Southampton Preliminary Flood Risk Assessment

Preliminary Assessment Report

June 2011




SOUTHAMPTON CITY COUNCIL

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Executive Summary

The Southampton Preliminary Assessment Report has been prepared to enable Southampton City Council, designated as a Lead Local Flood Authority, to fulfil their statutory duty to complete a Preliminary Flood Risk Assessment as required by the Flood Risk Regulations 2009. The scope of the Preliminary Flood Risk Assessment is to consider the effects of past flooding and potential consequences of future flooding in Southampton from local flood sources, including surface water, groundwater and ordinary watercourses.

To develop a clear understanding of local flood risk within Southampton, records of historic flooding and potential future flooding were gathered from the relevant organisations. Records of 194 historic flood events were retrieved, however, in part due to the limited details on flood extents and consequences of these events none were considered to have had 'significant harmful consequences'. Data on future local flood risks were used to estimate the potential harmful consequences of future flood events. Based on national surface water modelling approximately 4,500 properties in Southampton are estimated to be at risk from flooding to a depth of 0.3m during a rainfall event with a 1 in 200 annual chance of occurring.

A national methodology to determine 'significance', established by Defra, has been applied by the Environment Agency to identify Indicative Flood Risk Areas. Of the ten areas identified nationally, none fall within the administrative boundary of Southampton. None of the information gathered during this preliminary assessment has shown any local factors which would justify a change to the national assessment, which means the subsequent stages of the Flood Risk Regulations are not required to be completed by Southampton City Council during this cycle. However, it must be noted that the risk of flooding from local sources across Southampton will be managed through the Local Flood Risk Management Strategy.

1. Introduction

1.1 Preliminary Flood Risk Assessment

The requirement for Southampton City Council to complete a Preliminary Flood Risk Assessment (PFRA) originates from the Flood Risk Regulations [The Regulations] which came into force on the 10th December 2009. Under this legislation all Unitary Authorities, and County Councils in two-tier systems, are designated a Lead Local Flood Authority (LLFA) where they have been allocated a duty to prepare a preliminary assessment report in relation to flooding in their area.

The Regulations transpose the EC Floods Directive (Directive 2007/60/EC on the assessment and management of flood risk) into national legislation for England and Wales which enables implementation of the provisions outlined in the directive. The Regulations place a duty on the Environment Agency and LLFA's to prepare a number of documents to determine and manage the risk of flooding, including:

- Preliminary Flood Risk Assessment;
- Flood hazard maps and flood risk maps;
- Flood Risk Management Plan.

'The PFRA is a high level screening exercise to identify areas of significant risk' (Environment Agency, 2010). The scope of the PFRA is to consider the effect of past flooding and likely impact of future flooding in Southampton from the following local flood sources:

- Surface water;
- Ground water; and
- Ordinary watercourses.[1]

The Environment Agency has the responsibility to prepare a preliminary assessment report in relation to flooding associated with the sea, main rivers and reservoirs. These sources **do not** have to be included in this PFRA, unless it is considered that it might interact with one of the local flood sources listed above.

The PFRA involves:

- Collating available information on past and future floods;
- Providing a high level summary of significant flood risk from local sources in a preliminary assessment report (this document); and
- Identifying significant flood risk areas.

For those areas with identified significant flood risk areas, the relevant LLFA will have to develop flood hazard and flood risk maps and subsequently a Flood Risk Management Plan for these areas.

Areas with flood risk, which has not been identified as 'significant' through the PFRA process, will be managed by the LLFA through a Local Flood Risk Management Strategy, a requirement introduced through the Flood and Water Management Act, 2010. Development of the Local Flood Risk Management Strategy will be supported by the PFRA.

[1] Canals are another potential local flood source in some areas but have not been listed above as there are no existing canal systems in Southampton.

1.2 Study Area

The study area for this PFRA is the administrative boundary of Southampton City Council covering approximately 50km^2, the geographical extent of which is outlined in Figure 1.1. Approximately 90% of Southampton is covered by existing development. The study area lies within the South East River Basin District and is served by the Environment Agency southern region. The water company serving the entire area is Southern Water.

Southampton is bordered to the north-east by Eastleigh Borough Council, to the north-west by Test Valley Borough Council and to the south (across Southampton Water) by New Forest District Council. The designated LLFA for each of these areas is Hampshire County Council.

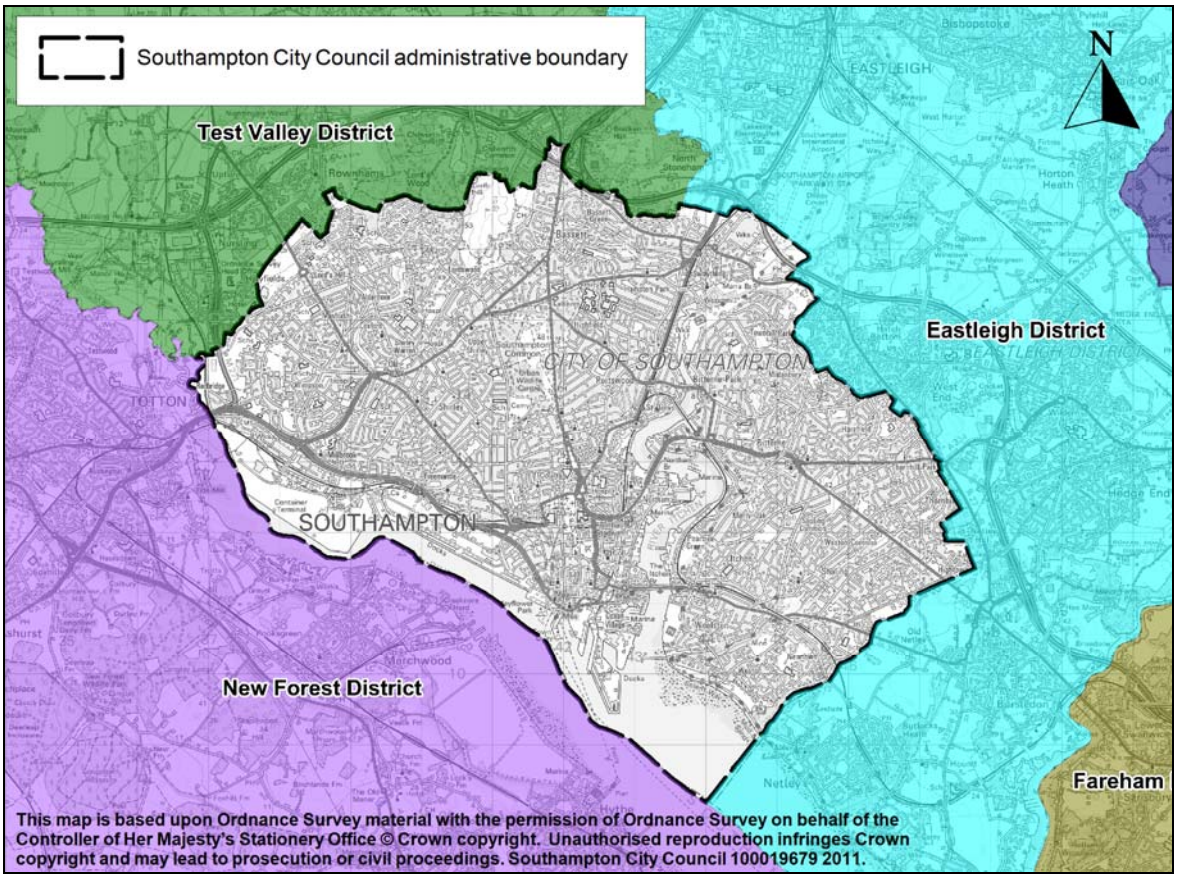


Figure 1.1: Southampton City Council administrative boundary

1.3 Aims and Objectives

The PFRA is a high level screening exercise to identify areas of significant flood risk. The aim of the PFRA is to provide an assessment of local flood risk across the study area through utilisation of information on past flood events and potential consequences of future floods.

