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## Contract

This report describes work commissioned by Rachel Jones, on behalf of St Helens Council, by a letter dated 4 April 2013. St Helens Council's representative for the contract was Bob Massingham, Environment Team Leader. Mike Williamson of JBA Consulting carried out this work.

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## Purpose

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JBA Consulting has no liability regarding the use of this report except to St Helens Council.

## Acknowledgements

JBA would like to thank all Council, Environment Agency and United Utilities' staff for their time and commitment to providing data and discussing the issues identified during the course of this study.

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## Executive Summary

As set out in the National Planning Policy Framework (NPPF) and its supporting Technical Guidance document, St Helens Council as a Local Planning Authority are required to undertake a Strategic Flood Risk Assessment (SFRA) to support the preparation of their Local Plan. This SFRA updates the previous SFRA completed in 2009.

The SFRA forms an essential reference tool providing the building blocks for future strategic planning. St Helens Council should use the evidence provided in this SFRA to inform their knowledge of flooding, refine information on the Flood Map and determine the variations in flood risk from all sources of flooding. The SFRA should form the basis for preparing appropriate policies for flood risk management within the area.

The primary objective of the SFRA is to enable St Helens Council to apply the Sequential Test and, if required, the Exception Test in the development allocation and development management process set out in the NPPF.

The NPPF requires that all development is steered to areas of lowest flood risk, where possible. Development is only permissible in areas at risk of flooding in exceptional circumstances where it can be demonstrated that there are no reasonable available sites in areas of lower risk and that the benefits of that development outweigh the risks from flooding. Such development is required to include mitigation and management measures to minimise risk to life and property should flooding occur.

The previous SFRA was prepared under Planning Policy Statement 25 (PPS25). However, since 2009 new legislation, policies, strategies and flood risk evidence have emerged. In April 2013, St Helens Council commissioned JBA Consulting to update the 2009 SFRA and to include a Level 2 SFRA in one document in accordance with the Government's development planning guidance.

The Level 1 SFRA collates all flood risk evidence into one document. The core output of this study is a series of maps and GIS datasets, which include a narrative of flood risk issues across the Borough.

The Level 2 element includes a flood risk review focusing on proposed development sites at significant risk. The flood risk review provides a detailed but high level overview of all sources of flood risk for each proposed development site. Using this analysis, development recommendations have been provided on site-specific FRAs and appropriate flood risk management within that community.

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## Abbreviations

AIMS	Asset Information Management System
AStSWF	Areas Susceptible to Surface Water Flooding
CDA	Critical Drainage Area
SHC	St Helens Council
CFMP	Catchment Flood Management Plan
DCLG	Department of Communities and Local Government
FMfSW	Flood Map for Surface Water
FRA	Flood Risk Assessment
FWMA	Flood and Water Management Act
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
NFCDD	National Flood and Coastal Defence Database
NPPF	National Planning Policy Framework
PFRA	Preliminary Flood Risk Assessment
PPM	Planned Preventative Maintenance
PPS	Planning Policy Statement
RBMP	River Basin Management Plan
RFRA	Regional Flood Risk Appraisal
RMA	Risk Management Authority
SA	Sustainability Appraisal
SAB	SuDS Approving Body
SFRA	Strategic Flood Risk Assessment
SIRS	Sewerage Incident Register System
SWMP	Surface Water Management Plan
uFMfSW	updated Flood Map for Surface Water
WFD	Water Framework Directive
WIRS	Wastewater Incident Register System

# 1 Introduction

## 1.1 Commission

St Helens Council (SHC) commissioned JBA Consulting in April 2013 to undertake an update of the existing Level 1 Strategic Flood Risk Assessment (SFRA) whilst also completing a Level 2 SFRA for the Borough, in accordance with the Government's development planning guidance. The St Helens Level 2 SFRA provides a review of flood risk and development planning issues throughout St Helens Borough and is required to inform the preparation of the Allocations and Sustainable Development Plan Documents and the Bold Forest Park Area Action Plan.

## 1.2 St Helens SFRA

As a Lead Local Flood Authority (LLFA) and Local Planning Authority (LPA), SHC requires an SFRA to develop the evidence base for their Local Plan and to inform the Sustainability Appraisal (SA). The aims and objectives of the SFRA are:

- To form part of the evidence base and inform the Sustainability Appraisal (Incorporating the Strategic Environmental Assessment) for the St Helens Local Plan.
- To inform the preparation of the Allocations and Sustainable Development Plan Documents and the Bold Forest Park Area Action Plan.
- To assist in the preparation of, and to make recommendations of appropriate policies for the management of flood risk within the St Helens Local Plan.
- To understand flood risk from all sources and to investigate and identify the extent and severity of flood risk throughout the St Helens Borough. This assessment will enable the Council to steer development away from those areas where flood risk is considered greatest, ensuring that areas allocated for development can be developed in a safe, cost effective and sustainable manner.
- To enable the Council to meet its obligations under the National Planning Policy Framework (NPPF) and technical guidance.
- To assess the suitability of potential development site allocations across the Borough including their direct and indirect impacts on flood risk.
- To provide reference and a policy development user guide to advise and inform wider stakeholders, including the public, private and commercial developers in order for them to understand their obligations under the latest planning guidance.
- To supplement current policy guidelines and to provide a straightforward risk based approach to development management in the area. This is aimed at Councillors (including Parish Councils), the public and developers.
- To provide a reference document to which all parties involved in development planning and flood risk can reliably turn to for initial advice and guidance.
- To develop a report that forms the basis of an informed development management process that also provides guidance on the potential risk of flooding associated with future planning applications and the basis for site specific Flood Risk Assessments (FRAs) where necessary.
- To identify land required for current and future flood management that should be safeguarded as set out in the NPPF.

### 1.2.1 Report Format

The St Helens Level 1 and Level 2 SFRA have been prepared in one report covering flood risk policy, flood risk issues and development guidance. The structure of the report has been written in sections, supported by mapping, which will enable users to identify and focus on their particular requirements and areas of interest. The first sections of the report focus on setting the scene and include a general overview to flood risk management and planning policies, which influenced development of this SFRA. This is then developed to include an overview of the flood risk issues across St Helens Borough. The strategic assessment of risk has been undertaken in two stages:

1. Stage (or level) 1 - Collecting readily available flood risk information in order to provide a spatial assessment of flood risk from all sources across the Borough. This stage also includes a review of strategic development options identified by St Helens Council to allow the application of the Sequential Test. As previously mentioned, a Level 1 assessment has already been carried out in 2009. This SFRA will update the 2009 version.
2. Stage (or level) 2 - Building on the information collected in Stage 1; Stage 2 will include consideration of the detailed nature of flood hazards (including flood probability, depth and velocity). It takes into account the presence of flood risk management measures such as flood defences, and specifically, where high risk areas coincided with development pressures throughout the Borough. The aim of this assessment was to develop the understanding of risk in key areas and to inform the application of the Exceptions Test where required.

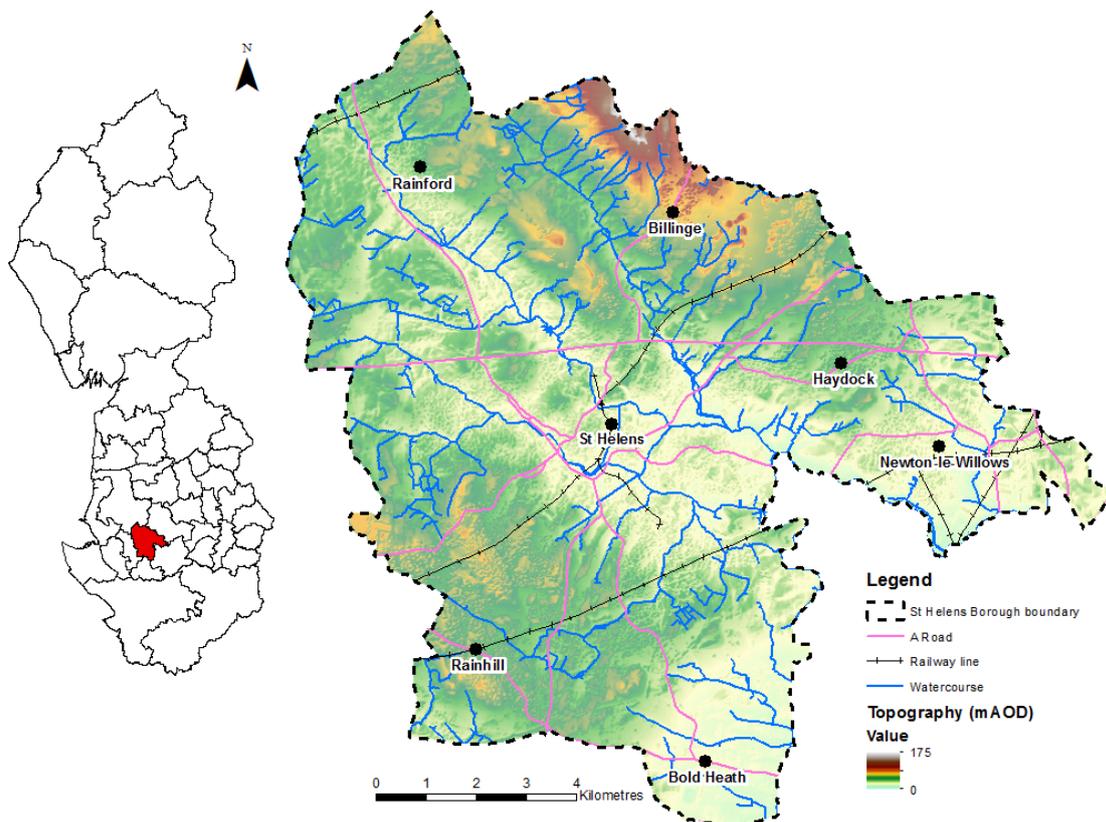
### 1.2.2 Study Area

St Helens is a Metropolitan Borough of Merseyside in North West England. The authority covers an area of 136 km<sup>2</sup> and is bounded by the councils of West Lancashire, Wigan, Warrington, Halton and Knowsley.

It is a mixture of rural and urban areas containing the towns of St Helens, Rainford, Billinge, Rainhill, Haydock and Newton-le-Willows. The St Helens area has a total population of around 175,308 (Census, 2011<sup>1</sup>).

St Helens has good transport and communication links to large cities including Liverpool, Manchester and Birmingham. The M6 and M62 motorways provide national transport links to the north, south and east of the UK. The A580 provides a direct link to Liverpool and Manchester. The West Coast Mainline (railway) passes near St Helens and can be accessed along with other main lines via local routes through Wigan, Warrington, Manchester and Liverpool. These rail links provide access to London, Scotland, Birmingham and Manchester, in addition to more local stations across St Helens and Merseyside.

Figure 1-1: St Helens SFRA Study Area



<sup>1</sup> <http://www.ons.gov.uk/ons/guide-method/census/2011/index.html>

## 2 Understanding Flood Risk

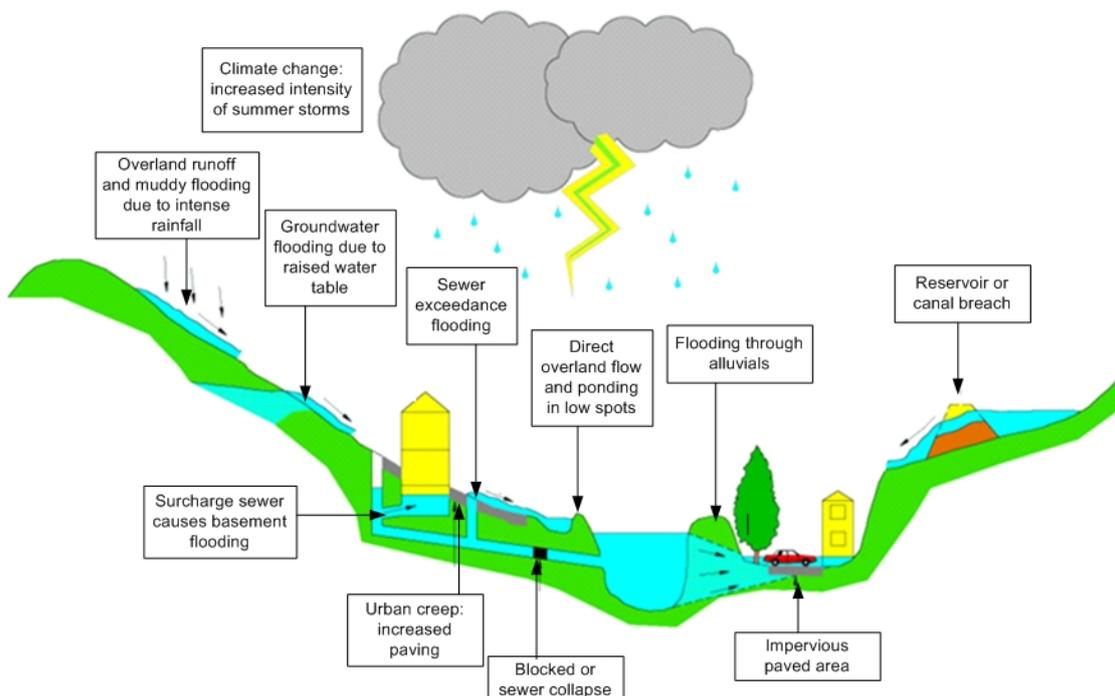
### 2.1 Sources of Flooding

Flooding is a natural process and can happen at any time in a wide variety of locations. It constitutes a temporary covering of land not normally covered by water and presents a risk when people and human or environmental assets are present in the area that floods. Assets at risk from flooding can include housing, transport and public service infrastructure, commercial and industrial enterprises, agricultural land and environmental and cultural heritage. Flooding can occur from many different and combined sources and in many different ways. Major sources of flooding include (also see Figure 2-1):

- **Fluvial** (rivers) - inundation of floodplains from rivers and watercourses; inundation of areas outside the floodplain due to influence of bridges, embankments and other features that artificially raise water levels; overtopping or breaching of defences; blockages of culverts; blockages of flood channels/corridors.
- **Tidal** - sea; estuary; overtopping of defences; breaching of defences; other flows (e.g. fluvial surface water) that could pond due to tide locking; wave action.
- **Surface water** - surface water flooding covers two main source including sheet run-off from adjacent land (pluvial) and surcharging of piped drainage systems (public sewers, highway drains, etc.)
- **Groundwater** - water table rising after prolonged rainfall to emerge above ground level remote from a watercourse; most likely to occur in low-lying areas underlain by permeable rock (aquifers); groundwater recovery after pumping for mining or industry has ceased.
- **Infrastructure failure** - reservoirs; canals; industrial processes; burst water mains; blocked sewers or failed pumping stations.

Different types and forms of flooding present a range of different risks and the flood hazards of speed of inundation, depth and duration of flooding can vary greatly. With climate change, the frequency, pattern and severity of flooding are expected to change and become more damaging.

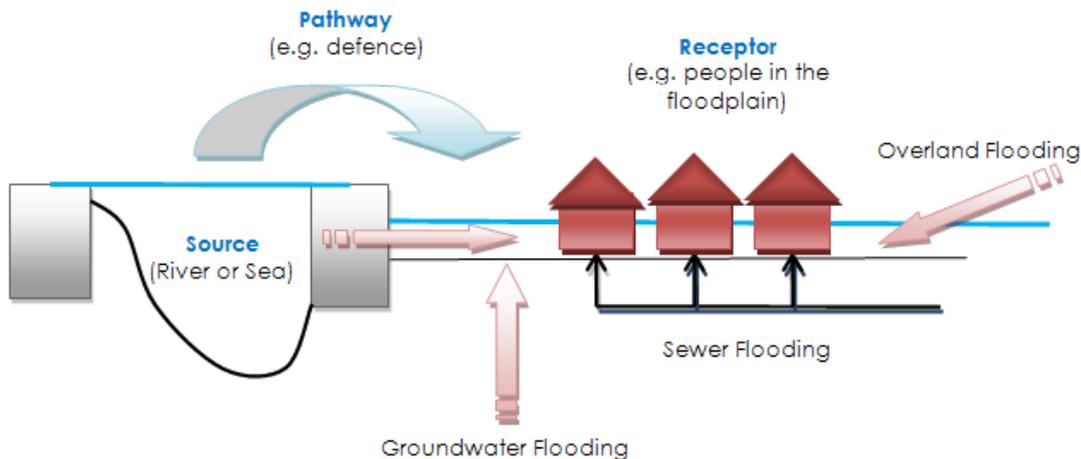
Figure 2-1: Flooding from all Sources



## 2.2 Likelihood and Consequence

Flood risk is a combination of the likelihood of flooding and the potential consequences arising. It is assessed using the source – pathway – receptor model as shown in Figure 2-2 below. This is a standard environmental risk model common to many hazards and should be the starting point of any flood-risk assessment. However, it should be remembered that flooding could occur from many different sources and pathways, and not simply those shown in the illustration below.

**Figure 2-2: Source-Pathway-Receptor Model**



The principal sources are rainfall or higher than normal sea levels, the most common pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets and the receptors can include people, their property and the environment. All three elements must be present for flood risk to arise. Mitigation measures have little or no effect on sources of flooding but they can block or impede pathways or remove receptors.

The planning process is primarily concerned with the location of receptors, taking appropriate account of potential sources and pathways that might put those receptors at risk. It is therefore important to define the components of flood risk in order to apply this guidance in a consistent manner.

### 2.2.1 Likelihood

Likelihood of flooding is expressed as the percentage probability based on the average frequency measured or extrapolated from records over a large number of years. A 1% probability indicates the flood level that is expected to be reached on average once in a hundred years, i.e. it has a 1% chance of occurring in any one year, not that it will occur once every hundred years. Table 2-1 provides an example of the flood probabilities used to describe Flood Zones as defined in the NPPF Technical Guide.

**Table 2-1: NPPF Flood Zones**

Flood Zone	Annual probability of flooding
1	This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1%).
2	This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.
3a	This zone comprises land assessed as having a 1 in 100 or 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.
3b	This zone comprises land where water has to flow or be stored in times of flood. This includes land that would flood with an annual probability of 1 in 20 (5%) or 1 in 25 (4%) or greater in any year, or is designed to flood in an extreme (0.1%) flood.

Considered over the lifetime of development, such an apparently low frequency or rare flood has a significant probability of occurring. For example:

- A 1% flood has a 26% (1 in 4) chance of occurring at least once in a 30-year period - the period of a typical residential mortgage
- And a 49% (1 in 2) chance of occurring in a 70-year period - a typical human lifetime

### 2.2.2 Consequence

The consequences of flooding can result in fatalities, damaging property, disrupting lives and businesses, with severe implications for people (e.g. financial loss, emotional distress, health problems). Consequences of flooding depend on the hazards caused by flooding (depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of receptors (type of development, nature, e.g. age-structure, of the population, presence and reliability of mitigation measures etc). Flood risk is then expressed in terms of the following relationship:

**Flood risk = Probability of flooding x Consequences of flooding**

## 2.3 Risk

Flood risk is not static; it cannot be described simply as a fixed water level that will occur if a river overtops its banks or from a high spring tide that coincides with a storm surge. It is therefore important to consider the continuum of risk carefully. Risk varies depending on the severity of the event, the source of the water, the pathways of flooding (such as the condition of flood defences) and the vulnerability of receptors as mentioned above.

### 2.3.1 Actual Risk

This is the risk 'as is' taking into account any flood defences that are in place for extreme flood events (typically these provide a minimum Standard of Protection (SoP)). Hence, if a settlement lies behind a fluvial flood defence that provides a 1 in 100-year SoP then the actual risk of flooding from the river in a 1 in 100-year event is generally low.

Actual risk describes the primary, or prime, risk from a known and understood source managed to a known SoP. However, it is important to recognise that risk comes from many different sources and that the SoP provided will vary within a river catchment. Hence, the actual risk of flooding from the river may be low to a settlement behind the defence but moderate from surface water, which may pond behind the defence in low spots and is unable to discharge into the river during high water levels.

### 2.3.2 Residual Risk

Even when flood defences are in place, there is always a likelihood that these could be overtopped in an extreme event or that they could fail or breach. Where there is a consequence to that occurrence, this risk is known as residual risk. Defence failure can lead to rapid inundation of fast flowing and deep floodwaters, with significant consequences to people, property and the local environment behind the defence.

Whilst the actual risk of flooding to a settlement that lies behind a fluvial flood defence that provides a 1 in 100-year SoP may be low, there will always be a residual risk from flooding if these defences overtopped or failed that must be taken into account. Because of this, it is never appropriate to use the term "flood free".

