.e., Flood Zone 3a) has been used as a proxy until such a time when more detailed information is available (i.e., an EA modelling study or hydraulic modelling undertaken for a site-specific flood risk assessment). This is not to say that the entire area used as a proxy is FFP, moreover that the boundary of the FFP falls somewhere within that area.

Flood Zone 3 plus an allowance for climate change is calculated for fluvial and tidal reaches. For fluvial reaches, this Flood Zone is calculated by adding a net increase of 20 % over and above peak flows to the 100 year flood event. Where modelled information is not available, the Flood Zone 2 outline has been used as a proxy until such a time when more detailed information is available (i.e., an EA modelling study or hydraulic modelling undertaken for a site-specific flood risk assessment). This is not to say that the entire area used as a proxy is Flood Zone 3 plus an allowance for climate change, moreover that the boundary of Flood Zone 3 plus an allowance for climate change falls somewhere within that area. For tidal reaches, the effects of climate change that are prescribed in PPS25 have been added on to the 200 year tide levels and an outline created using topographic data.

In general, the fluvial and tidal flood risk across the study area is low. The SFRA Flood Zones show that there are significant areas in the west of the study area that are potentially at risk of flooding, which is due to the flat, wide floodplains in the west of these areas that are tidally affected. However, these areas are largely rural and the populations potentially at risk are therefore minimal. Locations within the study area that are particularly affected by flooding include Croston, Penwortham, Walton-le-Dale and southwest Preston. In addition, there are numerous other settlements in the study area that have smaller areas at risk of fluvial and / or tidal flooding.

Sewer flooding was identified using historical records from United Utilities DG5 database (June 2007) detailing the total number of flood events that affected both internal and external property in a six month period. The number of recorded sewer flooding events varies across the region and due to the rural nature of the study area and the format in which data was provided, it is difficult to pin-point specific areas. However, Grimsargh, Walton-le-Dale and Euxton and their surrounding areas were shown to have been particularly affected by sewer flooding.

Little or no records of groundwater flooding were found during the course of the study. However, there are major aquifers with more permeable superficial deposits overlying them

within the study area. Following periods of sustained rainfall, there may be a potential for groundwater flooding to affect basements and underground car parking facilities in certain areas, particularly Preston and also in areas immediately south of Preston including parts of Walton-le-Dale, Penwortham and Bamber Bridge.

The industrial heritage of Lancashire means that there are numerous artificial (manmade) waterways and reservoirs within or contributing to the Central Lancashire study area. British Waterways and private owners manage the canal network. Whilst there are few recorded incidents of flooding from the canal network, the risk of flooding still remains. Similarly, there are numerous reservoirs falling under the Reservoirs Act within the study area with additional reservoirs upstream of the region that may pose a risk. Again, there are few recorded incidents of flooding as a result of reservoirs, though the residual risk of breaching and overtopping remains, along with the risk associated with emergency discharges.

Due to the history of flooding in the study area, there are numerous structures and embankments (either purpose built or natural) that contribute to flood risk management. The EA maintain and keep records of many of the defences in the sub-region, though it should be noted that there are a great deal more “private” or “non-maintained” structures and embankments that provide a level of protection to areas. The standard of protection for defences within the study area varies markedly. As the CFMPs have all stated, locating and providing strategic flood storage in upper catchment areas can potentially provide protection to areas much further downstream. At present, there is one formally maintained flood storage area in Central Lancashire, which is located adjacent to Savick Brook in Fulwood, upstream of where Savick Brook passes beneath the A6 (Garstang Road).

A number of studies in addition to the CFMPs have identified an increased level of flood risk to the sub-region over the next 25 to 100 years as a result of climate change. Firstly, as a result of wetter and warmer winters, an increase in large fluvial flood events is likely to affect the larger rivers and watercourses in the sub-region. Secondly, extreme rainfall events are likely to become more frequent leading to a greater storm intensity and duration. This is likely to lead to a great deal more runoff causing surface water flooding and overwhelming of the urban sewer networks in particular.

To attempt to counteract this increase in runoff in local areas, the use of Sustainable Drainage Systems (SuDS) is becoming more important. In addition to the more usual attenuation and infiltration systems, providing more ‘green’ spaces within the urban environment can also help to reduce runoff and also increase wildlife habitat. These areas can be sometimes be most effective when placed alongside development in water corridors (e.g. along canals). Groundwater Vulnerability (GWV) data was collected for this study. GWV refers to the potential for contamination of groundwater, rather than groundwater flooding, and can be used to identify areas suitable for particular SuDS techniques.

Using information and analysis gathered during the planning policy and flood risk reviews, a strategic overview of the flood risk was carried out to identify potential conflicts between development pressures and flood risk now and in the future.

The draft Regional Spatial Strategy (RSS) outlines the housing provision targets for the Central Lancashire Authorities and involves an increase (between 2003 and 2021) of 9,120 for Preston, 8,600 for South Ribble and 6,500 for Chorley. The draft RSS indicates that at least 80 % of housing is located on previously developed (brownfield) land. Following the Examination in Public of the draft RSS, the panel recommended alterations to these figures. While the maximum target for Preston remains at 9,120, those for Chorley and South Ribble are both altered to 7,500 each. In addition, the brownfield allocation is recommended to be reduced to 70%. The Secretary of State’s proposed changes to the draft RSS are still awaited. In addition the three authorities have recently submitted an expression of interest jointly with Blackpool Council for a Growth Point, which will require an increase in housing provision of at least 20% above draft RSS figures.

A focused settlement assessment was undertaken by categorising settlements in the study area according to planning policy. These categories are: Urban Settlements, Potential Major Development Sites and Rural Settlements. A series of maps were produced for each of the Rural and Urban Settlements and Potential Major Development Sites that presented all of the available flood information. The maps, statistics and main issues were presented on summary sheets for each of the settlements.

The Potential Major Development Sites that were investigated at this stage were Riversway (Preston), Buckshaw Village (South Ribble / Chorley) and Goosnargh / Whittingham (Preston). Of these Potential Major Development Sites, Riversway is shown to be at a significant risk of flooding from the tidally influenced reach of the River Ribble. A site specific FRA has been undertaken for the proposed development and this was reviewed.

The purpose of the focused settlement assessment is to identify where future strategic level development sites could potentially be located. In addition, the maps can be used to identify the requirements for, and also inform, site-specific FRAs for future development. Guidance on undertaking site-specific FRAs is provided in the report.