The objectives are outlined below:

- Identify partner organisations with a role in flood risk management and develop a method for future engagement;
- Establish arrangements for partnership and collaboration for ongoing collection, assessment and storage of flood risk data and information;

- Summarise the methodology for completing the PFRA with respect to data sources, availability and review procedures;
- Collate information on past flood events from local sources (including surface water, groundwater and ordinary watercourses) to assess the consequences and impacts of these events within Southampton;
- Assess the potential impacts of future flood risk from local sources within Southampton;
- Review the national assessment of indicative flood risk areas which were developed by the Environment Agency;
- Support the development of the local flood risk management strategy (statutory requirement of LLFA's under the Flood & Water Management Act 2010).

2. LLFA responsibilities

2.1 Coordination of Flood Risk Management

As a Lead Local Flood Authority, it is the role of Southampton City Council to establish effective partnerships with the relevant organisations with a role in flood risk management. In Southampton, these organisations include the Environment Agency, Southern Water and Associated British Ports. It is also important that the relevant departments within the Council are co-ordinated to ensure a consistent and holistic approach to flood risk management throughout the city.

In order to assist with the co-ordination of flood risk management within Southampton, a formal Joint Flood Management Board ('Flood Board') was established in 2008, the purpose of which is to co-ordinate flood risk management across agencies in Southampton with the aim of reducing the probability and consequences of flooding in the city. An overview of the composition of the Flood Board is outlined in Figure 2.1.

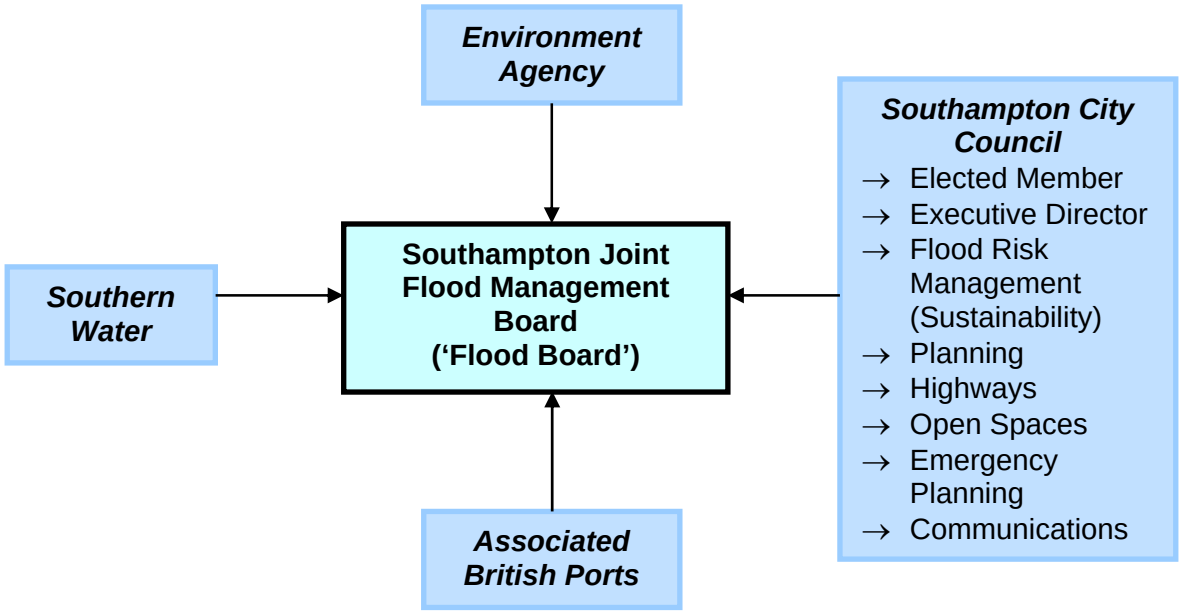


Figure 2.1: Joint Flood Management Board

The Flood Board is supported within the Council though an 'Internal Flood Board' which co-ordinates the various flood risk management activities carried out internally across the different departments.

Southampton City Council also engages with other existing networks and groups, across varying geographic scales, which are relevant to flood risk management. The links between these groups are illustrated in Figure 2.2.

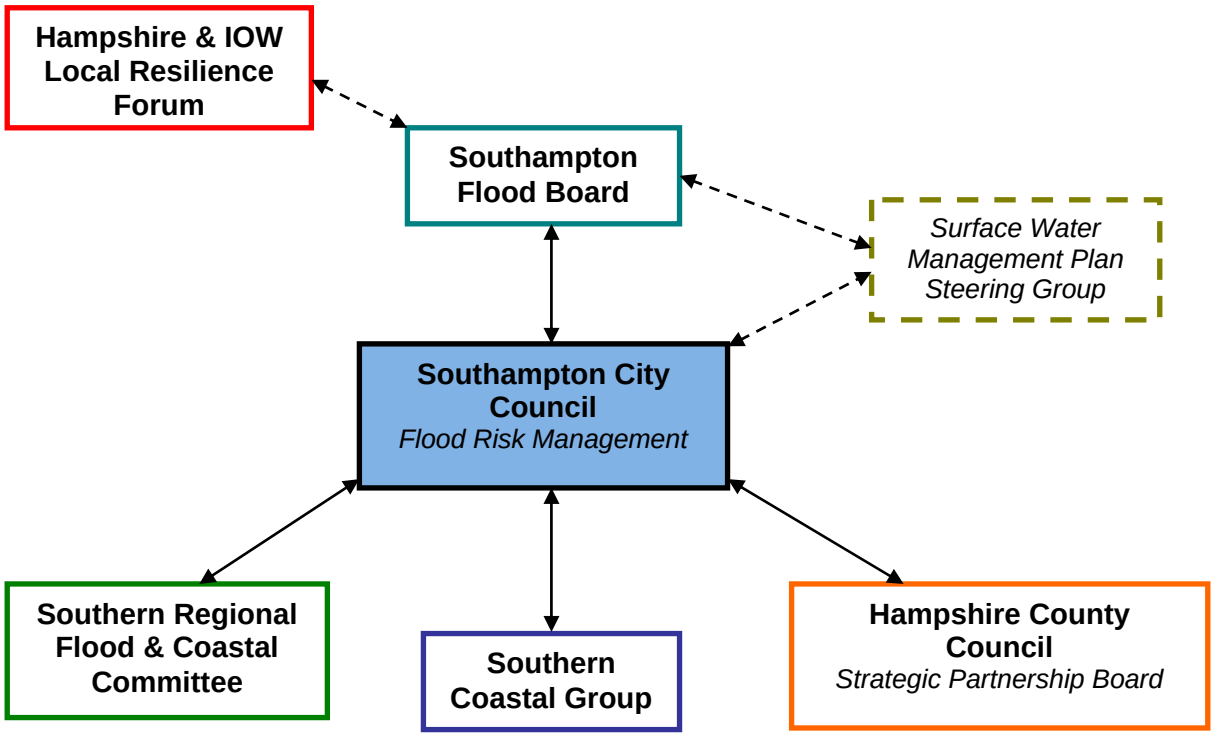


Figure 2.2: Links between existing networks/groups

2.2 Stakeholder Engagement

The PFRA was largely completed using the data collated for the Level 2 Strategic Flood Risk Assessment (SFRA2) completed in September 2010 and the Surface Water Management Plan (SWMP) completed in March 2011. A number of stakeholders were engaged throughout development of the SWMP, including:

- Southern Water
- Network Rail
- Environment Agency
- Associated British Ports
- Hampshire County Council
- Relevant departments within the Council

Continuous communication with stakeholders during development of the PFRA was conducted through the Southampton Flood Board.