### 3 The Planning Framework and Flood Risk Policy

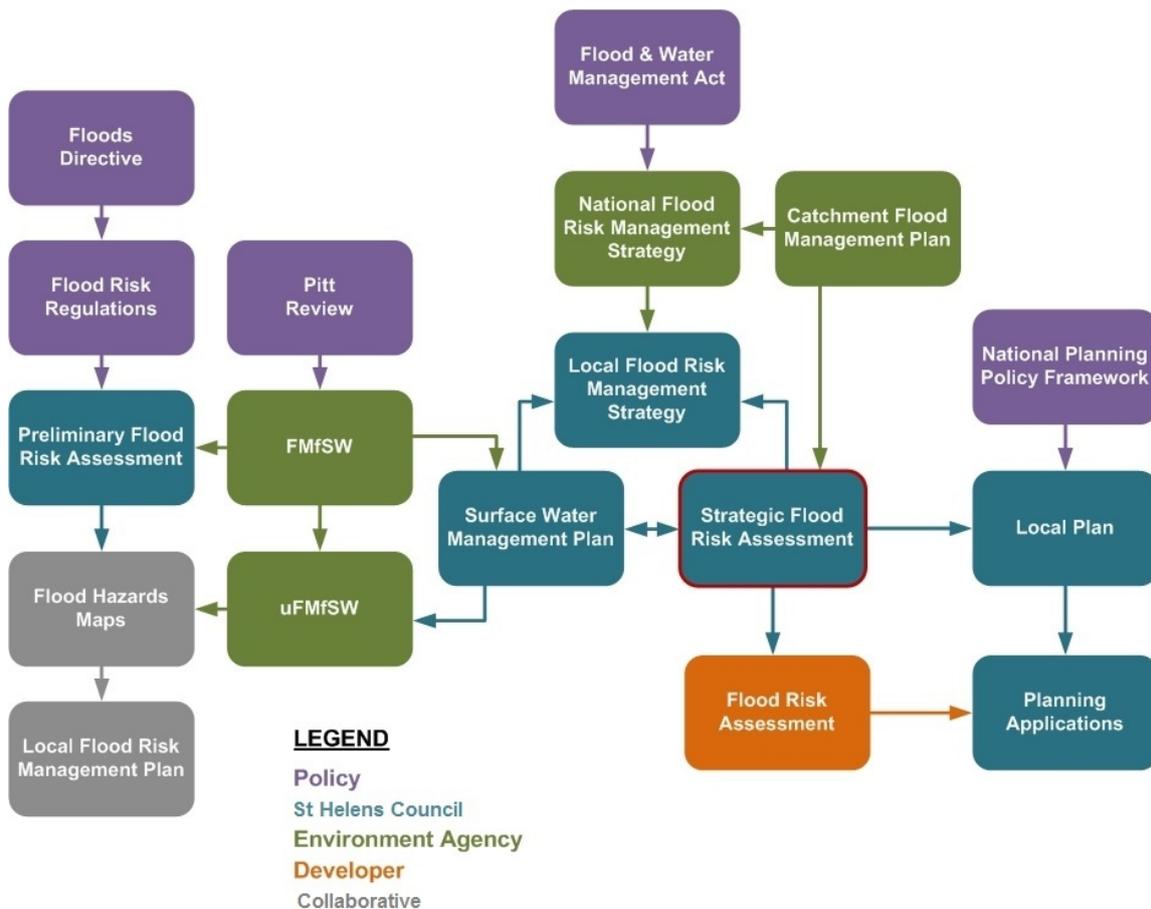
#### 3.1 Introduction

The main purpose of this section of the SFRA is to provide an overview of the key planning and flood risk policy documents that have shaped the current planning framework. This section also provides an overview and context of the Council’s responsibilities and duty in respect to managing local flood risk including but not exclusive to the delivery of the requirements of the Flood Risk Regulations (FRR) 2009 and the Flood and Water Management Act (FWMA) 2010.

Figure 3-1 illustrates the links between legislation, national policy, statutory documents and flood risk assessments. The figure shows that whilst the key pieces of legislation and policy are separate, they are closely related and their implementation should aim to provide a comprehensive and planned approach to asset record keeping and improving flood risk management within communities.

It is intended that the non-statutory SWMPs and SFRA can provide much of the base data required to support the delivery of statutory flood risk management tasks as well supporting local authorities in developing capacity, effective working arrangements and informing Local Flood Risk Management Strategies (LFRMS) and Local Plans, which in turn help deliver flood risk management infrastructure and new development at a local level.

**Figure 3-1: Key Documents and Strategic Planning Links - Flood Risk**



## 3.2 Legislation

### 3.2.1 EU Floods Directive and the Flood Risk Regulations

The European Flood Directive (2007) sets out the EU's approach to managing flood risk and aims to improve the management of the risk floods pose to human health, the environment, cultural heritage and economic activity.

The Directive was translated into English law by the Flood Risk Regulations (FRR) 2009 and outlines the requirement for the Environment Agency and Lead Local Flood Authorities (LLFA) to create Preliminary Flood Risk Assessments (PFRAs), with the aim of identifying significant Flood Risk Areas.

PFRAs cover the entire area for local flood risk (focusing on ordinary watercourses, surface water and groundwater flooding). Where significant Flood Risk Areas are identified using a national approach (and locally reviewed), the LLFA will then be required to undertake flood risk hazard mapping and Flood Risk Management Plans (FRMPs) as illustrated in Figure 3-2.

The FRMP will need to consider objectives for flood risk management (reducing the likelihood and consequences of flooding) and measures to achieve those objectives.

The Environment Agency have implemented one of the exceptions for creating PFRAs, etc for main rivers and coastal flooding, as they already have mapping (i.e. Flood Map) and plans (i.e. CFMPs) in place to deal with this. The Environment Agency therefore focused their efforts on assisting LLFAs through this process.

#### St Helens Preliminary Flood Risk Assessment

The St Helens PFRA was published in August 2011 as required under the FRR. The PFRA did not consider any historical flood events to have had a 'significant harmful consequence' in the Borough, nor were any Flood Risk Areas identified using the national significant thresholds set by Defra. As a result, the next stages of the PFRA process, the requirement to develop flood risk hazard mapping and Flood Risk Management Plans, do not apply to SHC.

That said, the Environment Agency have recently updated their national Flood Map for Surface Water (uFMfSW), which meets the requirements for flood risk hazard mapping and was made available in December 2013. As illustrated by Figure 3-1, the updated national map should be informed by a SWMP.

### 3.2.2 Flood and Water Management Act

The Flood and Water Management Act (FWMA) was passed in April 2010. It aims to improve both flood risk management and the way we manage our water resources.

The FWMA creates clearer roles and responsibilities and instils a more risk-based approach. This includes a new lead role for Local Authorities in managing local flood risk (from surface water, ground water and ordinary watercourses) and a strategic overview role of all flood risk for the Environment Agency.

The content and implications of the FWMA provide considerable opportunities for improved and integrated land use planning and flood risk management by Local Authorities and other key partners. The integration and synergy of strategies and plans at national, regional and local scales, is increasingly important to protect vulnerable communities and deliver sustainable regeneration and growth. Table 3-1 provides an overview of the key LLFA responsibilities under the FWMA.

Figure 3-2: PFRA Process



**Table 3-1: Key LLFA Duties under the FWMA**

Responsibility	Description	Start Date
Local Strategy for Flood Risk Management	A LLFA is required to develop, maintain, apply and monitor a local strategy for flood risk management in its area. The local strategies will build on information such as national risk assessments and will use consistent risk based approaches across different Local Authority areas and catchments. The local strategy will not be secondary to the national strategy; rather it will have distinct objectives to manage local flood risks important to local communities.	October 2010
Investigating Flood Incidents	A LLFA has a duty to investigate and record details of significant flood events within their area. This duty includes identifying risk management authorities and their functions and how they intend to exercise those functions in response to a flood. The responding risk management authority must publish the results of its investigation and notify any other relevant risk management authorities.	April 2011
Asset Register	A LLFA has a duty to maintain a register of structures or features, which are considered to have an effect on flood risk, including details on ownership and condition as a minimum. The register must be available for inspection and the Secretary of State will be able to make regulations about the content of the register and records.	April 2011
Works Powers	The Act provides a LLFA with powers to do works to manage flood risk from surface runoff, groundwater and on ordinary watercourses, consistent with the local flood risk management strategy for the area.	December 2011
Designation Powers	The Act provides a LLFA with powers to designate structures and features that affect flooding or coastal erosion. The powers are intended to overcome the risk of a person damaging or removing a structure or feature that is on private land and which is relied on for flood or coastal erosion risk management. Once a feature is designated, the owner must seek consent to alter, remove, or replace it.	August 2012
SuDS Approving Body	The Act establishes each LLFA as a SuDS Approving Body (the "SAB"). The SAB would have responsibility for the approval of proposed drainage systems in new developments and redevelopments, subject to exemptions and thresholds. Approval must be given before the developer can commence construction. The SAB would also be responsible for adopting and maintaining SuDS, which serve more than one property, where they have been approved. Highways authorities will be responsible for maintaining SuDS in public roads, to National Standards.	Expected 2014

A full progress report on the implementation of the FWMA can be found on the Defra website.<sup>2</sup>

### 3.2.3 Water Framework Directive and Water Environment Regulations

The purpose of the Water Framework Directive (WFD) is to deliver improvements across Europe in the management of water quality and water resources. The WFD requires all inland and coastal waters to reach "good ecological status" by 2015 through a catchment-based system of River Basin Management Plans (RBMPs), incorporating a programme of measures to improve the status of all natural water bodies. There is an exception for "heavily modified water bodies", that are required to achieve "good ecological potential". The Water Environment Regulations

<sup>2</sup> <http://www.defra.gov.uk/publications/2012/12/14/pb13844-fmwa-progress/>

(2003) transposed the WFD into law in England and Wales. The Environment Agency is leading on the delivery of the WFD.

St Helens Borough is within the North West River Basin District and the Environment Agency published the final North West River Basin Management Plan in December 2009. The main responsibility for SHC is to work with the Environment Agency to develop links between river basin management planning and the development of Local Authority plans, policies and assessments. In particular, the programme of actions (measures) within the RBMP highlights the need for:

- Water Cycle Strategies,
- Considering the WFD objectives (achieving good status or potential as appropriate) in the spatial planning process, including LDDs and Sustainable Community Strategies, and
- Promoting the use of Sustainable Drainage Systems (SuDS) in new development.

### 3.3 Planning Policy

#### 3.3.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012, as part of reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. It replaces most of the Planning Policy Guidance Notes (PPGs) and Planning Policy Statements (PPSs).

The NPPF is guidance for Local Planning Authorities to help them prepare Local Plans and take development management decisions. The NPPF states that Local Plans

*“...should be supported by a Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as Lead Local Flood Authorities and Internal Drainage Boards. Local Plans should apply a sequential, risk-based approach to the location of development to avoid, where possible, flood risk to people and property and manage any residual risk, taking account of the impacts of climate change.”* (Para 100)

Technical guidance on flood risk has been published alongside the NPPF and sets out how the policy should be implemented, although it is stated that this is an interim measure.

Whilst the NPPF concentrates on high level national policy and avoids prescriptive guidance, the PPS25 Practice Guide still applies. The Sequential Test has also been carried forward from PPS25 and must be performed when considering the placement of future development and for planning application proposals. The Sequential Test is used to direct all new development (through the site allocation process) to locations at least risk of flooding, giving highest priority to Flood Zone 1.

The Environment Agency has produced a useful guide<sup>3</sup> on the impacts of the NPPF on flood and coastal change risk management and development. They have also published a technical note<sup>4</sup>, which provides guidance on how to apply the Sequential Test as per the NPPF and in relation to allocation of land, individual planning applications, windfall sites, and renewable energy projects, redevelopment of an existing single property and change of use.

#### 3.3.2 Localism Act

The Localism Act was given Royal Assent in November 2011 with the purpose of shifting power from Central Government back to Councils, communities and individuals. The Government has abolished RSS, providing the opportunity for Councils to re-examine the local evidence base and establish their own local development requirements for employment, housing and other land used through the plan making process.

<sup>3</sup> Environment Agency (2012) National Planning Policy Framework – Flood and Coastal Change Risk Management - <http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geho0512bupi-e-e.pdf>

<sup>4</sup> Environment Agency (2012) Demonstrating the flood risk Sequential Test for Planning Applications version 3.1 Advise – [http://www.environment-agency.gov.uk/static/documents/Business/SequentialTestProcess\\_v3.1.pdf](http://www.environment-agency.gov.uk/static/documents/Business/SequentialTestProcess_v3.1.pdf)

Additionally the Act places a duty to cooperate on Local Authorities, including statutory bodies and other groups, in relation to planning of sustainable development. This duty to cooperate requires local authorities to

*“...engage constructively, actively and on an ongoing basis in any process by means of which development plan documents are prepared so far as relating to a strategic matter.”* (Provision 110)

The Act also provides new rights to allow parish or town councils to deliver additional development through neighbourhood planning. This means local people can help decide where new homes and businesses should go and what they should look like. Local Planning Authorities will be required to provide technical advice and support as neighbourhoods draw up their proposals.

### 3.3.3 Local Plan

The Council is currently developing its Local Plan which will consist of a set of documents that set out how the Borough may change over the next few years and promote a proactive, positive approach to managing development.

The Local Plan focuses on land use development and protection, set within the context of wider social, economic and environmental trends and considerations. Reflecting the NPPF, Local Plans make strategic provision for the long-term use of land and buildings, providing a framework for local decision making and the reconciliation of competing development and conservation interests. They aim to ensure that land use changes proceed coherently, efficiently, and with maximum community benefit. Local Plans indicate clearly how local residents, landowners, and other interested parties might be affected by land use change. They are subject to regular periods of intensive public consultation, involvement and negotiation.

The St Helens Local Plan consists of the Core Strategy (adopted 31<sup>st</sup> October 2012), saved policies of the 1998 Unitary Development Plan and supplementary planning documents. There will also be other documents that will eventually form part of the Local Plan in the future, including the Joint Merseyside and Halton Waste Local Plan, which is now adopted, the Allocations and Sustainable Development DPD and the Bold Forest Park Area Action Plan.

## 3.4 Flood Risk Management Policy

### 3.4.1 Catchment Flood Management Plans

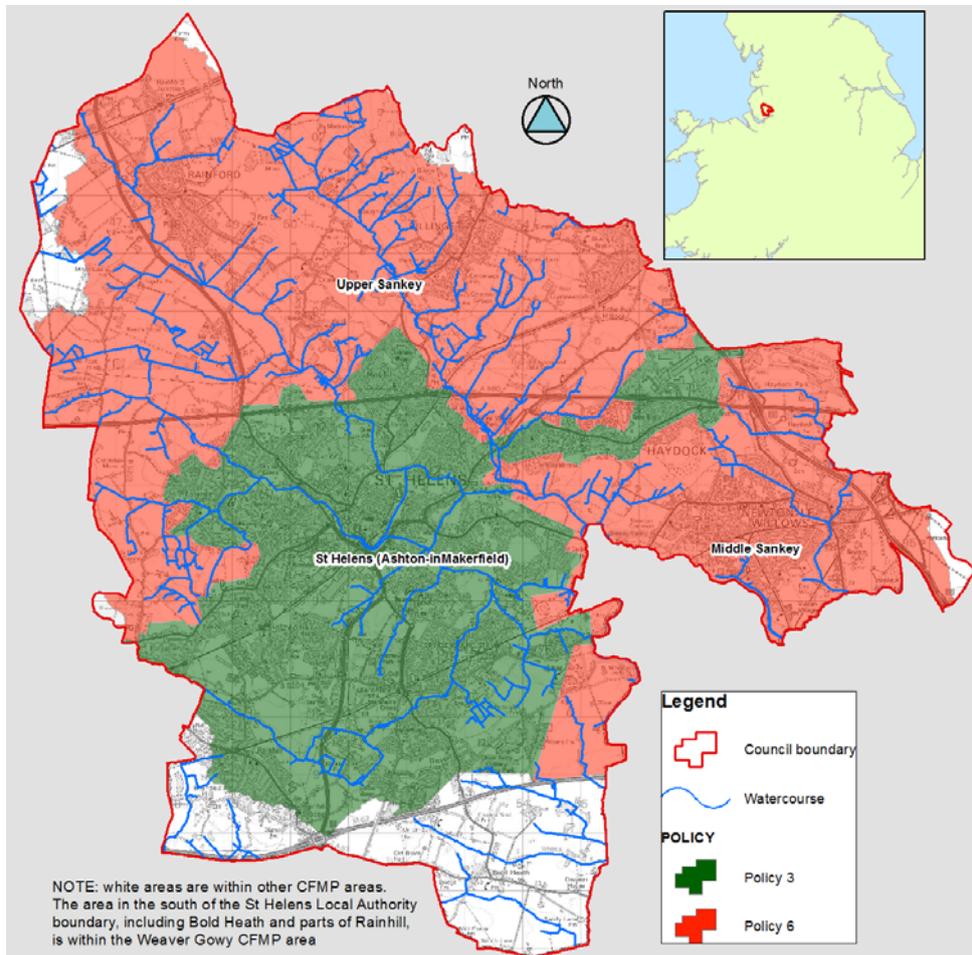
A Catchment Flood Management Plan (CFMP) is a key tool within spatial planning. As well as providing a detailed overview of flood risk from multiple sources, they develop complementary policies for long-term management of flood risk within the catchment that take into account the likely impacts of climate change, the effects of land use and land management, deliver multiple benefits and contribute towards sustainable development. This is critical when areas under development pressure coincide with high flood risk.

Chosen policies and actions highlight where to avoid development in those areas where deemed inappropriate to reduce flood risk now and in the future. They also indicate when water should be allowed to flood or where current flood risk measures should be reduced. Development should therefore be focused towards the more 'sustainable' areas in terms of lower risk of flooding or where flood risk management is considered viable within the short and long-term plans. Therefore if development has been proposed in flood risk areas and the chosen policy is not to take further action to reduce flood risk, then developments will find it difficult to rely on Environment Agency led FRM infrastructure investment and there will be a great reliance on private (developer) funding to reduce risk. In this instance, development may not be viable.

As part of the CFMP process each CFMP area was divided up into broad areas (known as 'policy units'), which represent areas of similar characteristics, flood mechanisms and flood risks. Each policy unit was then assessed to decide which policy will provide the most appropriate level and direction of flood risk management both now and in the future. Whilst the policy unit simplifies direct action over vast areas of land, in reality, the chosen policy may only focus on a small urban or rural area within that policy unit. The majority of St Helens Borough is located in

the Mersey Estuary CFMP catchment. Figure 3-3 illustrates the CFMP policies covering the district.

**Figure 3-3: St Helens Borough CFMP Policies**



The six CFMP policies include:

- **Policy 1** – continue to monitor and advise and to work with natural flood processes as far as possible.
- **Policy 2** - reduce existing flood risk management actions (accepting that flood risk will increase over time).
- **Policy 3** - continue with existing or alternative actions to manage flood risk at the current level.
- **Policy 4** - take further action to sustain the current level of flood risk into the future (responding to the potential increases in risk from urban development, land use change and climate change).
- **Policy 5** - take further action to reduce flood risk.
- **Policy 6** - take action to store water or manage runoff in locations that provide overall flood risk reduction or environmental benefit.

It is important to note that Policy Options 4 and 5 do not automatically equate to the Environment Agency, or others, taking action on the ground. Policy responses indicate a long-term direction of travel and do not reflect the likelihood of any particular area qualifying for funding for a scheme under the priority scoring system.

### 3.4.2 North West Regional Flood Risk Appraisal

The North West Regional Flood Risk Appraisal (RFRA) for the North West RSS was published in October 2008.

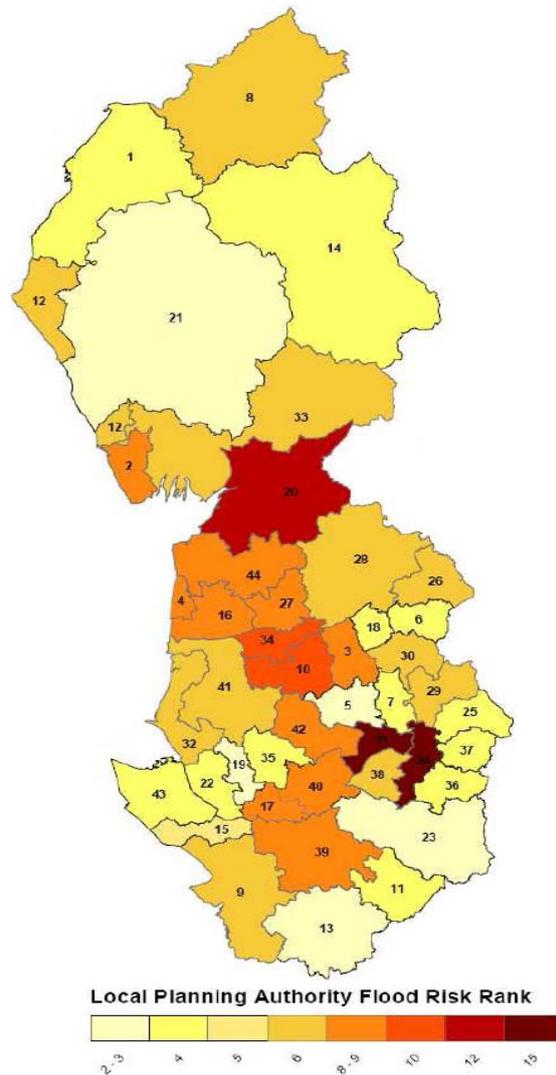
The RFRA identifies the potential flood risk issues that are of regional significance as illustrated in the adjacent figure. It also sets out flood risk rankings produced by the Environment Agency that, although have their limitations, provide Local Authorities with an indication of the type and scale of fluvial and tidal flood risk management challenge they face.