2.3 Public Engagement

It is recognised that members of the public may also have valuable information to contribute to the PFRA and to local flood risk management more generally across Southampton. Engaging with the public can afford significant benefits to local flood risk management including building trust, gaining access to additional local knowledge and increasing the chances of acceptance of options and decisions proposed in future flood risk management plans. Due to the time constraints for completing the PFRA, it was not possible to establish a mechanism for engaging the public during this round. However, the final preliminary assessment report will be made publically available and an efficient process for gathering information will be established prior to the review.

In addition, public engagement will be undertaken when formulating the management system (either a local flood risk management plans where significant Flood Risk Areas are identified or a local flood risk management strategy for all other areas of flood risk). This process will also help to inform future levels of public engagement. Southampton City Council will follow the guidelines outlined in the Environment Agency's 'Building Trust with Communities' document which provides a useful process of how to communicate risk including the causes, probability and consequences to the general public and professional forums such as local resilience forums.

2.4 Additional responsibilities

LLFA's have been assigned a number of additional responsibilities in relation to the management of flood risk from local sources. These responsibilities were introduced through the Flood & Water Management Act, which include:

- **Investigate flooding incidents** – LLFA's have a duty to investigate and record flooding incidents within their area. This duty includes identification of which flood risk management authorities have a function and what they have done or intend to do to in response to the flood, notifying any relevant flood risk management authorities where necessary. The LLFA must publish the results following an investigation.
- **Asset Register** – LLFA's have a duty to establish and maintain a register of structures/features which are considered to have a significant effect on flood risk in the area. A record of information on the structure/feature, including ownership and condition, must be maintained. The register must be available for inspection at all reasonable times.
- **Power to designate features** – LLFA's, in addition to the Environment Agency, have the power to designate any structures or features (man-made or natural) which are considered to play an important role in managing flood risk or coastal erosion in order to safeguard those assets.
- **Power to undertake works** – LLFA's have the power to undertake works to manage flood risk from surface water and groundwater, consistent with the Local Flood Risk Management Strategy.
- **Local Flood Risk Management Strategy** – Under the Flood & Water Management Act LLFA's are required to develop, implement and review a local strategy for managing flood risk within their area. The local strategy will have to be consistent with the National Flood & Coastal Erosion Risk Management Strategy, currently being developed by the Environment Agency. The information contained in this report will be used to inform the local strategy.
- **SUDS Approving Body** – LLFA's are designated as SuDS Approving Body (SAB) where they will be responsible for the approval, adoption and maintenance of new sustainable drainage systems (SUDS) within their area once this function has been commenced.

3. Methodology and data review

3.1 Methodology

The approach for developing the PFRA follows the PFRA Final Guidance published by the Environment Agency in December 2010. The guidance stated that it was sufficient to use available and readily derivable data in order to complete the PFRA as it was not required that new information be developed.

3.1.1 Data Collection

Since the PFRA only had to be based on available and readily derivable information (Environment Agency, 2010), the local data used to complete the Southampton PFRA was derived from the recently completed Level 2 Strategic Flood Risk Assessment (Sept 2010) and the draft Surface Water Management Plan (March 2011) for the area. The following authorities and organisations were contacted and provided information collated for the purposes of completing these documents:

- Southern Water
- Network Rail
- Associated British Ports
- Environment Agency
- Southampton City Council (various departments including Emergency Planning, Highways, Planning, Open Spaces & IT)

3.1.2 Assessing Historic Flood Risk

The collated datasets relating to historic flooding were reviewed to identify details of major past flood events and associated consequences, including impacts on the local population, economic damage, environmental and cultural consequences. The majority of the information was provided as GIS outputs from the SFRA2 and SWMP which made it possible to display the information using GIS software. This enabled data layers to be overlaid to identify the spatial distribution of the historic flooding records and correlate them to other information, such as receptor information, in order to assess the overall flood risk.

3.1.3 Assessing Future Flood Risk

The assessment of future flood risk largely involved a technical review of the Environment Agency's Flood Map for Surface Water (second generation national surface water flood mapping), Areas Susceptible to Groundwater Flooding and Fluvial Flood Map (in relation to the modelled ordinary watercourses).

The following factors were considered when assessing future flood risk across the Southampton:

- Topography;
- Location & characteristics of ordinary watercourses;
- Location of people (residential properties) & critical infrastructure;
- Areas where economic activity is concentrated (non-residential properties) & infrastructure network;
- Effectiveness of any measures constructed for the purpose of flood risk management;
- Current & predicted impact of climate change;

- Location of environmental & cultural assets;
- Location & potential impact of tidal flood risk;
- Predicted impact of long-term developments that might affect the occurrence or significance of flooding, such as future development.

3.1.4 Identifying Flood Risk Areas

The identification of Flood Risk Areas through the PFRA must take account of past and potential future floods. Indicative Flood Risk Areas were determined by the Environment Agency using national datasets (surface water flood maps and national receptor database). A set of indicators were used to determine the potential consequences and impacts of future flooding (outlined in Table 3.1).

Table 3.1: Flood Risk Indicators

Harmful consequences on:	Flood Risk Indicator
Human health	– Number of residential properties – Number of critical services (Hospitals, Schools Police/Ambulance/Fire Stations, Nursing Homes, etc)
Economic activity	– Number of non-residential properties – Infrastructure network (length of roads & rail) – Area of agricultural land
Environment (including cultural heritage)	– Designated sites (International & national including SPAs, Ramsar, SAC & SSSIs) – Desinated heritage assets (International & national including World Heritage Sites, Scheduled Monuments, listed buildings & registered gardens & parks)

The process for developing the Flood Risk Areas is illustrated in Figure 3.1.

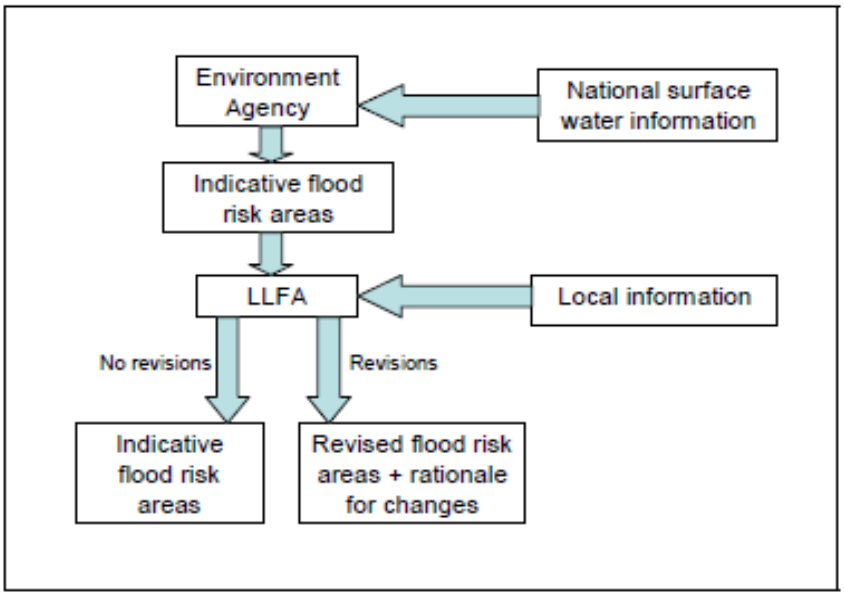


Figure 3.1: Developing Flood Risk Areas
(Environment Agency, 2010)

Defra (2010) set the criteria for determining significance (and hence the thresholds for the flood risk indicators which define the Flood Risk Areas. Those areas where flood risk and the potential consequences exceed the pre-determined threshold have been identified by the Environment Agency as indicative Flood Risk Areas. These were distributed to LLFA's to review in light of more detailed local data.