Although the RSS has been abolished, the mechanisms of flood risk have not changed and they will still need to be addressed at a strategic level.

As illustrated in the RFRA, flood risk does not respect administrative boundaries and there are a number of Local Authorities in the North West that are hydraulically connected. Strategic flood risk management studies such as CFMPs provide some of this evidence base. However, they are mainly focused on providing a long-term direction of travel of flood risk management and subsequent action will still be required depending on a number of factors including available resources or schemes qualifying for funding.

There are also clear links between the RFRA and the SHC SFRA with the flood risk data it provides across the North West and regional guidance it offers. The RFRA still has a major role to play in influencing local planning by considering flood risk strategically and helping to develop regional approaches and establishing partnerships.

Figure 3-4: RFRA Flood Risk Rank



### 3.4.3 National and Local Flood Risk Management Strategies

The FWMA establishes that flood risk will be managed within the framework of National Strategies for England and Local Strategies for each LLFA area.

The national strategy for England has been developed by the Environment Agency with the support and guidance of Defra. It sets out principles for how flood risk should be managed and provides strategic information about different types of flood risk and which organisations are responsible for their management. The Act requires risk management authorities (local authorities, internal drainage boards, sewerage companies and highways authorities) to act consistently with the national strategy in carrying out their flood and coastal erosion risk management functions.

LLFAs have responsibility for developing a Local Flood Risk Management Strategy (LFRMS) for their area covering local sources of flooding. The local strategy produced must be consistent with the national strategy. It will set out the local organisations with responsibility for flood risk in the area, partnership arrangements to ensure co-ordination between these, an assessment of the flood risk and plans and actions for managing the risk.

## 3.5 Roles and Responsibilities

The new and emerging responsibilities for the risk management authorities (RMA) under the Flood and Water Management Act and the Flood Risk Regulations are summarised below.

### 3.5.1 Environment Agency as a RMA

- The Environment Agency has a strategic oversight role for all forms of flooding.
- Has the power to request information from any partner in connection with its risk management functions.
- Must exercise its flood or coastal erosion risk management functions in a manner consistent with the National Strategy and Local Strategies.
- Must be consulted on Local Strategies by the LLFA, if affected by the strategy.

### 3.5.2 St Helens Council as a LLFA

- Must develop, maintain, apply and monitor a strategy for local flood risk management. This must be consulted on with all RMAs, the public and all other partners with an interest in local flood risk.
- The Act also imparts several other responsibilities on LLFAs
  - Required to coordinate local flood risk management between relevant authorities and partners.
  - Empowered to request information from others when it is needed in relation to their flood risk management functions.
  - Where it considers this necessary or appropriate, the LLFA must investigate flooding incidents in its area.
  - Duty to establish and maintain a record of structures within its area that have a significant impact on local flood risk.
  - Empowered to designate structures and features that affect flooding.
  - The LLFA must establish a SuDS Approval Body – this provision has yet to be commenced but is expected in late 2014.
  - LLFAs have powers to undertake works to manage flood risks from surface runoff and groundwater. Powers in relation to Ordinary Watercourses remain with district authorities.
  - Must exercise its flood and coastal erosion risk management functions in a manner consistent with the National Strategy and the Local Strategy.
  - Permitted to agree the transfer of responsibilities for risk management functions (except the production of a Local Strategy) to other RMAs.
  - Local Authorities and other RMAs must aim to contribute to sustainable development.
- LLFAs should consider flooding issues that require collaboration with neighbouring LLFAs and other RMAs.

### 3.5.3 United Utilities as a RMA

- Duty to act in a manner that is consistent with the National Strategy and have regard to Local Strategies.
- Must be consulted on Local Strategies by the relevant LLFA, if affected by the strategy.
- Duty to be subject to scrutiny from LLFAs.

### 3.5.4 Highways Authority (SHC) as a RMA

- Duty to act consistently with the National Strategy and Local Strategies.
- The Highways Authority has responsibility for ensuring effective drainage of local roads in so far as ensuring drains and gullies are maintained.
- Must be consulted on Local Strategies by the relevant LLFA, if affected by the strategy.

- Duty to be subject to scrutiny from LLFAs.

### 3.5.5 The Public

- Must be consulted on Local Strategies by the LLFA.
- The public have a key role in ensuring Local Strategies are capable of being successfully delivered within the community. They should actively participate in this process and be engaged by the LLFA.

### 3.5.6 Riparian Owners

A riparian owner is someone who owns land or property alongside a river or other watercourses including a culvert. A watercourse is any natural or artificial channel through which water flows, such as a river including where rivers flow through a culvert, brook, beck, or mill stream.

Riparian owners have statutory responsibilities, including:

- Maintaining river beds and banks;
- Allowing the flow of water to pass without obstruction;
- Controlling invasive alien species

Further guidance for riverside property owners can be found in the Environment Agency's helpful booklet 'Living on the Edge'<sup>5</sup> published in 2012.

### 3.5.7 Developers

- Have a vital role in ensuring effective local flood risk management by avoiding development in areas at risk of flooding. Local Strategies should form a key element of local planning guidance.

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<sup>5</sup> <http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/flho0912bwup-e-e.pdf>

## 4 Flood Risk in St Helens

### 4.1 Flood Risk Datasets

This section of the SFRA provides a strategic overview of flood risk from all sources within the study area. The information contained is the best available at the time of publication and is intended to provide the Council with an overview of risk. Where further detail is available, then the source of information is provided. Table 4-1 provides a summary of the key datasets used in this SFRA according to the source of flooding.

**Table 4-1: Flood Source and Key Datasets**

Flood Source	Datasets
Fluvial	Environment Agency Flood Map
	St Helens Council PFRA
	Mersey Estuary CFMP
	Environment Agency Hydraulic River Models
Pluvial (surface water runoff)	Environment Agency Surface Water Flood Maps – uFMfSW
	St Helens Council PFRA
Sewer	United Utilities Historical Flood Records (SIRS, WIRS & DG5)
	United Utilities Hydraulic Sewer Modelling Outputs
Groundwater	Environment Agency Groundwater Susceptibility Maps
Canal	Canal & River Trust Asset Register
Reservoir	Environment Agency Reservoir Flood Maps (available online)
Flood Risk Management Infrastructure	Environment Agency NFCDD / AIMS
	United Utilities Assets
	Canal & River Trust Asset Register
	St Helens Council Asset Register

### 4.2 Fluvial Flooding

Fluvial flooding is associated with the exceedance of channel capacity during higher flows. The process of flooding on watercourses depends on a number of characteristics associated with the catchment including geographical location and variation in rainfall; steepness of the channel and surrounding floodplain; and infiltration and rate of runoff associated with urban and rural catchments.

The St Helens Borough covers roughly 13,900 hectares over an area of soft rolling hills, used primarily for agricultural purposes, and is around 50 m above sea level. The vast majority of the Borough lies within the catchment of the River Mersey and in the River Sankey sub catchment. The remainder is located within the Alt Catchment.

There is a watershed in the Borough on the approximate boundary of the M62 motorway. Sankey Brook is the primary watercourse draining St Helens running from the central low-lying landscape of the Borough before heading east and then south, into the River Mersey at Sankey Bridges in Warrington. The central area of the Borough is drained by a radial pattern of tributaries including Black Brook draining the north and running west of Billinge Hill; Rainford Brook and Windle Brook to the northwest and west respectively, and Sutton Brook to the south draining Rainhill. As a result of canalising or culverting many of these tributaries have become truncated producing a fractured river corridor and in places isolated 'pools'. To the south of the M62, the Borough drains direct to the Mersey through the small tributaries of Whittle, Union Bank and Penketh Brooks. Simonswood Brook in the north west of the Borough drains to the River Alt.

The majority of St. Helens is underlain by Upper Carboniferous Coal Measures consisting of a series of shales, mudstones, clay and sandstones interlaid with coal measures. There is a small area of the southern part of St. Helens which is underlain with Triassic Sherwood Sandstone. Superficial deposits consist mainly of sand deposits with some peat and diamicton.

Table 4-2 lists the key towns and villages and the main rivers and tributaries which run through them.

**Table 4-2: Rivers and Settlements**

Main Rivers	Settlements	Other Key Tributaries
Carr Mill Dam	Carr Mill	
Hardshaw Brook	St Helens	Sutton Brook
Windle Brook	Eccleston	Mill Brook
Rainford Brook	Rainford	
Sankey Brook	St Helens, Earlestown, Vulcan Village	Newton Brook, Cloghe Brook
Sutton Mill Brook	Sutton	
Black Brook	Blackbrook	Clipsley Brook
Pendlebury Brook	Clock Face	
Mill Brook	Eccleston	
Newton Brook	Newton-le-Willows	

St Helens Borough also contains a number of ordinary watercourses. ‘Ordinary Watercourses’ are any watercourses that are not designated a ‘Main River’. These watercourses can vary in size considerably and can include rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows.

Prior to the enactment of the FWMA, the responsibility for managing flood risk from these watercourses was often not clearly identified. As a result, their conditions are likely to be highly variable. Consequently, it is likely that there will be several locations where structures on Ordinary Watercourses will be in a significant state of disrepair. Furthermore, the condition of the assets will continue to deteriorate over time.

#### 4.2.1 Historical Flooding

The St Helens PFRA included a review of historical flood events and it was concluded that there are no “nationally significant” or “historical local significant” flooding incidents within the Borough. The Environment Agency Historical Flood Map (HFM) does record a significant fluvial flooding incident at Black Brook (see SFRA Map 007). There are also instances of flooding that are not significant of which the Council are aware.

#### 4.2.2 Environment Agency Flood Map

The Environment Agency’s Flood Map is the main dataset for predicting the location and extent of fluvial flooding throughout St Helens Borough. This is supported by the Mersey Estuary CFMP and a number of detailed hydraulic river modelling reports which provide further detail on flooding mechanisms.

The Environment Agency Flood Map provides flood extents for the 1 in 100-year fluvial, 1 in 200-year tidal and the 1 in 1000-year fluvial and tidal flood events. Flood zones were originally prepared by the Environment Agency using a methodology based on the national digital terrain model (NextMap), derived river flows (Flood Estimation Handbook (FEH)) and two dimensional flood routing. Since their initial release, the Environment Agency has regularly updated their flood zones with detailed hydraulic model outputs as part of their flood risk mapping programme.

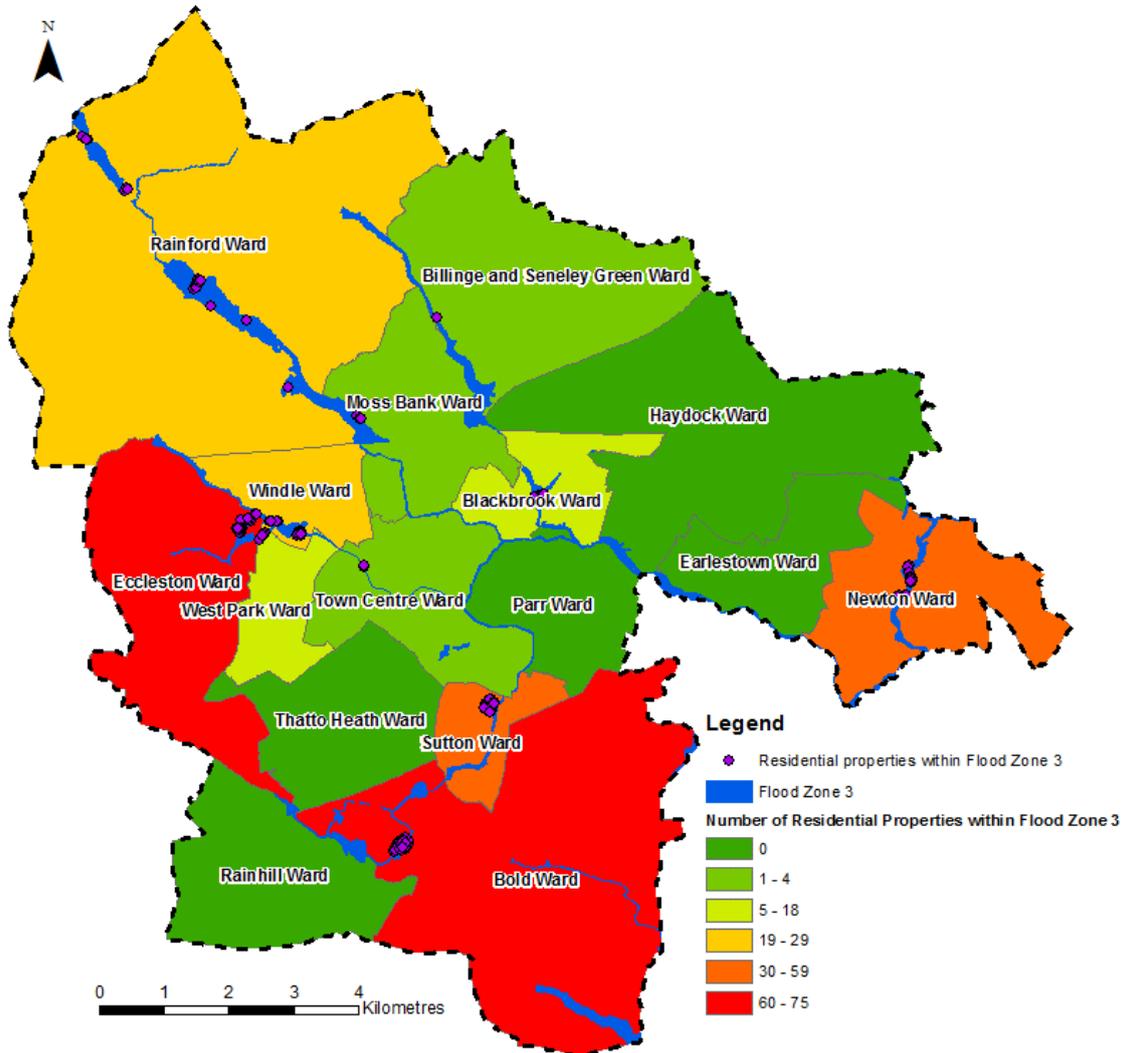
The Flood Map is precautionary in that it does not take account of flood defences (which can be breached, overtopped or may not be in existence for the lifetime of the development) and,

therefore, represent a worst-case extent of flooding. They do not consider sources of flooding other than fluvial and tidal, and do not take account of climate change.

This SFRA uses the Environment Agency Flood Map issued in January 2013. Using the Environment Agency Flood Zone 3, the number of existing residential properties potentially at risk from the 1 in 100-year fluvial flood event has been identified<sup>6</sup>. Figure 4-1 illustrates the distribution and total number of existing dwellings at risk in each Ward.

In St Helens Borough, 336 residential properties have been identified to be within Flood Zone 3. The Wards with the most properties at risk include Bold, Eccleston, Sutton and Newton with 75, 66, 59 and 51 residential properties at risk respectively. Blackbrook in comparison has 18 residential properties within Flood Zone 3. Like the Flood Zones, these counts include the properties that may be protected, to some extent, by flood defences.

**Figure 4-1: Residential Properties within Flood Zone 3 per Ward**



### Functional Floodplain

The PPS25 Practice Guide defines functional floodplain as Flood Zone 3b and is described as land where water has to flow or be stored in times of flood and includes water conveyance routes and flood storage areas. The functional floodplain is usually defined by more frequent flood extents, such as the 1 in 20 or 1 in 25 year flood outlines, but does not include currently developed land or areas that benefit from raised flood defences, infrastructure or buildings. The

<sup>6</sup> Residential properties at risk have been identified using a GIS query. Initially OS MasterMap building polygons that intersect Flood Zone 3 were selected. The selected buildings were then used to count NRD property points with the theme 'Dwelling'.

Historic Flood Map (HFM), provided by the Environment Agency, was included in the functional floodplain outline. The following areas are not included in an area of functional floodplain:

- Land already benefiting from raised flood defences as identified in the Environment Agency's Areas Benefiting from Defences (ABD) GIS layer;
- Currently developed land where no flood alleviation function has been defined;
- Major transport infrastructure (e.g. motorways and railways).

As part of this SFRA, the Environment Agency provided all their available hydraulic river models for the Borough. Where the 1 in 20 year outlines were available, they were used to define the functional floodplain. Where a 1 in 20 year outline had not been produced, the 1 in 25 year outline was used.

Where river models were not available, identified sites are located in Flood Zone 3a. Flood Zone 3a is defined as the areas of Flood Zone 3 that is not functional floodplain. It is recommended that further analysis is carried out during detailed site specific FRAs to improve the understanding and assessment of the actual risk and extent of any functional floodplain.

A draft version of the functional floodplain was sent to SHC and the EA in June 2013 for review and agreement before finalisation.

### 4.3 Surface Water Flooding

Surface water flooding, in the context of the St Helens SFRA, includes:

- Surface water runoff (also known as pluvial flooding); and
- Sewer flooding

Surface water flooding can occur anywhere in the St Helens Borough where ground levels and profiles tend to cause surface water to flow and accumulate. However, there are certain locations where the probability and consequence of these mechanisms are more prominent due to the complex hydraulic interactions in the urban environment. Urban watercourse connectivity, sewer capacity, and the location and condition of highway gullies all have a major role to play in surface water flood risk.

Whilst effort is taken to describe each source of surface water flooding below, it should be acknowledged that once an area is flooded during a large rainfall event, it is often difficult to identify the route, cause and ultimately the source of flooding without undertaking further site specific and detailed investigations.

St Helens Council has not yet produced a Surface Water Management Plan for the Borough. This SFRA will help to inform whether a SWMP is required and to advise on possible Critical Drainage Areas (CDAs) through interrogation of the updated Flood Map for Surface Water (uFMfSW). The need for further detailed surface water investigations is often based on historical records and detailed local knowledge of surface water flood risk within the Borough.

St Helens Council produced a SWMP Preparatory Stage document<sup>7</sup> in 2012 to ascertain the level of surface water risk in the Borough. In summary, it was found that the risk presented by the Flood Map for Surface Water (FMfSW) was overestimated. In effect, there are many areas across the Borough where there are interactions between surface water flow paths and areas of ponding within fluvial floodplains where surface water would drain into the watercourse. There is also limited historical evidence of significant surface water flooding. However, it was a conclusion of the report that there appears to be areas of significant risk and that these areas should be divided up into 10 individual flood risk studies, carried out under an overarching SWMP.

These 10 areas include:

- Eccleston
- Billinge
- Rainford
- Shevington Close, St Helens

<sup>7</sup> St Helens Council Surface Water Management Plan, Preparation Stage, Strategic Risk Assessment and Scoping Study, JACOBS, February 2012

- Clipsley Brook, Haydock
- Toll Bar, St Helens
- Old Boston, Haydock
- Queens Drive, Newton-le-Willows
- Sturgess Street, Newton-le-Willows
- Wargrave, Newton-le-Willows

#### 4.3.1 Pluvial Flooding

Pluvial flooding of land from surface water runoff is usually caused by intense rainfall that may only last a few hours. In these instances, the volume of water from rural land can exceed infiltration rates in a short amount of time, resulting in water flowing over land. Within urban areas, this intensity is too great for the urban drainage network resulting in excess water flowing along roads, through properties and ponding in natural low spots. Areas at risk can, therefore, lie outside of the fluvial flood zones.

Pluvial flooding within urban areas will typically be associated with events greater than the 1 in 30-year design standard of new sewer systems. Some older sewer and highway networks will have even less capacity than the 1 in 30-year event. There is also a residual risk associated with these networks due to possible network failures, blockages or collapses.

The Environment Agency has produced three national surface water flood maps aimed at helping to identify those areas where localised, flash flooding can cause problems even if the Main Rivers are not overflowing. The third generation map (see Section 4.3.4) has been used in this SFRA to help supplement the fluvial Flood Map by identifying areas in Flood Zone 1, which may have critical drainage problems.

#### 4.3.2 Areas Susceptible to Surface Water Flooding Map (AStSWF)

The first-generation national map, the Areas Susceptible to Surface Water Flooding (AStSWF) released in 2008, shows areas where surface water would be expected to flow or pond during an extreme rainfall event with a 1 in 200 chance of occurring. The simplified modelling method adopted excludes the underground sewerage, drainage systems, smaller over ground drainage systems and the impact of buildings. The first-generation map was a preliminary one provided to:

- Local Resilience Forums (LRFs) and Regional Resilience Teams for use in their functions that relate to emergencies as defined and required by the Civil Contingencies Act 2004, and
- LPAs for land use planning purposes.

The AStSWF map is separated into areas at less, intermediate or high susceptibility of surface water flooding. The areas identified as 'highly' susceptible will flood first, flood deepest and flood during lower rainfall events. On a national scale, these areas will also tend to be predominantly located in valleys, in the Main River floodplain, behind defences or raised structures or on flat low-lying land, which are generally also at fluvial risk.