If a LLFA does not have an indicative Flood Risk Area within its area and there is no local data which suggests a revision, then they are not required to take any further action on Flood Risk Areas (Environment Agency, 2010).

3.2 Data Sources

Table 3.2 details the relevant datasets and information held by flood risk management authorities and other partner organisations.

Table 3.2: Source and description of relevant data and information

	Dataset	Description
Environment Agency	Areas Susceptible to Surface Water Flooding	First generation national mapping that illustrates a general indication of areas that are susceptible to surface water flooding. The maps provide three bandings, indicating less, intermediate and more susceptible.
	Flood Map for Surface Water	Second generation national mapping that illustrates areas where surface water would be expected to flow or pond in two different rainfall events (a 1 in 30 and a 1 in 200 chance of occurring in any year) with two different depth bandings for each event (greater than 0.1m and greater than 0.3m).
	Flood Map (Rivers & Sea)	Shows the areas that could be affected by flooding from the rivers and the sea.
	Areas Susceptible to Groundwater Flooding	Strategic scale national mapping showing areas susceptible to groundwater flooding on a 1km square grid.
	Historic Flood Map	Shows the extents of known flooding from rivers, the sea & groundwater.
	National Receptors Database	National dataset of risk receptors categorised into themes (e.g. buildings, environment, heritage, transport, utilities etc) including residential & non-residential properties, schools, hospitals, electricity substations.
	Indicative Flood Risk Areas	Nationally identified flood risk areas which exceed the threshold for significance (as defined by Defra).
	Test and Itchen Catchment Flood Management Plan	Integrated strategic plan for flood risk management which considers all types of inland flooding (rivers, groundwater or surface water) within the catchment area.
Southampton City Council	Partnership for Urban South Hampshire (PUSH) Strategic Flood Risk Assessment (SFRA)	Strategic Flood Risk Assessment which outlines information on flood risk from all sources across the sub-regional area and specific to each local authority area.
	Level 2 Strategic Flood Risk Assessment	Provides detailed information on the flood risk (past & future) from all sources within Southampton

	Draft Southampton Surface Water Management Plan	Surface water management strategy for Southampton based on an analysis of all the elements contributing to or having an effect on surface water.
	Historic Flooding Records	Historic records of flooding from surface water, groundwater, ordinary watercourses and combination events with tidal flooding across the various departments.
Southern Water	Southern Water historic flooding records	Records of sewer (foul, combined & surface water) flooding incidents in Southampton.

3.3 Limitations

During the data collection, and subsequent analysis of the relevant datasets, there were a number of issues which arose, particularly with regards to internal data collection. Identification of these issues will provide a catalyst for improving collection of flood risk data in the future. The main issues identified are detailed below.

3.3.1 Inconsistent Recording System

There is an obvious lack of a consistent recording system across the various departments within the Council which has led to incomplete and sometimes non-existent flood record datasets. It appears that consistent records were kept during a two year period (2007 – 2008) but prior to and after this period the records are very sparse.

3.3.2 Inaccurate/Incomplete data

Analysis of the available historic flooding records has identified that the recording of important details of the event, such as source of flooding, cause, extent and ownership are often inaccurate or incomplete. It is likely that some of the details were unknown at the time of the event and/or records made by personnel with little or no flood risk management experience leading to incomplete records and inaccuracies within the data.

3.3.3 Records of Consequences of Flooding

Generally, the datasets relating to historic flood events have limited details of the consequences as a result of the event, which made accurately assessing the consequences of past flooding difficult.

3.4 Quality Assurance, Security and Data Restrictions

Data collected were subject to quality assurance measures to monitor and record the quality and accuracy of acquired information and datasets. A data quality score was given, which is a qualitative assessment based on the Data Quality System provided in the SWMP Technical Guidance document (Defra, 2010). This system is explained in Table 3.3.

Table 3.3: Data Quality System from SWMP Technical Guidance (Defra, 2010)

Data Quality Score	Description	Explanation	Example
1	Best available	No better available; not possible to improve in the near future	High resolution LiDAR, river flow data, rain gauge data
2	Data with known deficiencies	Best replaced as soon as new data is available	Typical sewer or river model that is a few years old
3	Gross assumptions	Not invented but based on experience and judgement	Location, extent and depth of surface water flooding
4	Heroic assumptions	An educated guess	Ground roughness for 2d models

The use of this system provides a basis for analysing and monitoring the quality of data that is being collected and used in the preparation of the PFRA. As mentioned in section 3.4, the quality of some collected data was poor, which was identified and recorded using this system.
The security of data is also a key consideration when it comes to collecting, collating and storing sensitive data. All data collected is stored on local servers which are password protected. Southampton City Council must adhere to these data security measures to ensure that sensitive data is held in a secure manner.

A summary table illustrating the restrictions on the use of this data is included in Table 3.4 below.

Table 3.4: Summary of data restrictions and licensing details

Organisation	Restrictions on use of data
Environment Agency	The use of some data is restricted to Southampton City Council for the preparation of its preliminary flood risk assessment. The use of other data is unrestricted.
Southern Water	The use of provided data is restricted to Southampton City Council for the preparation of its preliminary flood risk assessment.

4. Past flood risk

4.1 Overview and analysis of historic flooding in Southampton

Historic flood records were collated as described in Section 3. Records of 194 historical flood events were collected across Southampton City Council's administrative area. A summary map indicating the locations of these events is illustrated in Figure 4.1.

4.1.1 Surface Water Flooding

Surface water flooding occurs when intense rainfall is unable to soak into the ground or enter local drainage networks causing water to run across the ground. All of the records were sourced from either Southampton City Council internal records (Table 4.1), Environment Agency (Table 4.2) or Southern Water (Table 4.3). Those records obtained from internal sources are believed to contain inaccuracies in some of the recorded details, as discussed in Section 3.3, which could have resulted in a misclassification for a number of historic events. There are a number of locations in Southampton where historic flooding has been attributed to ground water, although it is likely these may have been a result of surface water flooding.

Table 4.1: Southampton City Council historic flooding records

Date	Location	Source	Pathway	Receptor
18th May 2007	QUEENS TERRACE/ LATIMER STREET	Heavy rain	Ground water	Not recorded
30th May 2007	SELBORNE AVENUE	Heavy rain & leaf fall	Water overflow drains / gullies	Property
14th June 2007	BROWNING AVENUE	Heavy rain	Ground water	Not recorded
13th July 2007	FIRGROVE ROAD	Heavy rain	Water overflow drains / gullies	Not recorded
14th July 2007	WIMPSON LANE	Heavy rain	Ground water	Not recorded
19th July 2007	ATHELSTAN ROAD	Heavy rain	Obstruction / blockage	Not recorded
	SOMERSET AVENUE	Heavy rain	Water overflow drains / gullies	Not recorded
	FOREST HILLS DRIVE	Heavy rain	Water overflow drains / gullies	Not recorded
	CENTRAL BRIDGE	Heavy rain	Obstruction / blockage	Not recorded
	MANSBRIDGE ROAD/ ITCHENSIDE CLOSE	Heavy rain & river levels	Ground water	Not recorded
	WOODMILL LANE	Heavy rain	Ground water	Not recorded
20th July 2007	BULLAR ROAD	Heavy rain	Obstruction / blockage	Not recorded
	DELL ROAD	Heavy rain	Obstruction / blockage	Not recorded
	EAST STREET	Heavy rain	Obstruction / blockage	Not recorded
	NEW ROAD	Heavy rain	Ground water	Not recorded
30th July 2007	WOODSIDE ROAD	Heavy rain	Ground water	Not recorded
31st July 2007	REDBRIDGE ROAD SUBWAY	Heavy rain	Ground water	Not recorded
21st September 2007	COPPERFIELD ROAD	Heavy rain	Ground water	Not recorded
1st October 2007	BRIDGE ROAD	Heavy rain & leaf fall	Water overflow drains / gullies	Not recorded
	PORTSMOUTH ROAD	Heavy rain & leaf fall	Water overflow drains / gullies	Not recorded
	BOTLEY ROAD	Heavy rain	Water overflow drains /	Not recorded

			gullies	
31st October 2007	ATHELSTAN ROAD	Heavy rain	Water overflow drains / gullies	Not recorded
23rd November 2007	BARNFIELD CLOSE	Heavy rain	Obstruction / blockage	Not recorded
3rd December 2007	WIMPSON LANE	Heavy rain	Ground water	Not recorded
5th December 2007	BURGESS ROAD	Heavy rain & leaf fall	Ground water	Not recorded
	INNER AVENUE	Heavy rain	Ground water	Not recorded
8th January 2008	MOUNT PLEASANT ROAD	Heavy rain	Ground water	Not recorded
15th January 2008	HULSE ROAD	Heavy rain	Ground water	Not recorded
	LOWER BROWNHILL ROAD	Heavy rain	Ground water	Not recorded
16th January 2008	HIGHFIELD ROAD	Heavy rain	Ground water	Not recorded
17th January 2008	THORNHILL PARK ROAD	Heavy rain	Water overflow drains / gullies	Not recorded
	TEST LANE	Heavy rain	Ground water	Not recorded
31st January 2008	NEWTOWN ROAD	Heavy rain	Ground water	Not recorded
1st February 2008	THORNHILL ROAD	Heavy rain	Ground water	Not recorded
5th February 2008	PLATFORM ROAD	Heavy rain	Ground water	Not recorded
6th February 2008	HINKLER ROAD	Heavy rain	Ground water	Not recorded
12th March 2008	ST JAMES ROAD	Heavy rain	Water overflow drains / gullies	Not recorded
1st April 2008	HAZEL ROAD	Heavy rain with high tides	Channel capacity exceeded (no raised defences)	Property
	WESTON PARADE	Heavy rain with high tides	Channel capacity exceeded (no raised defences)	Not recorded
15th April 2008	MILLBROOK POINT ROAD	Heavy rain	Water overflow drains / gullies	Not recorded
26th May 2008	SOUTHERN ROAD/ WESTERN ESPLANADE/ MILLBROOK ROAD EAST	Heavy rain	Surface water	Roads & Southampton Central Train Station
27th May 2008	THE AVENUE SUBWAY	Heavy rain	Ground water	Not recorded
	CIVIC CENTRE HILL/WESTERN ESPLANADE	Heavy rain	Ground water	Not recorded
	ENDLE STREET	Heavy rain	Channel capacity exceeded (no raised defences)	Not recorded
30th May 2008	ST AUBINS AVENUE	Heavy rain	Ground water	Not recorded
1st June 2008	MILLBROOK ROAD	Heavy rain	Unknown	Not recorded
2nd June 2008	PALM ROAD	Heavy rain	Ground water	Property
	DALE VALLEY ROAD	Heavy rain	Water overflow drains / gullies	Not recorded
4th June 2008	MILLBROOK ROAD EAST	Heavy rain & capacity	Ground water	Not recorded
	PENDLE CLOSE SUBWAY	Heavy rain	Ground water	Not recorded

5th June 2008	SOUTHERN ROAD	Heavy rain	Ground water	Not recorded
16th June 2008	WATERHOUSE LANE	Heavy rain	Water overflow drains / gullies	Not recorded
19th June 2008	DERBY ROAD	Heavy rain	Ground water	Not recorded
20th June 2008	BURSLEDON ROAD	Heavy rain	Ground water	Not recorded
4th July 2008	EMPRESS ROAD	Heavy rain & backflow from mains	Channel capacity exceeded (no raised defences)	Property
6th July 2008	WEST ROAD	Heavy rain	Obstruction / blockage	Property
9th July 2008	MOUSEHOLE LANE	Heavy rain	Ground water	Not recorded
10th July 2008	BARRY ROAD	Heavy rain	Ground water	Not recorded
19th July 2008	UNIVERSITY ROAD	Heavy rain	Ground water	Not recorded
20th July 2008	CHARLOTTE PLACE	Heavy rain	Ground water	Not recorded
25th July 2008	REDBRIDGE HILL	Heavy rain	Ground water	Property
13th August 2008	SUMMER - ALBERT ROAD NORTH	Heavy rain	Water overflow drains / gullies	Not recorded
14th August 2008	HIGHFIELD LANE	Heavy rain	Ground water	Not recorded
21st August 2008	OLD MILL WAY	Heavy rain & capacity	Ground water	Not recorded
22nd August 2008	ST MARY STREET	Heavy rain	Ground water	Not recorded
	KINGSWAY	Heavy rain	Ground water	Not recorded
29th August 2008	HONEYSUCKLE ROAD	Heavy rain & capacity	Ground water	Not recorded
5th September 2008	WIDE LANE	Heavy rain	Ground water	Not recorded
	REGENTS PARK ROAD	Heavy rain	Ground water	Not recorded
	WARREN AVENUE	Heavy rain	Ground water	Not recorded
13th November 2009	MANSBRIDGE ROAD	Heavy rain with high tides	Channel capacity exceeded (no raised defences)	Not recorded

Table 4.2: Environment Agency historic flooding records

Date	Location	Source	Pathway	Receptor
3rd-6th February 1990	Mansbridge	Heavy rainfall & high tides	Channel capacity exceeded	Unknown
24th – 26th December 1999	Northam	Not recorded	Not recorded	Not recorded
1st October 2000	Swaythling	Not recorded	Channel capacity exceeded	Not recorded
1st December 2000	Shirley	Run-off	Surface water	Road
3rd November 2005	St Deny's	Not recorded	Not recorded	Not recorded
10th March 2008	St Deny's	Over topping of defences	Not recorded	Not recorded
	Swaythling	Over topping of defences	Not recorded	Not recorded
9th February 2009	Mansbridge/ Woodmill	Heavy rainfall & high tides	Not recorded	Not recorded

4.1.2 Groundwater Flooding (Level 2 SFRA, 2010)

Groundwater flooding occurs when water levels in the ground (the water table) rise above the ground surface elevation or from water flowing from intermittent springs or streams. Water levels in the ground normally fluctuate throughout the year where they rise during wet months and fall during dry months as the water flows out into rivers. Groundwater flooding

tends to occur in low-lying areas underlain with permeable rocks (aquifers). These may be major aquifers, such as Chalk or sandstone, but also localised sand and river gravel floodplains. There are a number of mechanisms that can lead to groundwater flooding but the majority of incidents are a result of rising water levels in response to long periods of prolonged extreme rainfall.