#### 4.3.3 Flood Map for Surface Water (FMfSW)

The Environment Agency updated their national methodology in 2010 and released their second-generation national map, the Flood Map for Surface Water (FMfSW). The revised model included a number of improvements to the AStSWF including:

- Two storm events (1 in 30-year and 1 in 200-year)
- National drainage rates to represent the sewer system
- The influence of buildings

The resulting flood extents of each storm event were categorised as two zones:

- Shallow Surface Water Flooding - flooding greater than 0.1m
- Deep Surface Water Flooding - flooding greater than 0.3m

The Environment Agency chose the 0.3m threshold as it represents a typical value for the onset of significant property damage. It is also at this depth that moving through floodwater (driving or

walking) may become more difficult; both of which may lead users to consider the need to close roads or evacuate areas.

#### 4.3.4 Updated Flood Map for Surface Water (uFMfSW)

The Environment Agency updated the FMfSW in 2013 to produce a third generation national surface water flood map, the updated Flood Map for Surface Water (uFMfSW). The uFMfSW is much more refined than the second generation map in that:

- More detailed hydrological modelling has been carried out using several design rainfall events rather than one for the second generation
- A higher resolution Digital Terrain Model (DTM) has been used – 2 m, compared to 5 m for the second generation
- Manual edits of DTM to improve flow routes at over 91,000 locations compared to 40,000 for the second generation
- DTM edited to better represent road network as a possible flow pathway, this was not done for the second generation
- Manning's *n* roughness values varied using MasterMap Topography layer compared to blanket values for urban and rural land use in the second generation

The National Modelling and Mapping Method Statement, May 2013 details the methodology. This document was supplied to the Council with the uFMfSW, within the Supporting Documents folder.

#### 4.3.5 Locally Agreed Surface Water Information

During the St Helens PFRA, the Council were required by the Environment Agency to agree an appropriate dataset that represents the risk from surface water in their area. The FMfSW 1 in 200 year event shallow ( $\leq 0.1$  m depth) and the FMfSW 1 in 200 year event deep ( $\geq 0.3$  m depth) were used as these datasets best reflect the practical working knowledge that the Council has of flooding. This was agreed following consultation with St Helens Borough Council and United Utilities. Table 4-3 shows the number of properties at risk from surface water flooding as identified in the PFRA.

**Table 4-3: Properties at Risk from Surface Water Flooding**

Property Type	1 in 200 Year Shallow	1 in 200 Year Deep
All	17,400	4,700
Residential only	14,800	3,800

#### 4.3.6 Sewer Flooding

Combined sewers spread extensively across urban areas serving homes, businesses and highways, conveying waste and surface water to treatment works. Combined Sewer Overflows (CSOs), provide an overflow release from the drainage system into local watercourses or large surface water systems during times of high flows. Some areas may also be served by separate foul and surface water sewers which convey waste water to treatment works and surface water into local watercourses.

Flooding from the sewer network mainly occurs when flow entering the system, such as an urban storm water drainage system, exceeds its available discharge capacity, the system becomes blocked or it cannot discharge due to a high water level in the receiving watercourse. Pinch points and failures within the drainage network may also restrict flows. Water then begins to back up through the sewers and surcharge through manholes, potentially flooding highways and properties. It must be noted that sewer flooding in 'dry weather' resulting from blockage, collapse or pumping station mechanical failure (for example), is the sole concern of the drainage undertaker.

The water company that serves the administrative area is United Utilities. United Utilities were consulted on flood risk associated with their assets and provided a number of datasets. The three main datasets associated with historical flood incidents include:

- Sewerage Incident Register System (SIRS) - January 1990 to March 2008

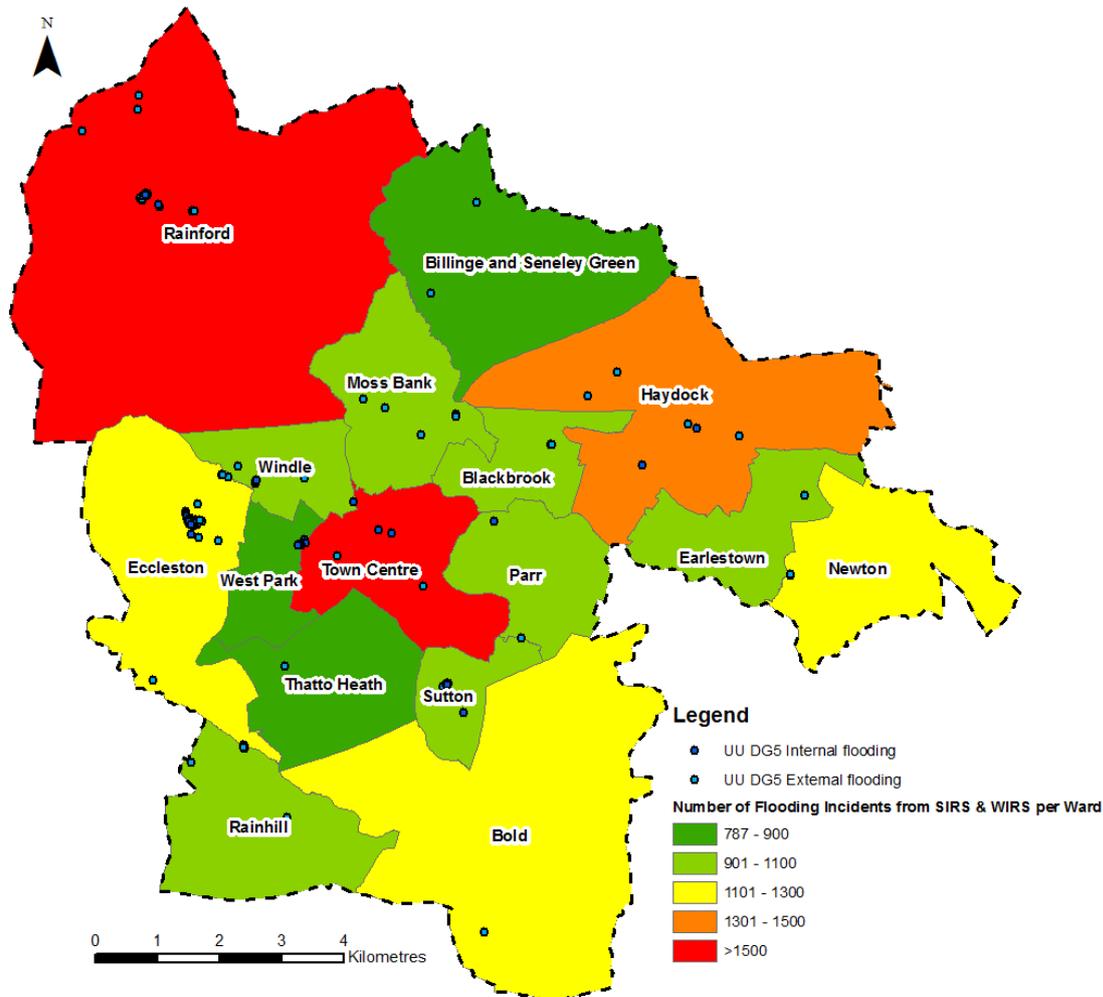
- Wastewater Incident Register System (WIRS) - April 2008 to April 2013
- DG5 Register – May 2013

United Utilities SIRS and WIRS datasets provide a register of all incidents related to United Utilities wastewater assets from 1990. The WIRS system replaced the SIRS in 2008. The raw incident data has been filtered to only include records which are flooding related (foul, surface water and sewer surcharge). In the majority of incidents, blockage of the underground system has been the root cause, resulting in flooding to properties and highways.

United Utilities also provided their “DG5 Register”, which is a register of properties in their area that have suffered internal or external flooding from overloaded public sewers. The register is only a “snap shot” in history of those properties on the register at the time it was supplied, and properties may have been added or removed since it was supplied. The DG5 register was provided in May 2013. In order to remove a property from the DG5 register the flooding problem should have been resolved or an investigation should have been undertaken to prove that the public sewer was not the source of the flooding.

Figure 4-2 illustrates the geographical distribution of DG5 records across the study area along with the total number of historical flooding incidents recorded in United Utilities SIRS and WIRS databases for each Ward in the Borough.

**Figure 4-2: United Utilities Historical Flood Records**



Whilst the DG5 register and the SIRS and WIRS datasets can give an idea of those areas at risk, they are purely identifying locations that have flooded previously and issues may have been resolved through United Utilities ongoing sewer improvements programme. The datasets do however provide a useful dataset for model verification or using alongside alternative data sources such as the Environment Agency’s AStSWF, FMfSW or uFMfSW.

#### 4.3.7 Critical Drainage Areas

The Town and Country Planning (Development Management Procedure) (England) Order 2010 defines Critical Drainage Areas as “an area within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the Environment Agency”.

For the purpose of this SFRA, a Critical Drainage Area (CDA) is considered to be an area contributing surface water runoff, either as direct overland flow or from the existing sewer network, which causes flooding at locations within that area. The risk of flooding is thereby confirmed, either by historical evidence, or through numerical modelling or other detailed form of analysis. A CDA therefore has areas within it where surface water flood risk exists (flood prone areas within a CDA) and areas where properties, although not directly at risk, contribute to that flood risk (upstream areas in a CDA directly affecting flood-prone areas).

In an attempt to designate CDAs the Council’s preparatory SWMP assessment has been reviewed along with the surface water risk to proposed sites, taking into account the size of development sites and the possibility of increased surface water risk caused by development on current Greenfield sites. Limited evidence exists regarding historical surface water flood incidents in the Borough, and a review of the larger allocation sites failed to yield any significant surface water drainage issues associated with allocated sites.

A further review was carried out using the uFMfSW 100 year outline, proposed allocations and current residential properties. The methodology used for this review can be found in Appendix E. The criteria for the proposal of CDAs is summarised below:

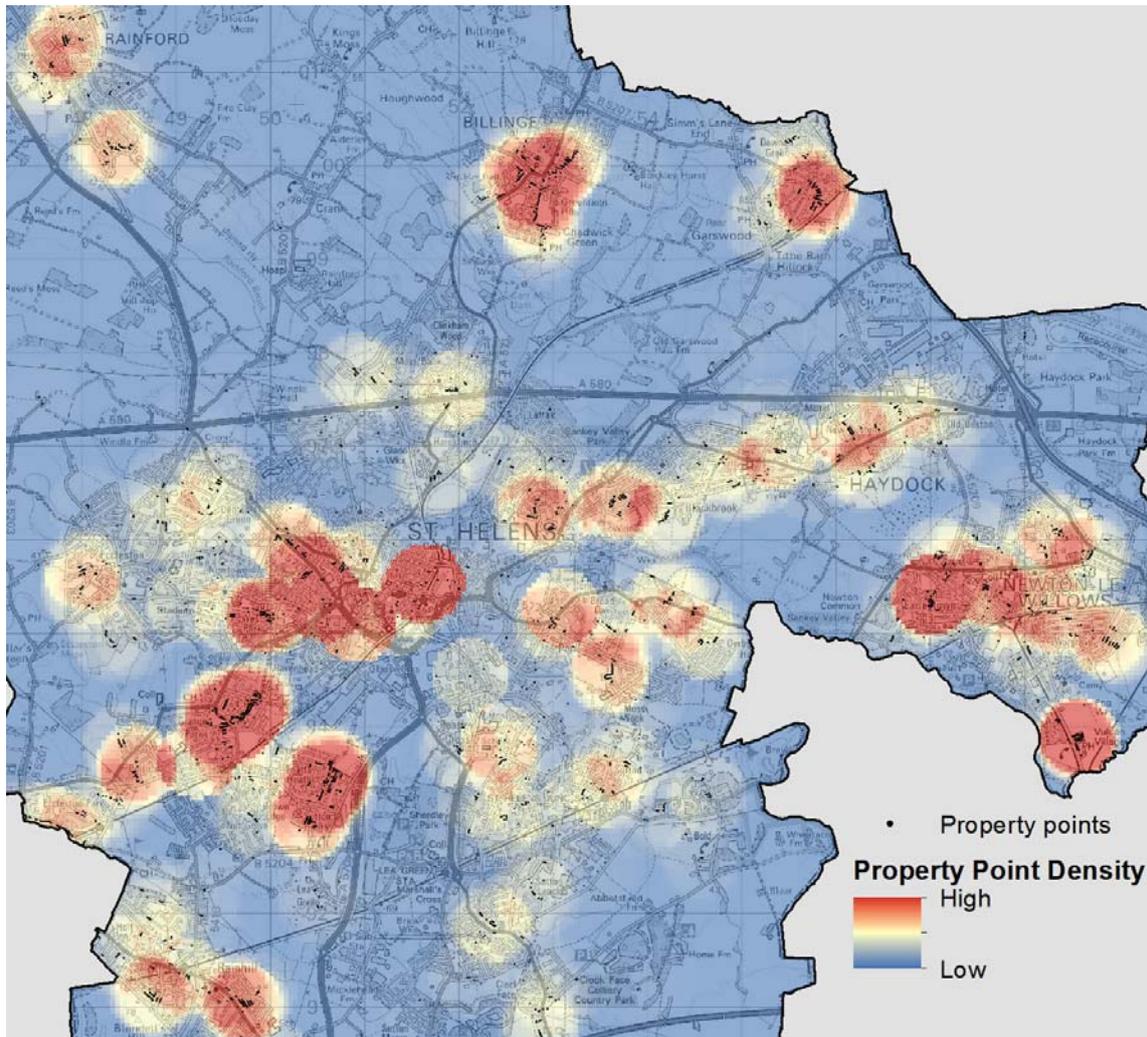
- Areas at surface water risk, according to the uFMfSW 100 year outline, that are within Flood Zone 1
- Areas with clusters of allocated new development within Flood Zone 1 that are at risk from surface water flooding – within the 1 in 100 year uFMfSW outline
- Areas with clusters of current residential properties within Flood Zone 1 that are at risk from surface water flooding – within the 1 in 100 year uFMfSW outline

The final output from the CDA review showed the areas with the highest numbers of allocations and properties at risk from a 1 in 100 year surface water flood event, in Flood Zone 1. Based on this output, the main areas that could be considered for CDAs include:

- Sutton Heath
- Toll Bar
- St Helens centre
- Earlestown
- Vulcan Village
- Garswood
- Billinge
- Rainhill

Figure 4-3 shows these areas in darker red, where clustering of properties and allocations is greatest. The Council should use this information together with any historic incidents and local knowledge to designate CDAs and to decide on whether a detailed SWMP or drainage strategy is required for these areas. Any further work would entail consultation between the Council and United Utilities on the capacity of existing sewer systems in order to identify critical parts of the system (pinch points). Model outputs could be obtained to confirm the critical parts of the drainage network. Recommendations could then be made for future development i.e. strategic SuDS sites, parts of the drainage system where any new connections should be avoided, parts of the system that has any additional capacity and recommended runoff rates.

**Figure 4-3: Proposed CDA Locations**



#### 4.4 Groundwater flooding

Groundwater flooding is caused by the emergence of water from beneath the ground, either at point or diffuse locations. The occurrence of groundwater flooding is usually local and unlike flooding from rivers and the sea, does not generally pose a significant risk to life due to the slow rate at which the water level rises. However, groundwater flooding can cause significant damage to property, especially in urban areas, and can pose further risks to the environment and ground stability.

There are several mechanisms that increase the risk of groundwater flooding including prolonged rainfall, high in bank river levels, artificial structures, groundwater rebound and mine water rebound. Properties with basements or cellars or that are located within areas susceptible to groundwater flooding are at particular risk.

The Environment Agency's CFMPs do not consider groundwater flooding to be a significant issue in the Borough, as there is little historic evidence to suggest that groundwater flooding is an issue worth further investigation.

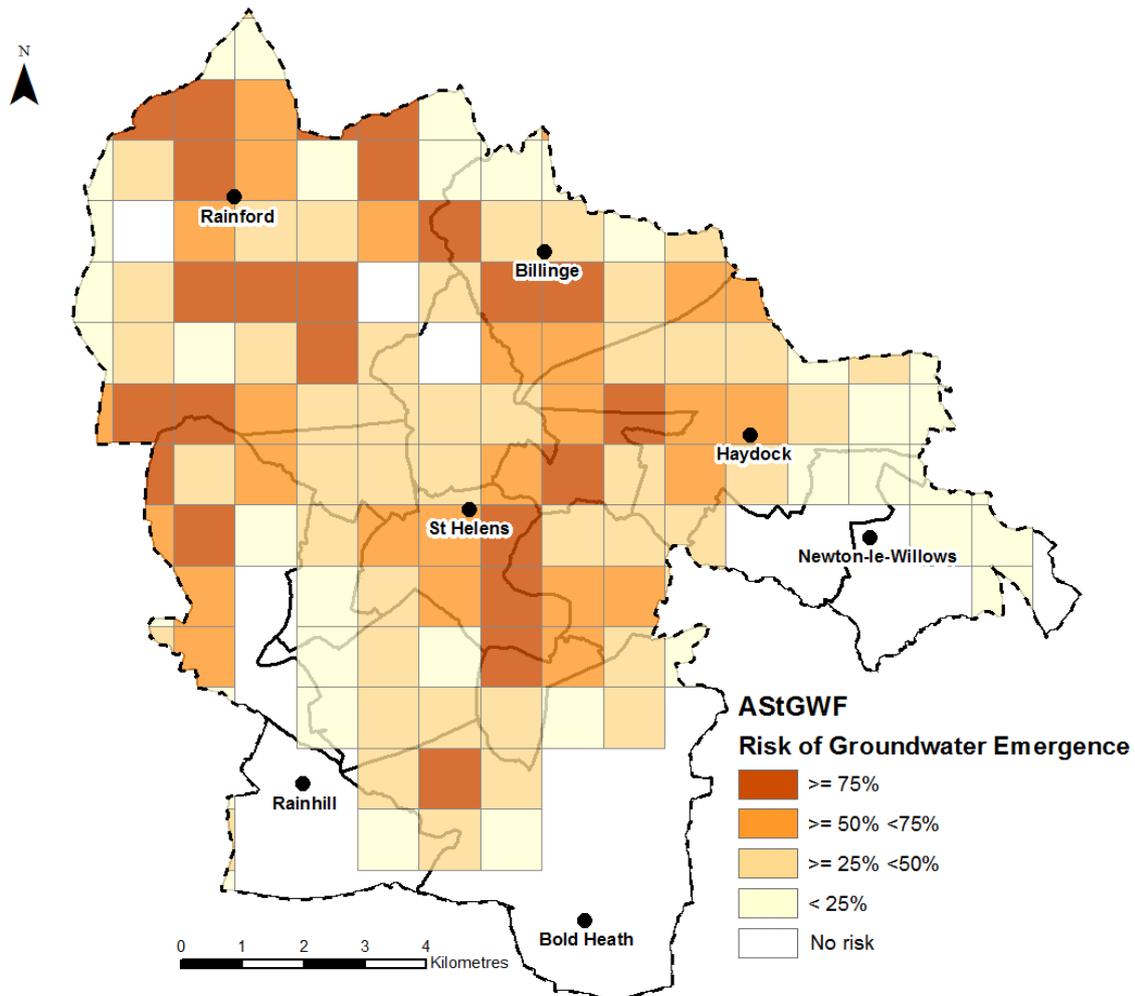
Development within areas susceptible to groundwater flooding will generally not be suited to SuDS and proposals for infiltration drainage; however, this is dependent on a detailed site investigation and risk assessment.

The Environment Agency's national dataset, Areas Susceptible to Groundwater Flooding (AStGWF), provides the main dataset used to assess the future risk of groundwater flooding. The AStGWF map uses four susceptible categories to show the proportion of each 1km grid

square where geological and hydrogeological conditions show that groundwater might emerge. It does not show the likelihood of groundwater flooding occurring.

Figure 4-4 illustrates the AStGWF map. It shows that the risk of groundwater emergence is very high in parts of St Helens, Rainford and Billinge and very low in Newton-le-Willows and Haydock. There could however be localised problems in these areas, which are not identified on this strategic map. The Council cannot recall any significant issues associated with groundwater flooding in the past however.

**Figure 4-4: Areas Susceptible to Groundwater Flooding**



## 4.5 Canal and Reservoir Flood Risk

### 4.5.1 Canals

The St Helens Canal, also known as the Sankey Canal, is now disused. The canal was subject to decline and gradual closure during the 20<sup>th</sup> century though recent restoration means some sections are in water and several locks have been rebuilt. In Halton Borough, the entrance to the canal from the River Mersey is still navigable and is used for moorings. The risk of flooding from the canal is unknown though risk is thought to be minimal.

### 4.5.2 Reservoirs

A reservoir is usually an artificial lake where water is stored for use. Some reservoirs supply water for household and industrial use, others serve other purposes, for example, as fishing lakes or leisure facilities. Like canals, the risk of flooding associated with reservoirs is residual and is associated with failure of reservoir outfalls or breaching. This risk is reduced through regular maintenance by the operating authority. Reservoirs in the UK have an extremely good safety record with no incidents resulting in the loss of life since 1925.

The Environment Agency is the enforcement authority for the Reservoirs Act 1975 in England and Wales. All large reservoirs must be regularly inspected and supervised by reservoir panel engineers. Local Authorities are responsible for coordinating emergency plans for reservoir flooding and ensuring communities are well prepared. Local Authorities will work with other members of the Local Resilience Forum (LRF) to develop these plans.