The solid geology of Southampton runs approximately parallel to the River Test. Across the majority of the southern half of Southampton is sand-based bedrock including the Selsey Sand, Earnley Sand and Wittering Formations (Bracklesham Group). Further to the north in Southampton the bedrock is dominated by London Clay. In contrast the upper catchments of the River Test and Itchen are dominated by permeable chalk.

The majority of the solid geology in Southampton is overlain by sands and gravels (River Terrace Deposits), however the historic floodplain of the Test and Itchen is predominantly clay (tidal flat deposits). This approximately corresponds to the area of reclaimed land along the Southampton coastal frontage.

The soil maps of England and Wales (1:250,000) indicate Southampton is mainly un-surveyed due to the urban environment. The local soils surrounding Southampton are generally slowly permeable and seasonally waterlogged.

Internal details of historic flooding include 60 records of flooding attributed to groundwater (Table 4.1). Data provided with the records indicates flooding lasted approximately 2 hours and was attributed to heavy rain. It is likely the majority of these flooding incidents were a result of saturated ground, including the flow of water through soil, rather than directly attributable to high groundwater levels. However, these records do illustrate the difficulty in accurately determining the source of flooding, particularly in relation to groundwater. For the purposes of this Preliminary Assessment Report, there is no identified historic groundwater flooding records with significant consequences.

4.1.3 Sewer Flooding

In urban areas rainwater is usually drained into surface water sewers or combined sewers containing both surface and waste water. Flooding from sewers occurs when rainfall exceeds the capacity of the network or when there is an infrastructure failure. Southern Water have provided datasets specifically detailing historic records of surface water sewer or combined/ foul sewer flooding within Southampton (Table 4.3).

Table 4.3: Southern Water Sewer Flooding Records

Date	Location	Source/Pathway	Receptor
7th December 1999	OBELISK ROAD	FOUL/COMBINED	Roads
14th May 1999	KING GEORGES AVENUE	SURFACE WATER	Roads
2nd June 1999	BOTLEY ROAD	FOUL/COMBINED	Property & roads
	KITCHENER ROAD	FOUL/COMBINED	Roads
	ROMSEY ROAD	FOUL/COMBINED	Road & curtilage
	SAXON ROAD	FOUL/COMBINED	Roads
3rd June 1999	PITT ROAD	SURFACE WATER	Roads
16th August 1999	BLACKTHORN ROAD	SURFACE WATER	Roads
22nd September 1999	NEWTOWN ROAD	SURFACE WATER	Roads
24th September 1999	LUCCOMBE ROAD	SURFACE WATER	Roads
29th September 1999	MANOR HOUSE AVENUE	SURFACE WATER	Roads
24th December 1999	BRICKFIELD ROAD	FOUL/COMBINED	Roads
	FIRGROVE ROAD	FOUL/COMBINED	Roads
4th July 2000	WINCHESTER ROAD	SURFACE WATER	Roads
29th July 2000	SOUTH EAST ROAD	FOUL	Curtilage
9th July 2001	OXFORD AVENUE	FOUL	Roads

17th July 2001	BURNS ROAD	FOUL	Curtilage
8th August 2001	NORHAM AVENUE	COMBINED	Road & curtilage
	PORTSWOOD ROAD	FOUL	Property
	QUAYSIDE ROAD	SURFACE WATER	Roads
22nd August 2001	JUNIPER ROAD	FOUL	Curtilage
31st July 2002	SISKIN CLOSE	SURFACE WATER	Roads
9th August 2002	PAYNES ROAD	FOUL	Roads
10th August 2002	SWIFT ROAD	FOUL	Curtilage
	LAXTON CLOSE	FOUL	Curtilage
	LEYTON ROAD	FOUL	Curtilage
	MOUNT PLEASANT ROAD	FOUL	Curtilage
	WILTON ROAD	FOUL	Curtilage
13th August 2002	BRAESIDE ROAD	FOUL	Curtilage
19th August 2002	DUKES ROAD	FOUL	Curtilage
24th November 2002	BRIDGE ROAD	FOUL	Roads
26th December 2002	SOMERSET AVENUE	FOUL	Not recorded
30th December 2002	PROCTOR CLOSE	FOUL	Roads
	SOMERSET AVENUE	FOUL	Roads
2nd January 2003	REDBRIDGE LANE	FOUL	Roads
3rd January 2003	BASSETT AVENUE	FOUL	Roads
	ORPEN ROAD	FOUL	Roads
22nd June 2003	SHIRLEY ROAD	FOUL	Roads
1st December 2003	LOWER BROWNHILL ROAD	FOUL	Curtilage
	THE CRESCENT, PORTSMOUTH ROAD	FOUL	Roads
2nd December 2003	LOANE ROAD	FOUL	Roads
4th December 2003	TERMINUS TERACE/ PLATFORM ROAD	FOUL	Roads
12th January 2004	EXFORD AVENUE	FOUL	Roads
	ALANDALE ROAD	SURFACE WATER	Roads
19th January 2004	THACKERAY ROAD	FOUL	Not recorded
4th February 2004	HILL LANE	FOUL/COMBINED	Property
11th May 2004	UNIVERSITY ROAD	SURFACE WATER	Curtilage
16th August 2004	POINTOUT CLOSE	SURFACE WATER	Curtilage
18th August 2004	BEVOIS VALLEY ROAD	SURFACE WATER	Roads
25th August 2004	MIDDLE ROAD	FOUL	Roads
28th October 2004	ALEXANDRA ROAD	FOUL	Roads
28th December 2004	BANBURY AVENUE	SURFACE WATER	Roads
25th April 2005	ARCHERY GROVE	FOUL	Roads
26th April 2005	ARCHERY GROVE	FOUL	Roads
24th June 2005	OLD MILL WAY	SURFACE WATER	Roads
	ARCHERY GROVE	FOUL	Not recorded
28th June 2005	EDELVALE ROAD	SURFACE WATER	Roads
2nd November 2005	SWIFT ROAD	FOUL	Roads
	UPPER DEACON ROAD	FOUL	Curtilage
22nd July 2006	BEAUWORTH AVENUE	SURFACE WATER	Roads
14th September 2006	ARCHERY GROVE	FOUL	Roads
	SPRING ROAD	FOUL	Roads
	WESTFIELD ROAD	FOUL	Curtilage
26th November 2006	SATURN CLOSE	SURFACE WATER	Roads & curtilage
	WATERHOUSE LANE	SURFACE WATER	Roads
28th November 2006	ARCHERY ROAD	FOUL	Not recorded
3rd December 2006	HARRISON ROAD	FOUL	Curtilage
	SPRING ROAD	FOUL	Roads
7th December 2006	CLEETHORPES ROAD	FOUL	Curtilage
	DEAN ROAD	FOUL	Curtilage
8th December 2006	PARK ROAD	FOUL	Not recorded
11th December 2006	COMMERCIAL STREET	FOUL	Road