There are a number of dams and reservoirs throughout the Borough which have residual flood risks associated with them. The largest of these dams is Carr Mill Dam which is owned and maintained by the Canal & River Trust. The remaining dams and reservoirs have not been investigated as part of this SFRA. It is appropriate to say however, that the residual risk associated with these dams should be mitigated through appropriate maintenance and regular inspections.

The previous Level 1 SFRA carried in 2009 found that a possible failure of the impounding structure of Carr Mill Dam and the ensuing spill of the reservoir to be a potentially very serious flood risk issue within St Helens, downstream of the dam. It is envisaged that the rapid emptying of the reservoir would lead to a rapidly moving body of water down Black Brook and through Sankey Valley Park prior to reaching the Sankey Brook confluence. Flood water depth, water velocities and the wave surge would all contribute to potentially significant economic damage and more importantly risk to people.

#### 4.5.3 Reservoir Flood Maps

The Environment Agency has prepared reservoir flood maps for all large reservoirs that they regulate under the Reservoirs Act 1975 (reservoirs that hold over 25,000 m<sup>3</sup> of water).

The maps show the largest area that might be flooded if a reservoir were to fail and release the water it holds but do not give any information about the depth or speed of the flood waters. Council Emergency Planners will have access to this information so they can develop effective Emergency Plans. However this is not available to the public due to the sensitivity of the information and therefore has not been provided within this SFRA.

However, reservoir flood maps can be viewed online only and can be found on the Environment Agency's website<sup>8</sup>.

The FWMA updated the Reservoirs Act, reducing the capacity at which reservoirs will be regulated from 25,000m<sup>3</sup> to 10,000m<sup>3</sup>. These reservoirs will not have been covered by the Environment Agency's inundation maps though may be mapped in any future updates.

#### 4.5.4 Historical Flooding

As part of the SFRA, the Canal & River Trust have provided their Asset Register<sup>9</sup>, which includes a database of their assets including canals, major embankments and reservoirs together with historic breach and overtopping locations. There are not many Canal & River Trust owned assets across the Borough with only the Sankey Canal, one major embankment, Carr Mill Dam reservoir and a short section of canal owned and maintained by the Canal & River Trust.

The listed condition grade of the major embankment, located at Newton Common is C (fair). The Asset Register records that the Sankey Canal was overtopped on both banks on 24<sup>th</sup> September 2012 leading to flooding of the Blackbrook housing estate to the east of the canal. There was also a recorded breach in 1951 at Vulcan Village due to a culvert collapse. SFRA Map 010 shows the recorded historical flood events from Canal & River Trust assets.

## 4.6 Flood Risk Management

The aim of this section of the SFRA is to identify existing Flood Risk Management (FRM) assets and proposed FRM schemes through St Helens. The location, condition and design standard of existing assets will have significant impact on actual flood risk mechanisms. Whilst future schemes in high flood risk areas carry the possibility of reducing the probability of flood events

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<sup>8</sup>[http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=\\_e&topic=reservoir](http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=reservoir)

<sup>9</sup> Canal and River Trust Asset Register dated 8<sup>th</sup> May 2013

and reducing the overall level of risk. Both existing assets and future schemes will have a further impact on the type, form and location of new development or regeneration through the Borough.

#### 4.6.1 Environment Agency Assets

There are several formal raised man-made defences identified within the Environment Agency's National Flood and Coastal Defence Database (NFCDD) in the Borough. These are listed in Table 4-4 and shown on SFRA Map 006. There are also many watercourses which are classed as maintained channels and are maintained by private owners or by the Environment Agency.

Note that NFCDD is being superseded, in 2014, by the Asset Information Management System (AIMS) which will hold all information on all assets of interest to the Environment Agency.

**Table 4-4: NFCDD Raised Man-Made Defences**

Asset Reference	Maintainer	Design Standard	Condition Assessment	Watercourse	Grid Reference
01316MLEC0101R09	Private	5	Unknown	Mill Brook	SJ4919495865
01316MLEC0102L97	Environment Agency	50	Unknown	Mill Brook	SJ4878595679
01316MLEC0102L99	Environment Agency	50	Unknown	Mill Brook	SJ4893695840
01316PEN20101R05	Environment Agency	75	Unknown	Pendlebury Brook	SJ5152191217
01316SUM10101R13	Private	5	Unknown	Waterdale Reservoir	SJ5289093287
01316WIND0101L02	Environment Agency	50	Poor, following structural inspection	Windle Brook	SJ5002695956
01316WIND0101L26	Environment Agency	50	Unknown	Windle Brook	SJ4958296124
01316WIND0101L29	Environment Agency	50	Unknown	Windle Brook	SJ4934096168
01316WIND0101R18	Private	5	Unknown	Windle Brook	SJ4957496121

The Environment Agency carries out a number of other flood risk management activities that help to reduce the probability of flooding, whilst also addressing the consequences of flooding. These include:

- Maintaining and improving existing flood defences, structures and watercourses.
- Enforcement and maintenance where riparian owners carry out work detrimental to flood risk.
- Identifying and promoting new flood alleviation schemes where appropriate.
- Working with Local Authorities to influence the location, layout and design of new and redeveloped property and ensuring that only appropriate development is allowed on the floodplain.
- Operation of Flood Warnings Direct and warning services in areas of Rainford along Rainford Brook, Dentons Green in St Helens along Windle Brook, Moss Nook in St Helens along Sutton Brook and at Sutton Leach in St Helens along Sutton Mill Brook.
- Promoting awareness of flooding so that organisations, communities and individuals are aware of the risk and are prepared in case they need to take action in time of flood.
- Promoting resilience and resistance measures for those properties already in the floodplain.

#### 4.6.2 United Utilities Assets

The sewerage infrastructure of St Helens is largely based on Victorian sewers and there is a risk of localised flooding associated with the existing drainage and sewer system. The drainage system may be under capacity and/or subject to blockages resulting in localised flooding of roads and property. United Utilities is responsible for the management of the urban drainage system throughout St Helens including surface water and foul sewerage. Such United Utilities assets include Wastewater Treatment Works, Combined Sewer Overflows, pumping stations, detention tanks, sewer networks and manholes.

United Utilities take the issue of surface and foul water flooding very seriously and have invested £52 million over recent years to reduce flooding from these sources in the North West. St Helens is one of the areas that have benefited from this investment. The Amp 4 project involved a refurbishment of St Helens WwTW 'B' works activated sludge plant. United Utilities were consulted to obtain information on the number of recorded incidences of sewer flooding.

United Utilities are currently developing their business plan for AMP6 (2015-2020) and were unable to provide any further details.

#### 4.6.3 St Helens Council Assets

As a LLFA, SHC will own and maintain a number of assets throughout the district including culverts, bridge structures, trash screens, highway drains and gullies. The majority of these assets are likely to lie along the Ordinary Watercourses in the Borough, especially within urban areas, such as St Helens, where they have been culverted or diverted. These assets can have flood risk management functions as well as affect flood risk if they become blocked or fail.

As part of their FWMA duties, SHC has a duty to maintain a register of structures or features, which are considered to have an effect on flood risk, including details on ownership and condition as a minimum. Data collection was carried out by JBA Consulting in 2012 and the SHC Flood Asset Database was completed in 2013. The database includes such information as asset owner, structure type, asset reference ID and watercourse classification and flood risk extents if failure was to occur. Asset condition ratings are not yet included but the Council are currently undertaking asset inspections to prioritise individual structures.

The SHC LFRMS should outline how the Council intend to manage these assets or features including their ongoing maintenance programme. Where assets or features are located in a high risk area or have been assessed to have the potential to effect flood risk, the Council should prioritise and focus any maintenance or upgrades.

#### 4.6.4 Future Flood Risk Management Schemes

Within their Medium Term Plan, the Environment Agency is planning to carry out an appraisal of the river and surface water flooding issues experienced in the summer of 2012. Local Levy planned expenditure on the appraisal will be approximately £30,000.

## 5 Development and Flood Risk

### 5.1 Introduction

This section of the SFRA provides a strategic assessment of the suitability of potential site allocations across the Borough, including their direct and indirect impact on flood risk.

The information and guidance provided in this section (supported by the SFRA mapping) can be used by the Council to inform the Sustainability Appraisal (incorporating the Strategic Environmental Assessment Directive) of the Local Plan, and provide the basis from which to apply the Sequential Approach in the development allocation and development management process.

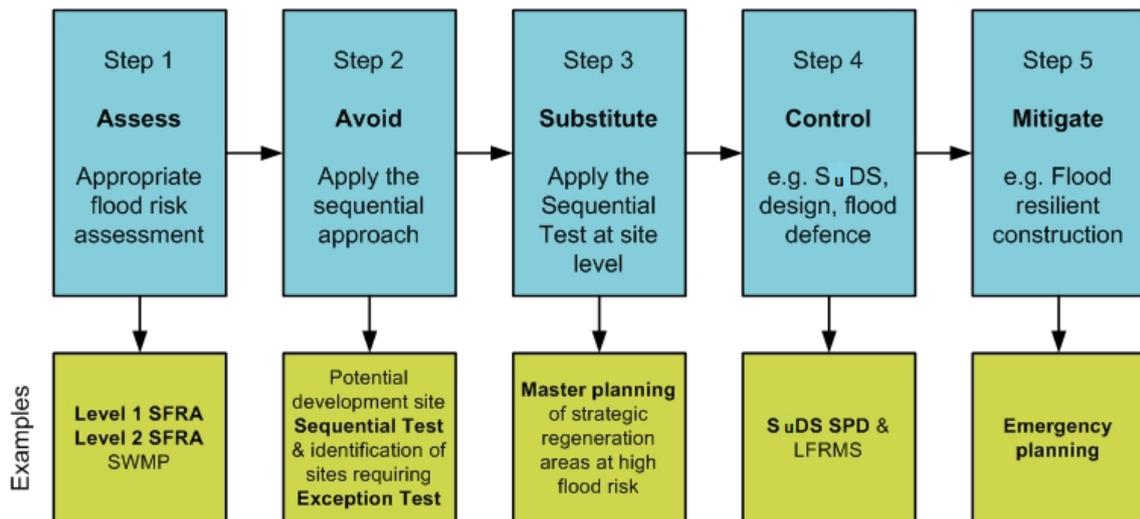
### 5.2 The Sequential Approach

The NPPF Technical Guide provides the basis for the Sequential Approach. It is this approach, integrated into all stages of the development planning process, which provides the opportunities to reduce flood risk to people, their property and the environment to acceptable levels.

The approach is based around the flood risk management hierarchy, in which actions to avoid, substitute, control and mitigate flood risk is central. For example, it is important to assess the level of risk to an appropriate scale during the decision making process, (starting with this SFRA). Once this evidence has been provided, positive planning decisions can be made and effective flood risk management opportunities identified.

Figure 5-1 illustrates the flood risk management (FRM) hierarchy with an example of how these may translate into the Council's management decisions and actions.

**Figure 5-1: Flood Risk Management Hierarchy**



The overall aim of the Sequential Approach should be to steer new development to low risk Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, the flood risk vulnerability of land uses and reasonably available sites in Flood Zone 2 should be considered, applying the Exception Test if required.

Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in higher risk Flood Zone 3, be considered. This should take into account the flood risk vulnerability of land uses and the likelihood of meeting the requirements of the Exception Test if required.

There are two different aims in carrying out the Sequential Approach depending on what stage of the planning system it is being carried out i.e. Local Planning Authorities (LPAs) allocating land in Local Plans or determining planning applications for development.

The following sections are split between the two key users to provide a guided discussion on why and how the Sequential Approach should be applied, including the specific requirements for undertaking **Sequential** and **Exception Testing**.

### 5.3 Local Plan Sequential and Exception Test

SHC, as the LPA, should seek to avoid inappropriate development in areas at risk of flooding by directing development away from areas at highest risk and ensuring that all development does not increase risk and where possible can help reduce risk from flooding to existing communities and development.

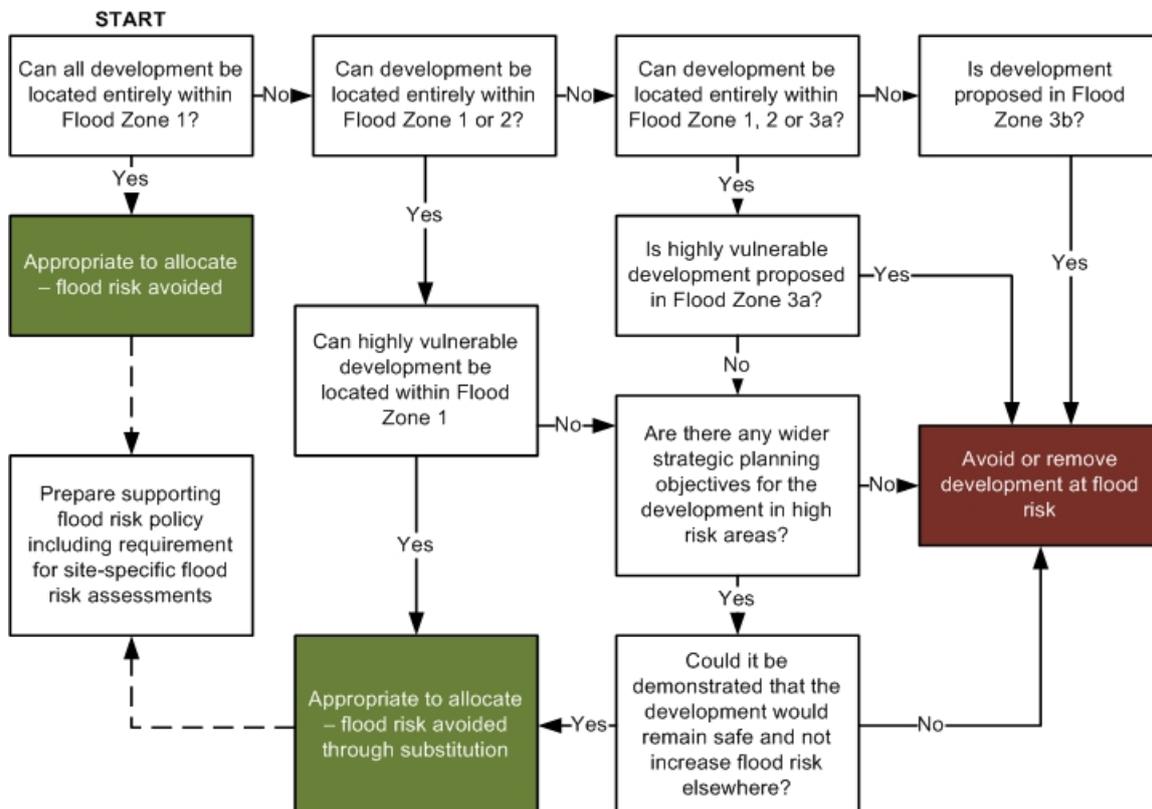
At a strategic level, this should be carried out as part of the Core Strategy and/or allocation of sites for development during the Local Plan by applying the risk-based approach to the allocation of development to avoid flood risk to people and property and manage any residual risk, taking account of the impacts of climate change. This should be done by:

1. Applying the Sequential Test and if necessary, applying the Exception Test;
2. Safeguarding land from development that is required for current and future flood management; and
3. Using opportunities offered by new development to reduce the causes and impacts of flooding.

Figure 5-2 illustrates the Sequential and Exception Tests as a process flow diagram using the information contained in this SFRA to assess potential development sites against the NPPF Flood Zone and development vulnerability compatibilities (see Appendix A).

This is a stepwise process, but a challenging one, as a number of the criteria used are qualitative and based on experienced judgement. The process must be documented and evidence used to support decisions recorded.

**Figure 5-2: Local Plan Sequential Approach to Allocation**



This SFRA provides the main evidence required, along with the LPA Core Strategy and Sustainability Appraisal, to carry out this process. This process also enables those sites requiring the Exception Testing to be identified.

For the Exception Test to be passed:

- a) It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk; and
- b) A site-specific Flood Risk Assessment (FRA) must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Although actually passing the Exception Test will require the completion of a site-specific FRA, the Council should be able to assess the likelihood of passing the test at the Local Plan level by using the information contained in this SFRA to answering the following questions:

1. Can development within higher risk areas be avoided through avoidance or substitution?
2. Is flood risk associated with possible development sites considered too high; and will this mean that the criteria for Exception Testing are unachievable?
3. Can risk be sustainably managed through appropriate techniques without compromising the viability of the development?
4. Can the site and its occupiers remain safe during times of flood if developed?

Where it is unlikely that the Exception Test can be passed due to few wider sustainability benefits, the risk of flooding being too great, or the viability of the site is compromised by the flood risk management work required, then the Council should consider avoiding the site all together.

Once the process has been completed the Council should then be able to revisit and update the Sustainability Appraisal with the allocation of development sites, as well as prepare flood risk policy including the requirement to prepare site-specific FRAs for all allocated sites that remain at risk of flooding.

## 5.4 Potential Development Site Assessment

The Strategic Housing Land Availability Assessment<sup>10</sup> (SHLAA) went out to public consultation from 14<sup>th</sup> February to 13<sup>th</sup> March 2013.

The assessment found there to be 403 suitable sites that could deliver a projected 7,917 units over the next 15 years with a further 593 units expected to come forward in years sixteen and beyond. This has been identified from a total of 238 hectares and at a density of 36 dwellings per hectare. 80% of units are expected to be built on previously developed land, whilst 59% of the identified supply will be delivered by sites within the planning process (i.e. those with planning permission or allocated for housing).

A number of potential development sites have been identified by the Council including:

- Suitable SHLAA sites 2012. Those that are considered suitable for development within 15 years
- SHLAA Nondelptot 2012 – sites currently not deliverable but with some potential in the future
- Economic Land Group 1 sites – 2012
- Economic Land Group 2 sites – 2012

In order to inform the first part of the Sequential Approach, illustrated in Figure 5-2, this SFRA has carried out a high level screening exercise overlaying all potential development sites, provided by the Council, against Flood Zones 1, 2, 3a and 3b. As an extra layer of information,

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<sup>10</sup> St Helens Council Strategic Housing Land Availability Assessment, May 2013

each site has been reviewed against the Environment Agency's uFMfSW map to help identify those sites that may have critical drainage problems. A detailed proposed site screening Excel spreadsheet is included in Appendix C which provides a breakdown of each site and the Area (ha) and percentage cover of each of the fluvial and surface water flood zones.

Table 5-1 provides a count of the number of potential development sites within the NPPF Flood Zones 1, 2, 3a and 3b. Each site has been attributed to the highest flood risk zone.

**Table 5-1: Number of Potential Development Sites at Risk from NPPF Flood Zones**

Site Type	Number of Sites	Number of Sites Partially within...		
		Flood Zone 2	Flood Zone 3a	Flood Zone 3b
SHLAA Suitable	403	6	6	1
SHLAA Nondelpot	135	1	4	2
Economic Group 1	13	0	0	0
Economic Group 2	17	1	1	0
<b>Total</b>	<b>568</b>	<b>8</b>	<b>11</b>	<b>3</b>

There are 22 sites at fluvial risk. Table 5-2 provides a detailed breakdown of the 22 sites identified as high to medium risk of flooding (Flood Zone 3b, 3a and 2).

**Table 5-2: Summary of Potential Development Sites at Risk**

Flood Zone 2
Flood Zone 3a
Flood Zone 3b

Development Name	Development Type	Area (ha)	% in FZ1	% in FZ2	% in FZ3a	% in FZ3b
Land South West Of Sandwash Close	Economic Land Group 2	6.18	68	6	26	0
Former Sankey Sugar Works	Economic Land Group 2	4.73	100	0.002	0	0
Land rear of 14 to 20 Weymouth Avenue	SHLAA 2012 Suitable	0.36	24	76	0	0
Land Between 8 & 34 Portland Way and 161 & 123 Berry's Lane	SHLAA 2012 Suitable	0.28	0.2	99.8	0	0
Former Polar Ford, City Road	SHLAA 2012 Suitable	2.32	99.7	0.3	0	0
Former Bowling Green Inn, 220 Watery Lane	SHLAA 2012 Suitable	0.22	77	23	0	0
Land at Somerset Street and Sussex Grove	SHLAA 2012 Suitable	2.22	100	0.00002	0	0
Land rear of 64-94 Marshalls Cross Road	SHLAA 2012 Suitable	0.97	92	7.4	0.2	0

Development Name	Development Type	Area (ha)	% in FZ1	% in FZ2	% in FZ3a	% in FZ3b
Former Windle City Sports Club, City Road	SHLAA 2012 Suitable	4.67	99.7	0.3	0	0
Former Rivington Centre, Rivington Road	SHLAA 2012 Suitable	0.50	99.3	0.5	0.04	0.1
Birch Tree Farm, Moss Bank Road	SHLAA 2012 Suitable	0.63	50	33	17	0
McFall Salvage, Southworth Road	SHLAA 2012 Suitable	1.13	99	0.2	1.2	0
Mill Brow Cottage, Mill Brow	SHLAA 2012 Nondelpot	0.08	99.8	0.02	0.07	0.04
Prestige Motors, Mill Lane	SHLAA 2012 Nondelpot	0.26	99.5	0.5	0	0
Land rear of 2-64 Boardmans Lane	SHLAA 2012 Nondelpot	1.57	86	5	2	7
Land north of Vicarage Road	SHLAA 2012 Nondelpot	0.64	87	8	5	0
Milton Street	SHLAA 2012 Nondelpot	1.28	69	15	16	0
Land adjacent Allotments, Walkers Lane	SHLAA 2012 Nondelpot	0.86	97	0.5	2.4	0
Christ Church Parish Hall, Chapel Lane	SHLAA 2012 Suitable	0.36	99.99	0	0.004	0
Land to the side of 3 Ash Grove	SHLAA 2012 Suitable	0.04	96	0	4.5	0
Land adjacent St. Helens Hospital, Marshalls Cross Road	SHLAA 2012 Suitable	1.66	98	0	2	0
1 Lords Fold	SHLAA 2012 Nondelpot	0.14	92	0	7.6	0

The Council should use the screening spreadsheet to identify which sites should be avoided during the Sequential Test. The spreadsheet can also be used to assess whether or not economic and housing projections can be met by purely allocating sites in areas at low risk of flooding.