6TH January 2007	BOTLEY ROAD	FOUL	Not recorded
12th February 2007	THORNDIKE ROAD	SURFACE WATER	Road
15TH May 2007	ATHELSTAN ROAD	SURFACE WATER	Road
15th June 2007	SPINDLEWOOD CLOSE	SURFACE WATER	Curtilage
25th June 2007	KESTEVEN WAY	SURFACE WATER	Road
2nd July 2007	BASSETT WOOD DRIVE	SURFACE WATER	Curtilages
10th July 2007	MIDDLE ROAD	FOUL	Curtilage
21st November 2007	PEARTREE AVENUE	FOUL	Curtilage
2nd December 2007	BLUEBELL ROAD	SURFACE WATER	Road & curtilage
10th January 2008	UNIVERSITY ROAD	FOUL	Road
10th March 2008	ELMWOOD AVENUE	SURFACE WATER	Road
29th April 2008	HILL LANE	FOUL	Curtilages
	WATERLOO ROAD	FOUL	Curtilage
1st May 2008	CAWTE ROAD	FOUL	Curtilage
26th May 2008	WINCHESTER ROAD	FOUL	Curtilage
	NORHAM AVENUE	FOUL	Road & curtilages
29th May 2008	SWIFT GARDENS	FOUL	Curtilages
	MIDDLE ROAD	FOUL	Road & curtilage
	MIDDLE ROAD	FOUL	Road
	DALE VALLEY ROAD	SURFACE WATER	Curtilage
30th May 2008	BYRON ROAD	SURFACE WATER	Curtilage
	PEARTREE ROAD	FOUL	Road
3rd June 2008	MILLBROOK ROAD WEST	SURFACE WATER	Roads & curtilage
4th June 2008	BELLEMOOR ROAD	FOUL	Road & curtilages
9th June 2008	MALWOOD AVENUE	FOUL	Curtilage
8th July 2008	SMYTHE ROAD	FOUL	Properties & curtilages
10th November 2008	EMPRESS ROAD	COMBINED	Road
11th November 2008	WEST QUAY ROAD	FOUL	Curtilage
13th February 2009	WINCHESTER ROAD	SURFACE WATER	Road & curtilage
31st July 2009	CHETWYND DRIVE	SURFACE WATER	Curtilages
2nd September 2009	MERSHAM GARDENS	SURFACE WATER	Road
	COXFORD ROAD	SURFACE WATER	Roads
4th September 2009	LAWRENCE GROVE	FOUL	Properties, curtilages & roads
7th October 2009	HINKLER ROAD	SURFACE WATER	Road & curtilage
13th November 2009	BOTANY BAY ROAD	FOUL	Road
	POUND STREET	FOUL	Property & curtilages
2nd December 2009	BURGESS ROAD	FOUL	Not recorded
6th December 2009	OBELISK ROAD	FOUL	Curtilage
24th January 2010	CARNATION ROAD	SURFACE WATER	Road
23rd February 2010	RICHMOND ROAD	FOUL	Not recorded
25th February 2010	ALFRISTON GARDENS	FOUL	Roads
28th February 2010	WILLOW TREE WALK	FOUL	Roads
1st March 2010	CAWTE ROAD	FOUL	Curtilages

4.1.4 Ordinary Watercourse Flooding

There are currently no records of historic flood events related to ordinary watercourses within Southampton.

4.1.5 Interaction with Main Rivers and the Sea

The sewerage system in Southampton is complicated by the tidal nature of the sewer outfalls. In many instances 'non-return' valves are located on the outfalls. This protects the drainage system from the sea entering the network, but at the same time it will often prevent (or reduce) the ability of the system to discharge surface water – referred to as 'tide locking'.

This results in surface water 'backing up' in the drainage system, potentially leading to flooding. Outfall culverts which drain the area to the west of the River Itchen are affected by tide locking (Draft Southampton SWMP, 2011).

Seven historic flood events were recorded as resulting from heavy rainfall combined with either a high tide or exceeding of channel capacity which led to surface water flooding. It is possible that other past flood events which occurred in low-lying areas within the vicinity of the main rivers in Southampton may have resulted from an interaction of surface water with main rivers and the sea but it was not recorded as the cause.

4.2 Consequences of historic flooding

As a result of the issues discussed in Section 3.4, insufficient data is available to draw definitive conclusions on the impacts and consequences of historic flood events on people, the economy and the environment, as this information has not been recorded in the past.

Due to the lack of information available, no historic flood events have been considered to have had 'significant harmful consequences' and therefore none will be recorded in Annex 1 of the Preliminary Assessment Spreadsheet. However, a complete record of locations where flooding has occurred will be kept by Southampton City Council as a future evidence base. This base will be built up in the future through ensuring full details of flood events are recorded; this will then be used to support and inform future PFRA cycles and development of Southampton's Local Flood Risk Management Strategy.

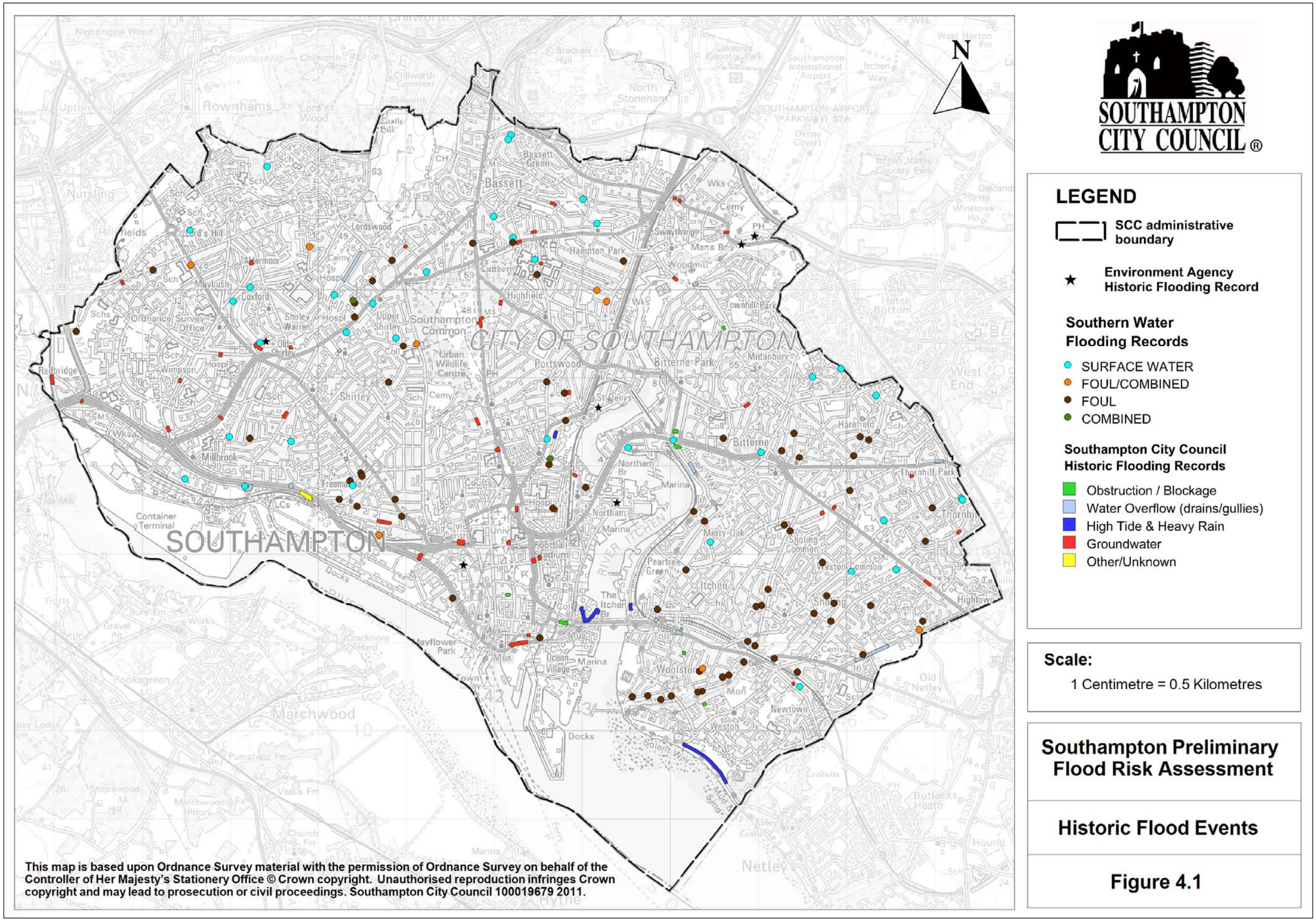


Figure 4.1: Historic flood events in Southampton

5. Future flood risk

5.1 Overview of Future Flood Risk

5.1.1 Surface Water Flooding

Local information has been produced for the development of the Southampton SWMP, but at the time of writing this report the SWMP had not been finalised. Therefore, the results from this study have not been included in this PFRA, but they will be used to inform future iterations of the PFRA process.