If this is not the case, or where wider strategic objectives require regeneration in areas already at risk of flooding, then the Council should consider the compatibility of vulnerability classifications and Flood Zones (Appendix A) and whether or not the Exception Test will be required before allocating sites.

## 5.5 Proposed Development Sites Review

This section provides a detailed yet high level overview of flood risk for each of the 22 proposed sites identified in the screening process. The site reviews are split up based on the level of risk.

### 5.5.1 Proposed Sites at Risk from Flood Zone 3b (Functional Floodplain)

#### SHLAA Suitable site 330 – former Rivington Centre, Rivington Road



		Flood Zones	uFMfSW		
	Proposed site		Flood Zone 3b		30 year event
	Detailed River Network		Flood Zone 3		100 year event
	Internal DG5		Flood Zone 2		1000 year event
	External DG5				
	SIRS / WRS				

0.7% of this site is at fluvial risk from Windle Brook with only 0.1% within Flood Zone 3b. The site is currently developed with part of the site having been cleared. Due to the small proportion of the footprint at risk, it is recommended that there is no development within Flood Zone 3 (including the maintenance easement). 19% of the site is at risk from surface water flooding. The southern portion of the site should entail on-site surface water drainage design to take this risk into account.

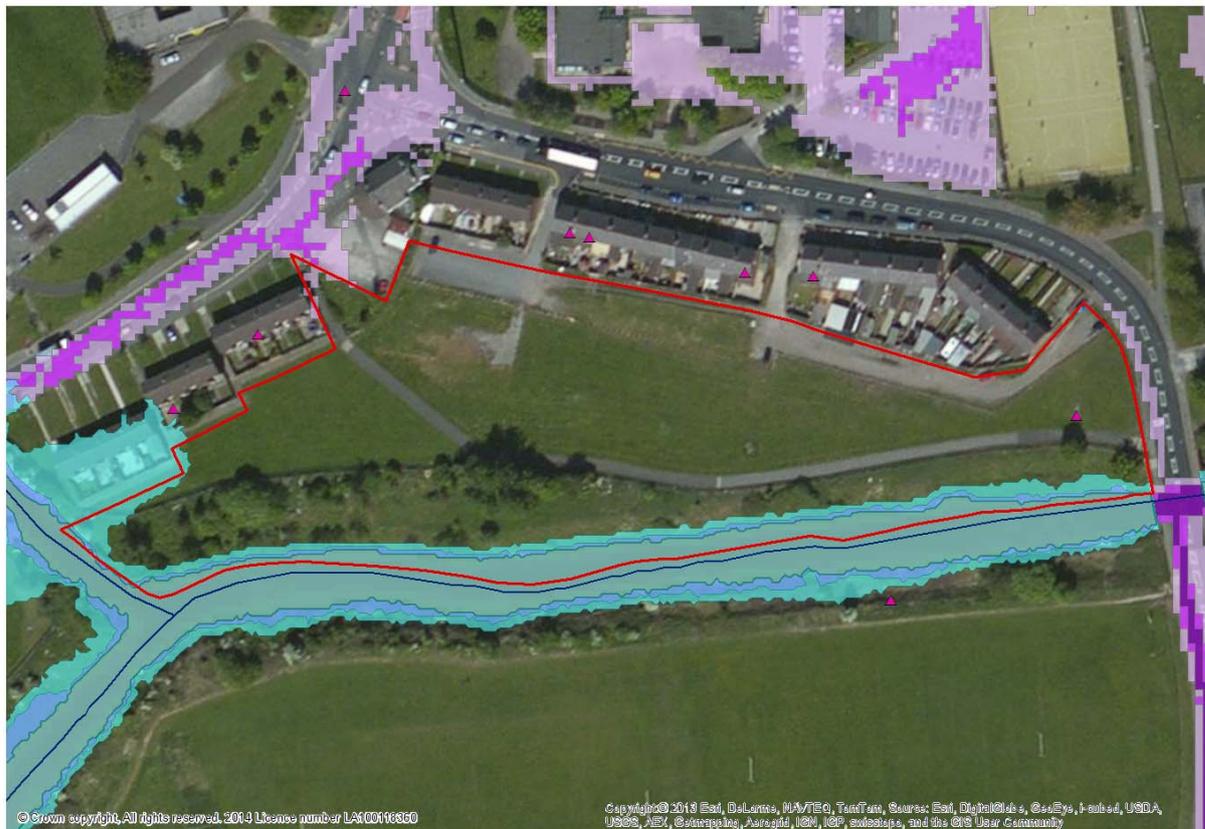
**SHLAA Nondelipot site 28 – Mill Brow Cottage, Mill Brow**



	Proposed site	<b>Flood Zones</b>	<b>uFMfSW</b>
	Detailed River Network		Flood Zone 3b
	Internal DG5		Flood Zone 3
	External DG5		Flood Zone 2
	SIRS / WRS		30 year event
			100 year event
			1000 year event

The SHLAA dataset states that original permissions were for the replacement of the existing dwelling therefore there would be no net increase in site footprint. Only 0.1% of this site is at fluvial risk from Sutton Mill Brook with only 0.04% within Flood Zone 3b. The area of the site at risk is within the 8m easement where development is not permitted. It is recommended that there should be no development within Flood Zone 3. Surface water flooding is not an issue at this site though there have been two previous surface water flooding incidents which can be attributed to blocked drains on site.

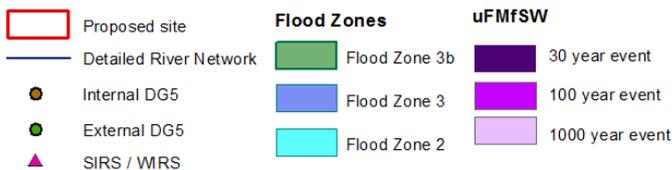
SHLAA Nondelipot site 270 – land rear of 2 – 64 Boardmans Lane



	Proposed site	<b>Flood Zones</b>	<b>uFMfSW</b>
	Detailed River Network	 Flood Zone 3b	 30 year event
	Internal DG5	 Flood Zone 3	 100 year event
	External DG5	 Flood Zone 2	 1000 year event
	SIRS / WRS		

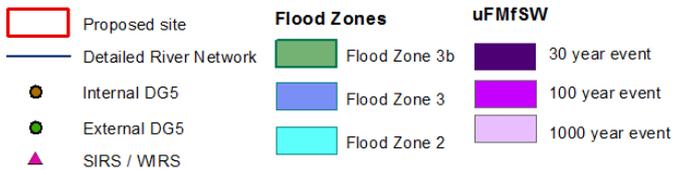
This site was allocated as public open space in the Unitary Development Plan (UDP). 14% of this site is at fluvial risk from Sankey Brook with 7% within Flood Zone 3b. More vulnerable uses (residential dwellings) are not permitted in Flood Zone 3b according to NPPF guidance. 2% of the site is within Flood Zone 3a where more vulnerable uses should pass the Exception Test. It is recommended that there should be no development within Flood Zone 3a. An alternative would be to modify the southern boundary to remove it from Flood Zone 3a. 5% of the site is within Flood Zone 2 where more vulnerable uses are permitted though a detailed FRA would be required including consideration of surface water management and SuDS. Not all flood susceptible areas of the site are located within the 8m easement where development is not permitted. Surface water flood risk is not a significant issue on site however as the current land use is open green space, any development should consider surface water management to ensure that on and off site risks are controlled. SuDS may offer opportunities to control runoff to Greenfield rates. This site is also affected by proposed alternative routes for a restored Sankey Canal.

### 5.5.2 Proposed Sites at Risk from Flood Zone 3a Economic Land Group 2 site 3Ec2 – land south-west of Sandwash Close



32% of this site is at fluvial risk from Rainford Brook with 26% within Flood Zone 3a. A modelled 20 year or 25 year outline is not available for this section of Rainford Brook so Flood Zone 3a should conservatively be considered as representative of functional floodplain. Only water compatible or essential infrastructure is therefore permitted and any essential infrastructure should pass the Exception Test. A detailed FRA would be required, possibly including modelling of Rainford Brook to confirm flood zone definition and to define the extent of the functional floodplain. The site has not previously been developed and is currently open greenspace used for grazing. It is recommended that no development should be located within the Flood Zone 3 area though the proposed development footprint is constrained by Rainford Industrial Estate and field boundaries. Surface water flood risk is not a significant issue on site. However as the current land use is open greenspace, any development should consider surface water management to ensure that on and off site risks are controlled. SuDS may offer opportunities to control runoff to Greenfield rates.

SHLAA Suitable site 234 – Christ Church Parish Hall, Chapel Lane



A nominal area of this site is located within Flood Zone 3. Recommend that development is located with Flood Zone 1 (subject to effective management of surface water). The area of the site at risk is likely to be located within the 8m easement where development is not permitted.

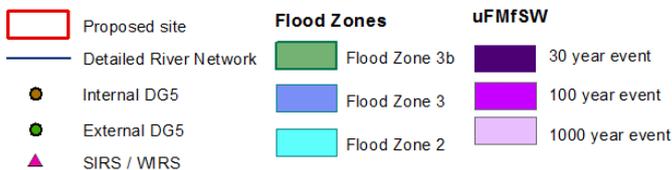
SHLAA Suitable site 286 – land rear of 64 – 94 Marshalls Cross Road



	Proposed site	<b>Flood Zones</b>	<b>uFMfSW</b>
	Detailed River Network	 Flood Zone 3b	 30 year event
	Internal DG5	 Flood Zone 3	 100 year event
	External DG5	 Flood Zone 2	 1000 year event
	SIRS / WRS		

This site has been allocated for housing under the UDP and has not previously been developed. 7.4% of the site is at fluvial risk from culverted Main River with 0.2% within Flood Zone 3a. A modelled 20 year or 25 year outline is not available for this area so Flood Zone 3a should conservatively be considered as representative of functional floodplain. The recommendation therefore, is for no development within Flood Zone 3 however more vulnerable uses (residential development) may be permitted within Flood Zone 2 following a detailed FRA including consideration of SuDS. Further modelling could be taken as part of the FRA to designate areas of functional floodplain though any remaining areas within Flood Zone 3 would need to pass the Exception Test. Surface water flood risk is not an issue on site however as the current land use is greenspace. Any development should consider surface water management to ensure that on and off site risks are controlled. SuDS may offer opportunities to control runoff to Greenfield rates.

**SHLAA Suitable site 413 – Birch Tree Farm, Moss Bank Road**



This site consists of agricultural buildings, within the Green Belt, considered for conversion to residential use within the next 6 – 10 years. 50% of this site is at fluvial risk from Rainford Brook with 17% within Flood Zone 3a. A modelled 20 year or 25 year outline is not available for this section of Rainford Brook so Flood Zone 3a should conservatively be considered as representative of functional floodplain. More vulnerable uses (residential dwellings) are not permitted in Flood Zone 3b according to NPPF guidance, therefore only water compatible or essential infrastructure are permitted and any essential infrastructure should pass the Exception Test. A detailed FRA would also be required. The recommendation is therefore for no development within the Flood Zone 3 area (area located partially within the 8m easement where development is not permitted). Further modelling of Rainford Brook could define the functional floodplain though any areas remaining in Flood Zone 3a would have to pass the Exception Test. 33% of the site is within Flood Zone 2, where more vulnerable uses are permitted once a detailed FRA is undertaken. Surface water flood risk is not a significant issue on the site but should be considered in surface water management of the site. The historic event shown from the SIRS / WIRS dataset was caused by a sewer collapse.

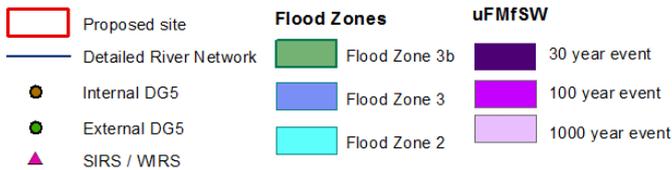
SHLAA Suitable site 661 – McFall Salvage, Southworth Road



	Proposed site	<b>Flood Zones</b>	<b>uFMfSW</b>
	Detailed River Network	 Flood Zone 3b	 30 year event
	Internal DG5	 Flood Zone 3	 100 year event
	External DG5	 Flood Zone 2	 1000 year event
	SIRS / WRS		

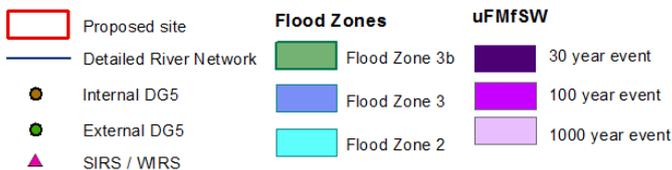
This site was formally a scrap-yard and is reserved for residential development within the next 5 years. Only 1.4% of this site is at fluvial risk from Newton Brook with 1.2% of the site being located within Flood Zone 3a. Only the far northern boundary of the site is within Flood Zone 3a and this part of the site is also with the 8m easement meaning development is not permitted in this area. The 0.2% within Flood Zone 2 can be removed through a slight adjustment of the site boundary. It should also be noted that the areas within Flood Zone 3 are at the toe of an embankment.

**SHLAA Suitable site 694 – land to the side of 3 Ash Grove**



This proposed development entails the construction of one dwelling on the site of a garage and swimming pool and covers a small section of land in a residential garden. 4.5% of this small site is within Flood Zone 3a at fluvial risk from Rainford Brook. A modelled 20 year or 25 year outline is not available for this section of Rainford Brook so Flood Zone 3a should conservatively be considered as representative of functional floodplain. Only water-compatible and less vulnerable uses of land are permitted in Flood Zone 3 according to NPPF guidance, more vulnerable uses (i.e. residential land use) need to pass the Exception Test. A detailed FRA would also be required which could include further modelling of Rainford Brook to define the functional floodplain. However any areas remaining in Flood Zone 3a would have to pass the Exception Test. Therefore the recommendation at the moment is for no development within the Flood Zone 3 area (area located partially within the 8m easement where development is not permitted). Surface water risk is extensive though confined to the 1 in 1000 year event. The possibility of withdrawing this development should be considered based on 80% of the site being at risk from surface water flooding and the fact that the site footprint is unlikely to be large enough to incorporate SuDS or on-site drainage.

**SHLAA Suitable site 766 – land adjacent St Helens Hospital, Marshalls Cross Road**



This site is a 1.7 ha previously developed site that has been cleared for a residential housing development for the elderly to be developed within the next 5 years. 2% of this site is within Flood Zone 3a at fluvial risk from culverted Main River. A modelled 20 year or 25 year outline is not available for this area so Flood Zone 3a should conservatively be considered as representative of functional floodplain. The recommendation is therefore for no development within Flood Zone 3 which should be possible through adjustment of the northern boundary of the site to remove it from the Flood Zone.

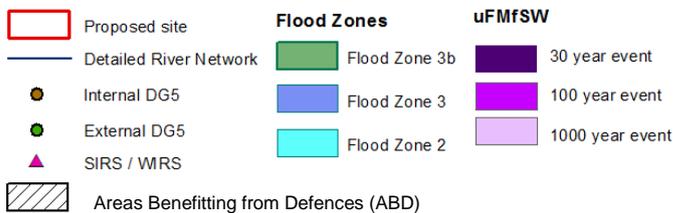
SHLAA Nondelpot site 280 – land north of Vicarage Road



	Proposed site	<b>Flood Zones</b>	<b>uFMfSW</b>
	Detailed River Network		Flood Zone 3b
	Internal DG5		Flood Zone 3
	External DG5		Flood Zone 2
	SIRS / WRS		30 year event
			100 year event
			1000 year event

This site covers an area of greenspace and allotments having been cleared from former development. 13% of the site is at fluvial risk from Clipsley Brook with 5% within Flood Zone 3a. A modelled 20 year or 25 year outline is not available for this section of Clipsley Brook so Flood Zone 3a should conservatively be considered as representative of functional floodplain. More vulnerable uses (residential dwellings) are not permitted within functional floodplain so the recommendation is for no development within the Flood Zone 3 area. Development within the 8m easement area is not permitted. 8% of the site is within Flood Zone 2 where more vulnerable uses are permitted. A detailed FRA would however be required through which further modelling of Clipsley Brook could define the functional floodplain. Any areas that remain in Flood Zone 3a would however have to pass the Exception Test. Surface water flooding also poses a significant risk with 39% of the site at some surface water flood risk and the potential of flooding from higher intensity events. Surface water will have to be effectively managed on site. The site is currently greenspace so potential development should consider surface water management to ensure that on and off site risks are controlled. SuDS may offer opportunities to control runoff to Greenfield rates.

SHLAA Nondelpot site 289 – Milton Street



The site is currently made up of greenspace and a number of allotments. 31% of this site is at fluvial risk from Pendlebury Brook with 16% within Flood Zone 3a. A modelled 20 year or 25 year outline is not available for this section of Pendlebury Brook so Flood Zone 3a should conservatively be considered as representative of functional floodplain. 68% of the site footprint within Flood Zone 3a is however within an Area Benefitting from Defences (ABD) which is protected by a 75 year Standard of Protection raised defence. Only 5% is therefore within what could be considered functional floodplain. More vulnerable uses (residential dwellings) are not permitted within functional floodplain therefore the recommendation is for no development to be located within non defended Flood Zone 3 area. Part of the site is located within the 8m easement where development is not permitted. 15% of the site is within Flood Zone 2, where more vulnerable uses are permitted once a detailed FRA is undertaken. The FRA could include further modelling of Pendlebury Brook to define the functional floodplain though any areas remaining in Flood Zone 3a would have to pass the Exception Test. Surface water flood risk is not a significant issue on the site but should be considered in surface water management of the site.

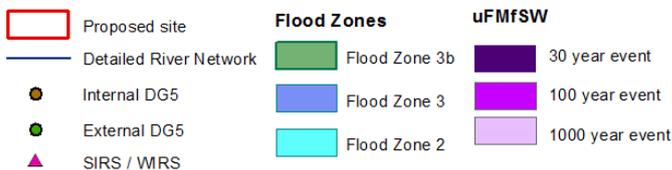
**SHLAA Nondelipot site 290 – land adjacent allotments, Walkers Lane**



	Proposed site	<b>Flood Zones</b>	<b>uFMfSW</b>
	Detailed River Network		
	Internal DG5		
	External DG5		
	SIRS / WRS		

The site is currently a wooded area allocated for housing under the UDP. Part of the site forms part of the Brickfields Community Woodland restoration project. If this site is developed then developers should be aware that 2.9% of the site is at fluvial risk from Pendlebury Brook with 2.4% within Flood Zone 3a. A modelled 20 year or 25 year outline is not available for this section of Pendlebury Brook so Flood Zone 3a should conservatively be considered as representative of functional floodplain. More vulnerable uses (residential dwellings) are not permitted in Flood Zone 3b so it is recommended that no development should be located within the Flood Zone 3 area. Part of the site is located within the 8m easement where development is not permitted. 0.5% of the site is within Flood Zone 2, where more vulnerable uses are permitted once a detailed FRA is undertaken. Any FRA could include further modelling of Pendlebury Brook to define the functional floodplain though any areas remaining in Flood Zone 3a would have to pass the Exception Test. Surface water flood risk is not a significant issue on the site but should be considered in surface water management of the site.

SHLAA Nondelpot site 573 – 1 Lord’s Fold



The site is currently a private residential garden. 7.6% of the site is within Flood Zone 3a at fluvial risk from Randle Brook. A modelled 20 year or 25 year outline is not available for this section of Randle Brook so Flood Zone 3a should conservatively be considered as representative of functional floodplain. More vulnerable uses (residential dwellings) are not permitted within functional floodplain therefore the recommendation is for no development to be located within Flood Zone 3. Further modelling of Randle Brook could be undertaken to define the functional floodplain though any areas remaining in Flood Zone 3a would have to pass the Exception Test. Part of the site is located within the 8m easement where development is not permitted. Surface water flooding also poses a significant risk with 70% of the site at some surface water flood risk and the potential of risk from higher intensity events. The possibility of withdrawing this development should be considered based on nearly three quarters of the site being at risk from surface water flooding and the fact that the site footprint is unlikely to be large enough to incorporate SuDS or on-site drainage. The site is currently greenfield so any potential development should consider surface water management to ensure that on and off site risks are controlled. SuDS may offer opportunities to control runoff to Greenfield rates.

### 5.5.3 Proposed Sites at Risk from Flood Zone 2

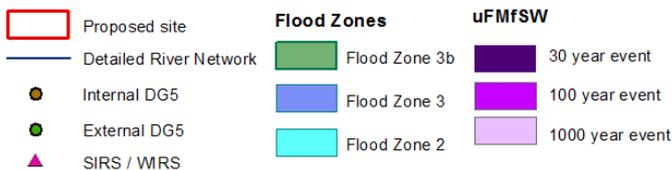
#### Economic Land Group 2 site 7.6 – Former Sankey Sugar Works



	Proposed site	<b>Flood Zones</b>	<b>uFMfSW</b>
	Detailed River Network	 Flood Zone 3b	 30 year event
	Internal DG5	 Flood Zone 3	 100 year event
	External DG5	 Flood Zone 2	 1000 year event
	SIRS / WRS		

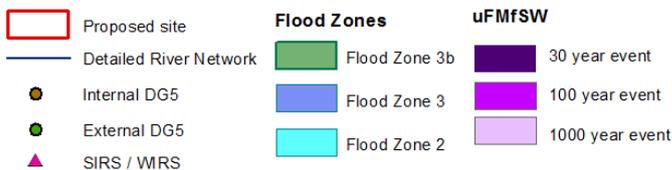
A nominal area of this site is located within Flood Zone 2. It is recommended that any development is located within Flood Zone 1 (subject to effective management of surface water). It should be possible to alter the southern corner of the development footprint to remove it from Flood Zone 2. Surface water risk is sporadic across several parts of the site and ranges from the 1 in 30 year event to the 1 in 1000 year event. The site footprint may be large enough for on-site flood storage though any potential development should ensure that on and off site risks are controlled. SuDS may offer opportunities to control runoff to Greenfield rates.

SHLAA Suitable site 19 – land rear of 14 to 20 Weymouth Avenue



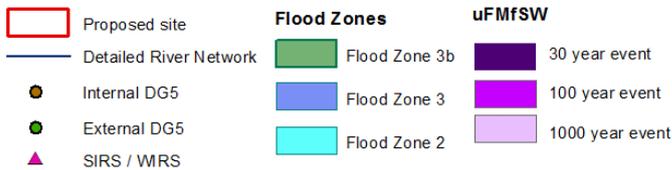
This site covers an area of greenspace and is constrained by infrastructure to the north and west. 76% of this site is at fluvial risk from Flood Zone 2 from Sutton Mill Brook. The site is considered more vulnerable (residential dwelling) so is permitted in Flood Zone 2. A detailed FRA is required to confirm criterion for safe development and flood risk management. 80% of the site is at risk from the 1 in 1000 year surface water flood event. The possibility of withdrawing this development should be considered based on nearly three quarters of the site being at risk from surface water flooding and the fact that the site footprint is unlikely to be large enough to incorporate SuDS or on-site drainage. The site is currently greenfield so any potential development should consider surface water management to ensure that on and off site risks are controlled. SuDS may offer opportunities to control runoff to Greenfield rates.

**SHLAA Suitable site 20 – land between 8 and 34 Portland Way and 161 and 123 Berry’s Lane**



This site covers an area of cleared housing and is constrained by infrastructure. 100% of this site is at fluvial risk from Flood Zone 2 from Sutton Mill Brook. The site is considered more vulnerable (residential dwelling) so is permitted in Flood Zone 2. A detailed FRA is required to confirm criterion for safe development and flood risk management, including SuDS. 84% of the site is at risk from the 1 in 1000 year surface water flood event. The possibility of withdrawing this development should be considered based on nearly three quarters of the site being at risk from surface water flooding and the fact that the site footprint is unlikely to be large enough to incorporate SuDS or on-site drainage. The site is currently greenfield so any potential development should consider surface water management to ensure that on and off site risks are controlled. SuDS may offer opportunities to control runoff to Greenfield rates.

SHLAA Suitable site 43 – former Polar Ford, City Road



A nominal area of this site is located within Flood Zone 2. It is recommended that any development is located within Flood Zone 1 (subject to effective management of surface water). It should be possible to alter the eastern corner of the development footprint to remove it from Flood Zone 2. Surface water risk is minimal. The northern area of the site, covered by the uFMfSW outlines, should be left as open space for storage of surface water.

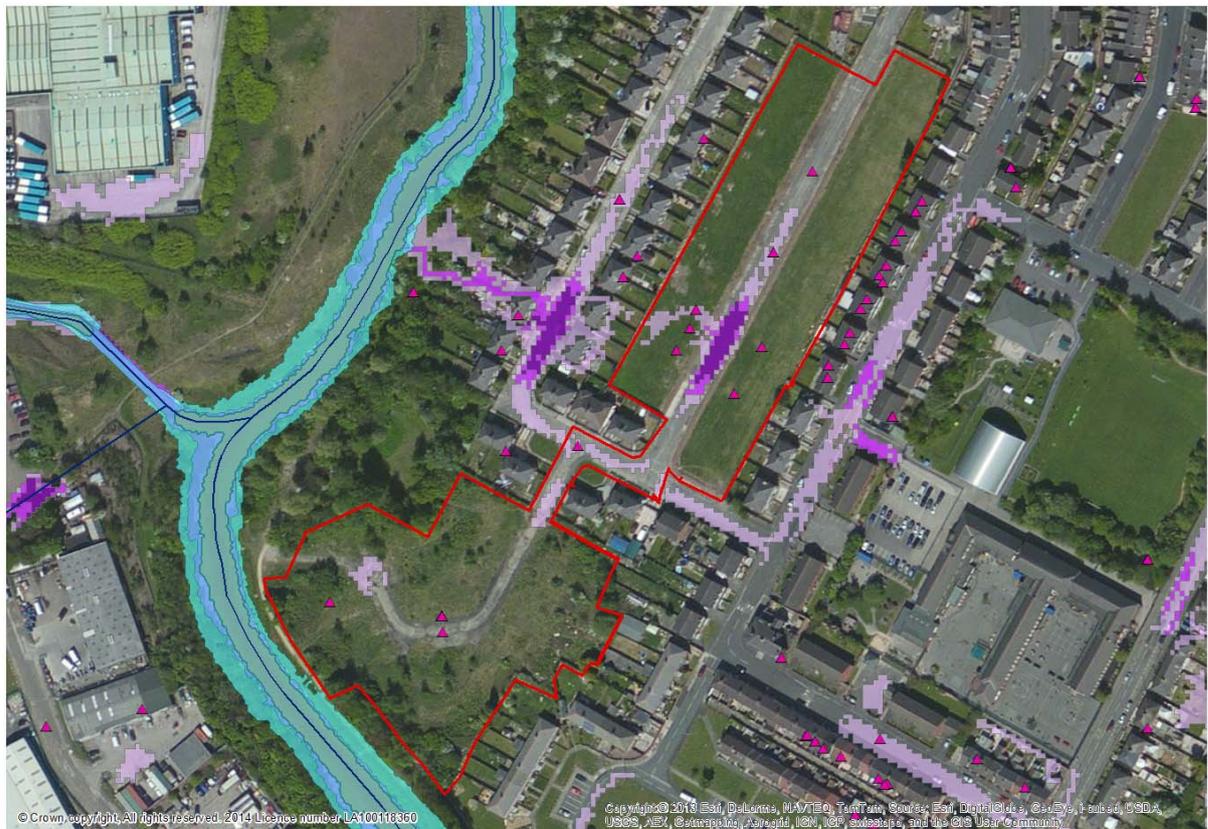
SHLAA Suitable site 71 – former Bowling Green Inn, 220 Watery Lane



	Proposed site	<b>Flood Zones</b>	<b>uFMfSW</b>
	Detailed River Network	 Flood Zone 3b	 30 year event
	Internal DG5	 Flood Zone 3	 100 year event
	External DG5	 Flood Zone 2	 1000 year event
	SIRS / WRS		

The former pub has been demolished and the site has been cleared. 23% of this site is at fluvial risk from Flood Zone 2 from Sutton Mill Brook. The site is considered more vulnerable (residential dwelling) so is permitted in Flood Zone 2. A detailed FRA is required to confirm criterion for safe development and flood risk management, including SuDS.

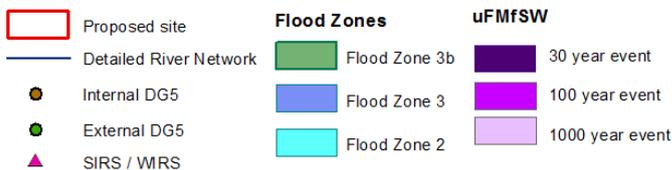
**SHLAA Suitable site 99 – land at Somerset Street and Sussex Grove**



	Proposed site	<b>Flood Zones</b>	<b>uFMfSW</b>
	Detailed River Network		 30 year event
	Internal DG5		 100 year event
	External DG5		 1000 year event
	SIRS / WRS		

This site is large at 2.2 ha and was formally developed having since been cleared. A nominal area of this site is located within Flood Zone 2. It is recommended that any development is located within Flood Zone 1 (subject to effective management of surface water). There is only a small area at risk from surface water flooding. However any surface water risk will have to be effectively managed on site and as the site is currently open land, potential development should consider surface water management to ensure that off site risks, as well as on-site risks, are controlled. SuDS may offer opportunities to control runoff to Greenfield rates. There have been a number of incidents recorded by United Utilities on the site. These relate to sewer blockages or defective manhole covers.

**SHLAA Suitable site 297 – former Windle City Sports Club, City Road**



This is a large site at 4.7 ha made up of sports fields and a cleared former sports club, earmarked for housing development in the next 5 years. A nominal area of this site is located within Flood Zone 2. It is recommended that any development is located within Flood Zone 1 (subject to effective management of surface water). It should be possible to alter the north-eastern corner of the development footprint to remove it from Flood Zone 2. Surface water flooding is an issue on site and the site is at risk from higher intensity events. Surface water will have to be effectively managed on site and as the site is currently open land, potential development should consider surface water management to ensure that off site risks, as well as on site risks, are controlled. The southern area of the site, covered by the uFMfSW outlines, should be left as open space for storage of surface water. SuDS may offer opportunities to control runoff to Greenfield rates.

SHLAA Nondelipot site 66 – Prestige Motors, Mill Lane



	Proposed site	<b>Flood Zones</b>	<b>uFMfSW</b>
	Detailed River Network		 30 year event
	Internal DG5		 100 year event
	External DG5		 1000 year event
	SIRS / WRS		

This site is currently used as a car park for Newton-le-Willows Railway Station though was originally allocated for residential development. A nominal area of the site is located within Flood Zone 2. It is recommended that any development is located within Flood Zone 1 (subject to effective management of surface water). It should be possible to alter the northern corner of the development footprint to remove it from Flood Zone 2 if development is to proceed.

#### 5.5.4 Surface Water Risk to Proposed Sites

As mentioned in Section 4.3, the uFMfSW was interrogated to gauge the level of surface water flood risk to proposed sites with a view to defining Critical Drainage Areas and to inform on the need for a Surface Water Management Plan (SWMP) for St Helens Borough. The initial screening of the proposed sites revealed there to be 192 out of the 568 proposed sites to be at risk from the 1 in 100 year surface water flood event which equates to 34% of sites. There are 130 sites at risk from the more frequent 1 in 30 year event and 320 at risk from the extreme 1 in 1000 year event. See Appendix B for details within the site screening spreadsheet.

Historic events were also assessed using United Utilities' DG5 register of sewer flooding and their SIRS / WIRS flood incident register in relation to proposed sites that are considered to be at surface water flood risk. The historical assessment found that 80 proposed sites have been subject to flooding incidents in the past. A number of these 80 sites however are not at risk from fluvial or surface water flooding. Incidents recorded by these United Utilities datasets can include instances of broken manholes, manhole subsidence, local drain blockage or backing up of sewage pipes.

Those sites considered to be at significant risk from surface water flooding are listed in Appendix C. Appendix C contains a table of proposed sites that have over 15% of their area within the 1 in 100 year uFMfSW outline. This equates to 14 sites. The Comments column discusses the risk and recommendations. Those sites highlighted in red are recommended for withdrawal, mostly due to large areas of the site footprint being at risk and there being limited scope for redesign due to a small development footprint. Recommendations on mitigation included within the site redesign entail the management of surface water on site whilst ensuring off site risks are controlled and that SuDS should be used to control surface water runoff to Greenfield rates. The site screening spreadsheet, in Appendix B, comments on other sites at surface water risk from the 1 in 30 and 1 in 1000 year events.

#### Critical Drainage Review of Proposed Sites

A review was carried out as to whether any large proposed development sites within Flood Zone 1 could be considered Critical Drainage Areas (CDAs). There are 18 sites that are greater than 5 ha in area. Three of these sites have over 10% of their site areas within the uFMfSW 1 in 1000 year event outline and none have greater than 10% area at risk from the 1 in 30 or 1 in 100 year events. As commented in the site screening spreadsheet in Appendix B, such large sites should be developed with surface water drainage management and SuDS in mind. Greenfield sites recorded in the Open Space Study polygons, provided by the Council, were checked in ArcGIS against aerial photography<sup>11</sup> and it was found that there are some areas of greenspace not included within the Open Space Study polygons.

<sup>11</sup> Copyright:© 2013 Esri, DeLorme, NAVTEQ, TomTom

## 5.6 Development Management Sequential and Exception Test

This section of the SFRA has been developed to provide a useful tool to inform the development management process about the potential risk of flooding associated with future planning applications and the basis for requiring specific FRAs where necessary.

According to the NPPF:

*“When determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific flood risk assessment following the Sequential Test, and if required the Exception Test, it can be demonstrated that:*

- *Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and*
- *Development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.” (Para 103)*

The NPPF re-affirms that planning applications *“must be determined in accordance with the development plan unless material considerations indicate otherwise”* (Para 11). Development proposals that are in line with Local Plan policies should be approved. Those that conflict should be refused unless material considerations indicate otherwise.

### 5.6.1 Demonstrating the Sequential Test for Planning Applications

The Environment Agency recommends the approach<sup>12</sup> below is used by LPAs to apply the Sequential Test to planning applications located in Flood Zones 2 or 3. The approach provides an open demonstration of the Sequential Test being applied in line with the NPPF and the flood risk Practice Guide. Close working between LPA Development Management and Spatial Planning departments will be required to implement the Sequential Test effectively.

The Sequential Test for planning applications can be carried out over three main stages described below and illustrated in Figure 5-3.

#### **Stage 1 – Strategic application and development vulnerability**

The Sequential Test does not apply to change of use applications unless it is for change of use of land to a caravan, camping or chalet site, or to a mobile home site or park home site. The Sequential Test can also be considered adequately demonstrated if both of the following criteria are met:

- The Sequential Test has already been carried out for the site (for the same development type) at the strategic level (Local Plan); and
- The development vulnerability is appropriate to the Flood Zone (see table 3 of technical guidance to the NPPF).

If both these criteria are met, reference should be provided for the site allocation and Local Plan document in question and the vulnerability of the development should be clearly stated. If neither criterion is met, then the applicant should move onto Stage 2.

#### **Stage 2 – Defining the evidence base**

Stage 2 considers the parameters in which the Sequential Test is to be applied, including:

- The geographic area in which the test is to be applied,
- The source of reasonable available sites in which the application site will be tested against; and
- The evidence and method used to compare flood risk between sites.

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<sup>12</sup> <http://www.environment-agency.gov.uk/research/planning/82587.aspx>

### **Stage 3 – Applying the Sequential Test**

Stage 3 focuses on applying the Sequential Test by comparing the reasonably available sites identified under stage 2 with the application site.

Sites should be compared in relation to flood risk; Local Plan status; capacity; and constraints to delivery including availability, policy restrictions, physical problems or limitations, potential impacts of the development, and future environmental conditions that would be experienced by the users of the development.

The test should conclude if there are any reasonably available sites, in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.

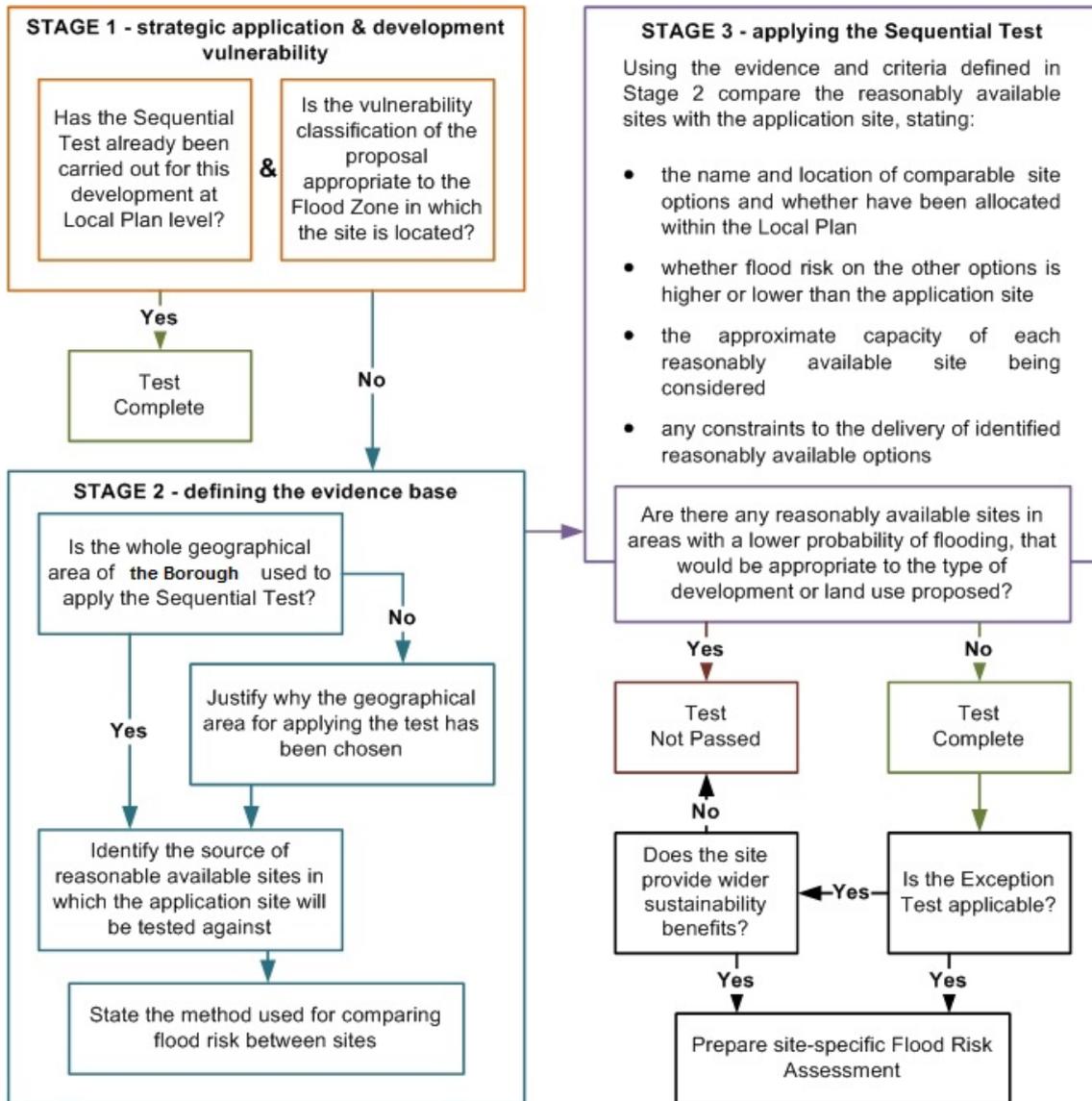
From the information provided in these three stages, the LPA should be able to assess whether or not the applicant site has passed the Sequential Test. If the Test has been passed the applicant should apply the Exception Test in the circumstances set out by tables 1 and 3 of the Technical Guidance to the NPPF.

In all circumstances, where the site is within areas at risk of flooding and where a site-specific FRA has not already been carried out, a site-specific FRA should be completed in line with the NPPF. Further guidance is provided in Section 5.7.

In addition to the formal Sequential Test, the NPPF sets out the requirement for developers to apply the sequential approach to locating development within the site. As part of their application and masterplanning discussions with applicants, LPAs should seek whether or not:

- Flood risk can be avoided by substituting less vulnerable uses or by amending the site lay-out;
- Less vulnerable uses for the site have been considered; or
- Density can be varied to reduce the number or vulnerability of units located in higher risk parts of the site.

Figure 5-3: Development Management Sequential Test Process



## 5.7 Site-Specific Flood Risk Assessment

According to the NPPF Technical Guide, a site-specific FRA should:

*“Identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account. Those proposing developments should take advice from the emergency services when producing an evacuation plan for the development as part of the flood risk assessment.” (Para 9)*

In line with the current Government NPPF guidance, development proposals should:

- Show development is not at risk of flooding or is compatible with the residual risk;
- Not increase flood risk elsewhere, taking into account the impacts of climate change;
- Not increase surface water peak flow rates or runoff volumes above Greenfield levels including an allowance for climate change, as this would result in an increased flood risk to the receiving catchments;
- Not increase the risk of groundwater flooding elsewhere or change the hydrogeological regime of the area;

- Wherever possible use the opportunities offered by new development to reduce flood risk within the site and elsewhere; and
- Ensure that where new development is, exceptionally necessary in areas of flood risk, it is made safe from flooding for the lifetime of the development, taking into account the impacts of climate change.

The NPPF Technical Guidance doesn't contain any further detail on the minimum requirements for FRAs. It is therefore important that Chapter 3 of the PPS25 Practice Guide and the Environment Agency's Flood Risk Standing Advice is still referred to. CIRIA's report C624 Development and Flood Risk also provides useful guidance.

### When is a FRA Required?

A site-specific FRA should be prepared when the application site is:

- Situated in Flood Zone 2 and 3
- Greater than 1ha in size and located in Flood Zone 1
- Located in Flood Zone 1 where there are critical drainage problems or within a designated Critical Drainage Area (CDA)
- At risk of flooding from other sources of flooding as identified in this SFRA
- Situated in an area currently benefitting from defences
- Situated within 20m of the bank top of a Main River
- Situated over a culverted watercourse or where development will require controlling the flow of any river or stream or the development could potentially change structures known to influence flood flow

### 5.7.1 Taking Climate Change into Account

Climate change will increase flood risk over the lifetime of a development. In making an assessment of the impacts of climate change on flooding from the land and rivers as part of a FRA, the sensitivity ranges shown below may provide an appropriate precautionary response to the uncertainty about climate change impacts on rainfall intensities and river flow.

Considering the impacts of climate change during a FRA will have implications for both the type of development that is appropriate according to its vulnerability to flooding and design standards for any SuDS or mitigation scheme proposed.

For example through very flat floodplains, using the +20 per cent from 2025 to 2115 allowance for peak flows, could see an area currently within lower risk zones (Flood Zone 2), in future be re-classified as lying within a higher risk zone (e.g. Zone 3a). Therefore residential development may not be appropriate without appropriate flood mitigation measures or flood resilient or resistant houses. In well-defined floodplains the same climate change allowance could have significant impacts on flood depths influencing building type and design (e.g. finished floor levels).

**Table 5-3: Recommended National Precautionary Sensitivity Ranges**

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

The sensitivity ranges shown in Table 5-3 and in the NPPF Technical Guidance, originate from Defra's FCDPAG3 Economic Appraisal Supplementary Note to Operating Authorities – Climate Change Impacts (October 2006) and are based on UK Climate Projections 2002 (UKCIP02) scenarios.

The Environment Agency has updated this advice note, with the Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities<sup>13</sup>, which uses the latest science from UKCP09. This advice is based on the Government's policy for climate change adaptation, and is specifically intended for projects or strategies seeking Government Flood

<sup>13</sup> Environment Agency Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities

Defence Grant in Aid (FDGiA). However, RMAs in England may also find it useful in developing plans and making FCERM investment decisions even if there is no intention of applying for central government funding. This is important for any future large scale infrastructure used to support the delivery of Strategic Sites such as flood defence schemes.

This is necessary to ensure that a fair comparison can be made between investment in sites in different locations that compete for central government grant, as well as ensuring that the most appropriate means of reducing risk is investigated in any one place.

The note offers a range of climate change sensitivities called change factors which are different depending on the region of England and are based on UKCP09 information. Upper and lower end estimates of change are also provided to help represent the range of the future risks.

Although, it is anticipated that the eventual change in river flows will lie somewhere within the range of lower to upper end estimates, more extreme change cannot be discounted. To help represent this extreme change “H++ scenarios” have been included in line with the UKCP09 approach. These can be used to represent more severe climate change impacts and help identify the options that would be required. The “H++ scenarios” should be considered in sensitive areas or for contingency planning to understand what might be required if climate change were to happen much more rapidly than expected. The UKCP09 change factors are presented below for North West England.

**Table 5-4: UKCP09 Change Factors**

Parameter	Estimates	2020s	2050s	2080s
Peak rainfall intensity	H++	No H++ scenario is provided for changes to extreme rainfall		
	Upper end estimate	+10%	+20%	+40%
	Change factor	+5%	+10%	+20%
	Lower end estimate	+0%	+5%	+10%
Peak river flow	H++	+40%	+60%	+105%
	Upper end estimate	+25%	+35%	+65%
	Change factor	+15%	+20%	+30%
	Lower end estimate	+5%	+10%	+10%

In order to help local authorities better understand current best estimates of climate change and associated uncertainty ranges across the River Basin (North West), the Environment Agency have carefully selected UKCP09 outputs and displayed them spatially on a map. This map can be found at: <http://www.environment-agency.gov.uk/research/planning/135749.aspx>

## 5.8 Sustainable Drainage Systems

Development has the potential to cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and a consequent potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts and other drainage infrastructure.

Managing surface water discharges from new development is therefore crucial in managing and reducing flood risk to new and existing development downstream. Carefully planned development can also play a role in reducing the amount of properties that are directly at risk from surface water flooding.

The FWMA 2010 requires new developments and redevelopments in England and Wales to have drainage plans for surface runoff approved by the Sustainable Drainage Systems Approval Body<sup>14</sup> (SAB) where the construction work would have drainage implications. The SAB is responsible for adopting and maintaining new SuDS that serve more than one property and have been constructed as approved and function as designed.

<sup>14</sup> SAB requirement of the FWMA is expected to be implemented in April 2014

The current Draft National Standards for Sustainable Drainage Systems<sup>15</sup> (2011) require all new developments, where practicable (excluding single properties), to implement SuDS.

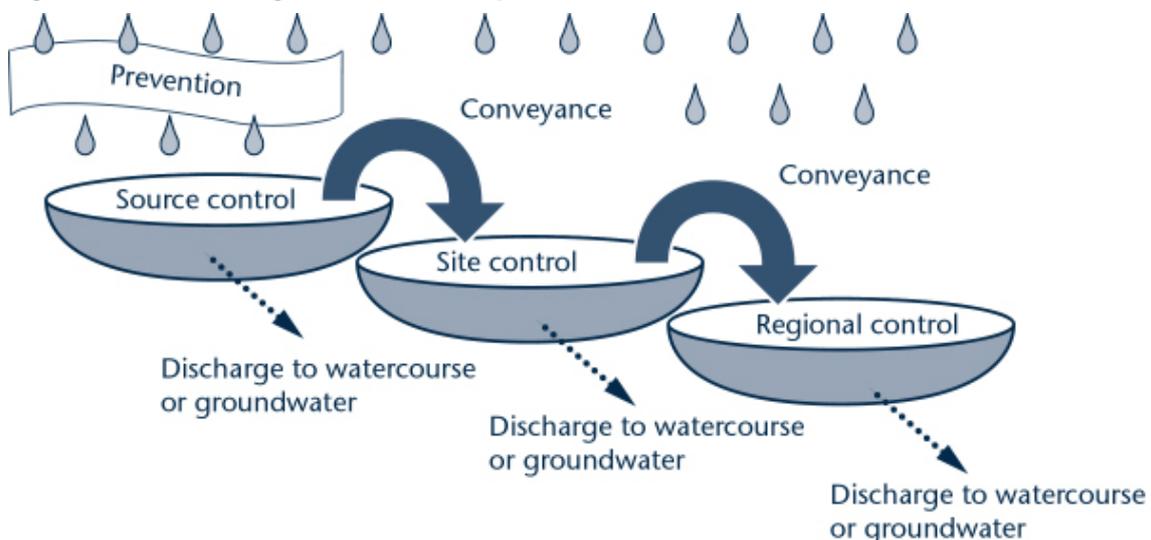
The standards set out appropriate design criteria based on four main parameters:

1. Runoff Destination (in order of preference)
  - a. To ground;
  - b. To surface water body;
  - c. To road drain or surface water sewer;
  - d. To combined sewer
2. Peak flow rate and volume (pre and post development)
3. Water Quality (based on potential hazards arising from development and sensitivity of the runoff destination)
4. Function (design; flood risk; operation and maintenance)

In addition, the Local Planning Authority may set local requirements for planning permission that have the effect of more stringent requirements than these National Standards. However more stringent requirements would have to in line with the NPPF. More stringent requirements should be considered where current Greenfield sites lie upstream of high risk areas. This could include improvements on Greenfield runoff rates.

Many different SuDS techniques can be implemented. As a result, there is no one correct drainage solution for a site. In most cases, a combination of techniques, using the Management Train principle, will be required, where source control is the primary aim.

**Figure 5-4: SuDS Management Train Principle<sup>16</sup>**



The effectiveness of a flow management scheme within a single site is heavily limited by land use and site characteristics including (but not limited to) topography, geology (soil permeability), and available area. Potential ground contamination associated with urban and former industrial sites should be investigated with concern being placed on the depth of the local water table and potential contamination risks. The design, construction and ongoing maintenance regime of any SuDS scheme must be carefully defined as part of a site-specific FRA. A clear and comprehensive understanding of the catchment hydrological processes (i.e. nature and capacity of the existing drainage system) is essential for successful SuDS implementation.

<sup>15</sup> Defra (2011) National Standards for Sustainable Drainage Systems

<sup>16</sup> CIRIA (2008) Sustainable Drainage Systems: promoting good practice – a CIRIA initiative

## 5.9 Emergency Planning

Along with the Environment Agency Flood Warning systems, there is a range of Flood Plans at a sub-regional and local level, outlining the major risk of flooding and the strategic and tactical response framework for key responders.

This SFRA contains useful data to allow emergency planning processes to be tailored to the needs of the area and be specific to the flood risks faced. The detailed maps and GIS layers provided should be made available for consultation by emergency planners during an event and in the planning process.

### 5.9.1 Civil Contingencies Act

Under the Civil Contingencies Act (CCA, 2004)<sup>17</sup>, SHC is classified as a Category 1 responder holding a statutory duty to provide civil protection to their communities to ensure human welfare, environmental stability and UK security are not affected. Under the Act, risk assessments and emergency planning are arranged through Local and Regional Resilience Forums (LRF/RRF).

During an emergency such as a flood event, the Local Authority must also co-operate with other Category 1 responders (such as the emergency services and the Environment Agency) to provide the core response.

SHC is part of the Merseyside Local Resilience Forum (LRF)<sup>18</sup>. The role of the LRF is to ensure that there is an appropriate level of preparedness to enable an effective multi-agency response to emergency incidents that may have a significant impact on the communities of Merseyside. The LRF consists of representatives from the Emergency Services, Local Authorities, Health, Environment Agency and other professional and voluntary agencies. As a strategic decision-making organisation, the LRF has prepared a Community Risk Register (CRR)<sup>19</sup>, which considers the likelihood and consequences of the most significant risks the area faces including tidal fluvial and urban flooding.

### 5.9.2 Local Flood Plans

The SFRA provides a number of flood risk data sources that should be used when producing or updating flood plans. Plans currently in place or under preparation that affect SHC include:

- Several small flood risk appraisals carried out by JBA Consulting from July 2013 at Warrington Road, Mill Lane and Clock Face Road in Bold Heath; Bell Lane, Sutton Manor; Peasley Cross Lane, Peasley Cross; Beech Gardens, Rainford; and College Street, Islands Brow and Merton Bank in St Helens.
- Environment Agency Appraisal of river and surface water flooding issues experienced in the summer of 2012 by the Environment Agency, within their Medium Term Plan.

The SFRA data can be used to:

- Update these Flood Plans if appropriate.
- Inform Emergency Planners in understanding the possibility, likelihood and spatial distribution of all sources of flooding (Emergency Planners may however have access to more detailed information, such as for Reservoirs Inundation Maps, which have not been made available for this SFRA).
- Identify safe evacuation routes and access routes for emergency services.
- Identify key strategic locations to be protected in flooding emergencies, and the locations of refuge areas which are capable of remaining operational during flood events.
- Engage local communities.
- Support emergency responders in planning for and delivering a proportionate, scalable and flexible response to the level of risk.
- Provide flood risk evidence for further studies.

<sup>17</sup> <https://www.gov.uk/preparation-and-planning-for-emergencies-responsibilities-of-responder-agencies-and-others#the-civil-contingencies-act>

<sup>18</sup> <http://www.merseysideprepared.org.uk/default.aspx>

<sup>19</sup> [http://www.merseyfire.gov.uk/asp/asp/pages/reports/pdf/Merseyside\\_CRR\\_2011\\_PUBLISHED.pdf](http://www.merseyfire.gov.uk/asp/asp/pages/reports/pdf/Merseyside_CRR_2011_PUBLISHED.pdf)

### 5.9.3 Flood Warning and Evacuation Plans

Developments that include areas that are designed to flood (e.g. ground floor car parking and amenity areas) or have a residual risk associated with them, will need to provide appropriate flood warning and instructions so users and residents are safe in a flood. This will include both physical warning signs and written flood warning and evacuation plans.

SHC will be unable to write specific flood plans for new developments at flood risk. Developers should write their own. Guidance can be found on the Environment Agency web site<sup>20</sup>. Alternatively, SHC may advise on appropriate Emergency Management Consultants who could design flood plans for new and existing developments. Generally, owners with individual properties at risk should write their own individual flood plans. However larger developments or regeneration areas, such as retail parks, hotels and leisure complexes, should consider writing one collective plan for the assets within an area.

Whilst there is no statutory requirement on the Environment Agency or the emergency services to approve evacuation plans, the Council as LPA is accountable via planning condition or agreement to ensure that plans are suitable. This should be done in consultation with Development Management Officers. Given the cross cutting nature of flooding, it is recommended that further discussions are held internally to SHC between emergency planners and policy planners/development management officers and drainage engineers and to external stakeholders such as the emergency services, the Environment Agency, United Utilities and the Canal & River Trust.

It may be useful for both Emergency and Spatial Planners to consider whether as a condition of planning approval, flood evacuation plans should be provided by the developer which aim to safely evacuate people out of flood risk areas, using as few emergency service resources as possible. The application of such a condition is likely to require policy support in the Local Plan, and discussions with the Merseyside LRF are essential to establish the feasibility / effectiveness of such an approach, prior to it being progressed. It may also be useful to consider how key parts of agreed flood evacuation plans could be incorporated within local development documents, including in terms of protecting evacuation routes and assembly areas from inappropriate development.

Once the development goes ahead, it will be the requirement of the plan owner (developer) to make sure the plan is put in place, and to liaise with the Council, as LPA, regarding maintenance and updating of the plan.

### 5.9.4 What should the Plan Include?

Flood warning and evacuation plans should include the information stated in Table 5-5.

**Table 5-5: Flood Warning and Evacuation Plans**

Consideration	Purpose
Availability of existing flood warning system	The Environment Agency offer a flood warning service that currently covers designated Flood Warning Areas in England and Wales. In these areas they are able to provide a full Flood Warning Service.
Rate of onset of flooding	The rate of onset is how quickly the water arrives and the speed at which it rises which, in turn will govern the opportunity for people to effectively prepare for and respond to a flood. This is an important factor within Emergency Planning in assessing the response time available to the emergency services.
How flood warning is given and occupants awareness of the likely frequency and duration of flood events	Everyone eligible to receive flood warnings should be signed up to the Environment Agency service. Where applicable, the display of flood warning signs should be considered. In particular sites that will be visited by members of the public on a daily basis; sports complexes, car parks, retail stores. It is envisaged that the responsibility should fall upon the developers and should be a condition of the planning

<sup>20</sup> <http://www.environment-agency.gov.uk/homeandleisure/floods/38329.aspx>

Consideration	Purpose
	permission. Information should be provided to new occupants of houses concerning the level of risk and subsequent procedures if a flood occurs.
The availability of staff / occupants / users to respond to a flood warning and the time taken to respond to a flood warning	The plan should identify roles and responsibilities of all responders. The use of community flood wardens should also be considered.
Designing and locating safe access routes, preparing evacuation routes and the identification of safe locations for evacuees	Dry routes will be critical for people to evacuate as well as emergency services entering the site. The extent, depth and flood hazard rating should be considered when identifying these routes.
Vulnerability of occupants	Vulnerability classifications associated with development as outlined in the NNPF. This is closely linked to its occupiers.
How easily damaged items will be relocated and the expected time taken to re-establish normal use following an event	The impact of flooding can be long lasting well after the event has taken place affecting both the property, which has been flooded and the lives that have been disrupted. The resilience of the community to get back to normal will be important including time taken to repair / replace damages.

### 5.9.5 Flood Awareness

Emergency planners should also use the outputs from the SFRA to raise awareness within local communities. This should include raising awareness of measures that people can take to make their homes more resilient to flooding from all sources and encouraging all those at fluvial flood risk to sign up to the Environment Agency's Floodline Warnings Direct service. It is also recommended that Category 1 responders are provided with appropriate flood response training to help prepare them for the possibility of a major flood with an increased number of people living within flood risk areas.

## 6 Conclusions and Recommendations

### 6.1 Conclusions

This SFRA provides a single repository planning tool relating to flood risk and development in the St Helens Borough. It has consulted key flood risk stakeholders such as the Environment Agency and United Utilities and collated all available and relevant flood risk information on all sources in one comprehensive assessment.

The flood risk information, assessment, guidance and conclusions of the SFRA will provide Strategic Planners with the evidence base required to apply the Sequential and Exception Tests, as required under the NPPF, and demonstrate that a risk based, sequential approach has been applied in the preparation of their development plans and documents. This will allow for a sustainable and robust Core Strategy and Allocations and Sustainable Development DPD.

Whilst the aim of the sequential approach is the avoidance of high flood risk areas, in locations such as St Helens, Haydock and Newton-le-Willows where the Council strives for continued growth and regeneration, this will not always be possible. The SFRA therefore provides the necessary links between spatial developments, wider flood risk management policies, local strategies and on the ground works by bringing flood risk information into one document.

### 6.2 Recommendations for Further Work

The SFRA process has however, developed into more than just a planning tool. Sitting alongside the St Helens PFRA, it can be used to provide a much broader and inclusive vehicle for integrated, strategic and local flood risk management and delivery.

There are a number of plans and assessments listed in Table 6-1 that would be of benefit to the Council in developing their flood risk evidence base to support the delivery of their Local Plan or help fill critical gaps in flood risk information.

**Table 6-1: Recommended Further Work**

Type	Study	Reason	Timeframe
Strategy	LFRMS	The Council should prepare a LFRMS as required under the FWMA.	Short Term. Draft due for consultation Feb 2014
Data Collection	Flood Incident Data	The Council have a duty to investigate and record details of significant flood events within their area. General data collected for each incident, should include date, location, weather, flood source (if apparent without an investigation), impacts (properties flooded or number of people affected) and response by any RMA.	Ongoing
Data Collection	Asset Register	The Council should continue to update and maintain their register of structures and features, which are considered to have an effect on flood risk.	Short Term / Ongoing
Risk Assessment	Asset Register Risk Assessment	The Council should carry out a strategic flood risk assessment of structures and features on the Asset Register to inform capital programme and prioritise maintenance programme.	Short Term / Ongoing
Capacity	SAB	Under the FWMA, the Council as an LLFA is required to establish a SAB. This is expected to be enacted in autumn 2014. SHC should identify internal capacity	Short Term

Type	Study	Reason	Timeframe
		required to deal with SuDS applications, set local specification and set policy for adoption and maintenance of SuDS.	
Partnership	United Utilities	The Council should continue to work with United Utilities on sewer and surface water projects.	Ongoing
Partnership	Environment Agency	The Council should continue to work with the Environment Agency on fluvial flood risk management projects. SHC should also identify potential opportunities for joint schemes to tackle flooding from all sources.	Ongoing
Partnership	Canal & River Trust	The Council should continue to work with the Canal & River Trust to understand the residual risks associated with the Carr Mill Dam Reservoir.	Ongoing

## Appendices

### A SFRA Flood Risk Maps

#### SFRA Interactive GeoPDFs

001	SHC_001_Potential_Development_Sites
002	SHC_002_Flood_Zones
003	SHC_003_FMfSW_30yr
004	SHC_004_FMfSW_200yr
005	SHC_005_AStGWF
006	SHC_006_FRM
007	SHC_007_Historical
008	SHC_008_uFMfSW

#### Note on how to use interactive GeoPDFs

For each set of maps, open the Index Map in Adobe and switch on the Layer Control for a key to the different layers. The index maps contain a set of index squares covering different areas of the Borough. By clicking on any index square you will open up a more detailed map of the area covered by that index square. Use the zoom tools and the hand tool to zoom and pan around the maps. In the Layer Control you can switch layers on and off if and when required. For instance you may wish to switch the development site labels off for the smaller sites in order to see the site more clearly. Note that Maps 001 and 005 do not contain index maps.

## **B Development Site Assessment Spreadsheet**

## **C Development Sites at Significant Surface Water Risk Spreadsheet**

## **D NPPF Flood Zones and Vulnerability Classifications Compatibility**



St. Helens  
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## **E Proposed Critical Drainage Area Methodology**



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