The Environment Agency has produced a national assessment of surface water flood risk in the form of two national mapping datasets. The first generation map, Areas Susceptible to Surface Water Flooding (AStSWF), contains three susceptibility bandings for a rainfall event with a 1 in 200 chance of occurring. The national methodology has since been updated to produce the Flood Map for Surface Water (FMfSW), a revised model containing two flood events (1 in 30 annual chance and 1 in 200 annual chance) and two depth bandings (greater than 0.1m and greater than 0.3m). The Flood Map for Surface Water is illustrated in Figure 5.1, highlighting areas at risk of surface water flooding in the future.

Using the FMfSW dataset, the number of properties at risk of surface water flooding within Southampton has been estimated. For a rainfall event with a 1 in 200 annual chance of occurring, 16,700 properties are at risk from flooding to a depth of 0.1m and 4,500 properties are at risk from flooding to a depth of 0.3m. Of these properties at risk, over three quarters are residential properties. Further details on the potential harmful consequences of future flooding are included in Annex 2 of the Preliminary Assessment Spreadsheet.

5.1.2 Groundwater Flooding

There is no substantive local information available which provides evidence on future groundwater flood risk across Southampton. The PUSH SFRA (2007) outlined that the key areas at risk of groundwater flooding lie in East Hampshire which is outside the Southampton administrative boundary. A broad scale assessment undertaken in the Level 2 SFRA (2010) identified that the majority of the city is of moderate permeability, therefore assessed at medium risk of groundwater flooding, indicating a potential risk of groundwater emerging due to geology, soils and elevation.

In the low lying areas of Southampton the groundwater table is linked to the tidal levels in River Itchen and River Test. As the effects of climate change result in the mean sea level rising, it is likely that local groundwater levels will also increase.

The Level 2 SFRA indicates that there is only limited probability of groundwater flooding at present, however the effects of rising sea level on the local water table in the low lying land in Southampton is likely to result in increased risk from this source of flooding in the future. The mean astronomical tide in Southampton is approximately 0mAOD. Over the next 100 years this could rise to 1.1mAOD. The majority of the low lying land in Southampton is above 3mAOD. The Watermark West Quay FRA identified a groundwater level 2m below ground level. On the basis of a 3mAOD site level this indicates an existing groundwater level of approximately 1mAOD at this site. It is difficult to draw any definitive conclusions based on a single groundwater measurement, however it does indicate the groundwater level in the low-lying parts of Southampton is currently higher than the astronomical tide. There is therefore potentially up to 2m difference between ground levels and future groundwater levels in the low-lying parts of Southampton, however fluctuations in the groundwater level will mean

there will be extended periods where groundwater is higher, and may approach ground levels during periods of high tide and winter rainfall.

The Environment Agency's national dataset, Areas Susceptible to Groundwater Flooding, has been used to form the basis of the assessment of future flood risk from groundwater. This dataset is illustrated in Figure 5.2 and areas at high risk from groundwater flooding are identified.

It is difficult to ascertain the potential consequences of future flooding from ground water. Most at risk within Southampton will be deep foundations, basements and underground infrastructure but it is not possible to quantify the potential consequences.

5.1.3 Ordinary Watercourse Flooding

The Detailed River Network was used to identify ordinary watercourses within Southampton and cross-referenced with the Flood Map for Rivers and Seas. It was established that only those watercourses classified as Main River or Critical (the responsibility of the Environment Agency) within Southampton are included in the Flood Map. Hence, there is little or no information available on future flood risk from ordinary watercourses within Southampton.

5.2 Locally agreed Surface Water Information

A definition of 'locally agreed surface water information' has been considered in conjunction with the Environment Agency and Southern Water in order to agree what surface water information best represents local conditions across Southampton.

Since the Southampton SWMP was not finalised at the time of determining the 'locally agreed surface water information', it is considered that the Flood Map for Surface Water dataset (Figure 5.1), which gives an overview of the future flood risk from surface water across Southampton, is the most appropriate source of information at present. This dataset largely correlates with the historical surface water flooding records throughout the city.

Please note the outputs from the SWMP will provide more accurate information on future flood risk in Southampton and will form part of the 'locally agreed surface water information' once completed. This will be used to inform the local strategy to manage future flood risk and the next cycle of the PFRA process.

5.3 Climate change

5.3.1 The Evidence

There is clear scientific evidence that global climate change is happening now. It cannot be ignored.

Over the past century around the UK we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. It seems to have decreased in summer and increased in winter, although winter amounts changed little in the last 50 years. Some of the changes might reflect natural variation; however the broad trends are in line with projections from climate models.

Greenhouse gas (GHG) levels in the atmosphere are likely to cause higher winter rainfall in future. Past GHG emissions mean some climate change is inevitable in the next 20-30 years. Lower emissions could reduce the amount of climate change further into the future, but changes are still projected at least as far ahead as the 2080s.

We have enough confidence in large scale climate models to say that we must plan for change. There is more uncertainty at a local scale but model results can still help us plan to adapt. For example we understand rain storms may become more intense, even if we can't be sure about exactly where or when. By the 2080s, the latest UK climate projections (UKCP09) are that there could be around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day). It is plausible that the amount of rain in extreme storms (with a 1 in 5 annual chance, or rarer) could increase locally by 40%.

5.3.2 Key Projections for South East River Basin District

If emissions follow a medium future scenario, UKCP09 projected changes by the 2050s relative to the recent past are:

- Winter precipitation increases of around 18% (very likely to be between 2 and 39%)
- Precipitation on the wettest day in winter up by around 16% (very unlikely to be more than 34%)
- Relative sea level at Portsmouth very likely to be up between 10 and 40cm from 1990 levels (not including extra potential rises from polar ice sheet loss)
- Peak river flows in a typical catchment likely to increase between 11 and 24%

Increases in rain are projected to be greater at the coast and in the west of the district.

5.3.3 Implications for Flood Risk

Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability.

Wetter winters and more of this rain falling in wet spells may increase river flooding, especially in the rapidly responding catchments draining the South Downs and Weald. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the unexpected.

Rising sea or river levels may increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses.

There is a risk of flooding from groundwater in the district. Recharge may increase in wetter winters, or decrease in drier summers.

Where appropriate, we need local studies to understand climate impacts in detail, including effects from other factors like land use. Sustainable development and drainage will help us adapt to climate change and manage the risk of damaging floods in future.

5.3.4 Adapting to change

Past emission means some climate change is inevitable. It is essential we respond by planning ahead. We can prepare by understanding our current and future vulnerability to flooding, developing plans for increased resilience and building the capacity to adapt. Regular review and adherence to these plans is key to achieving long-term, sustainable benefits.

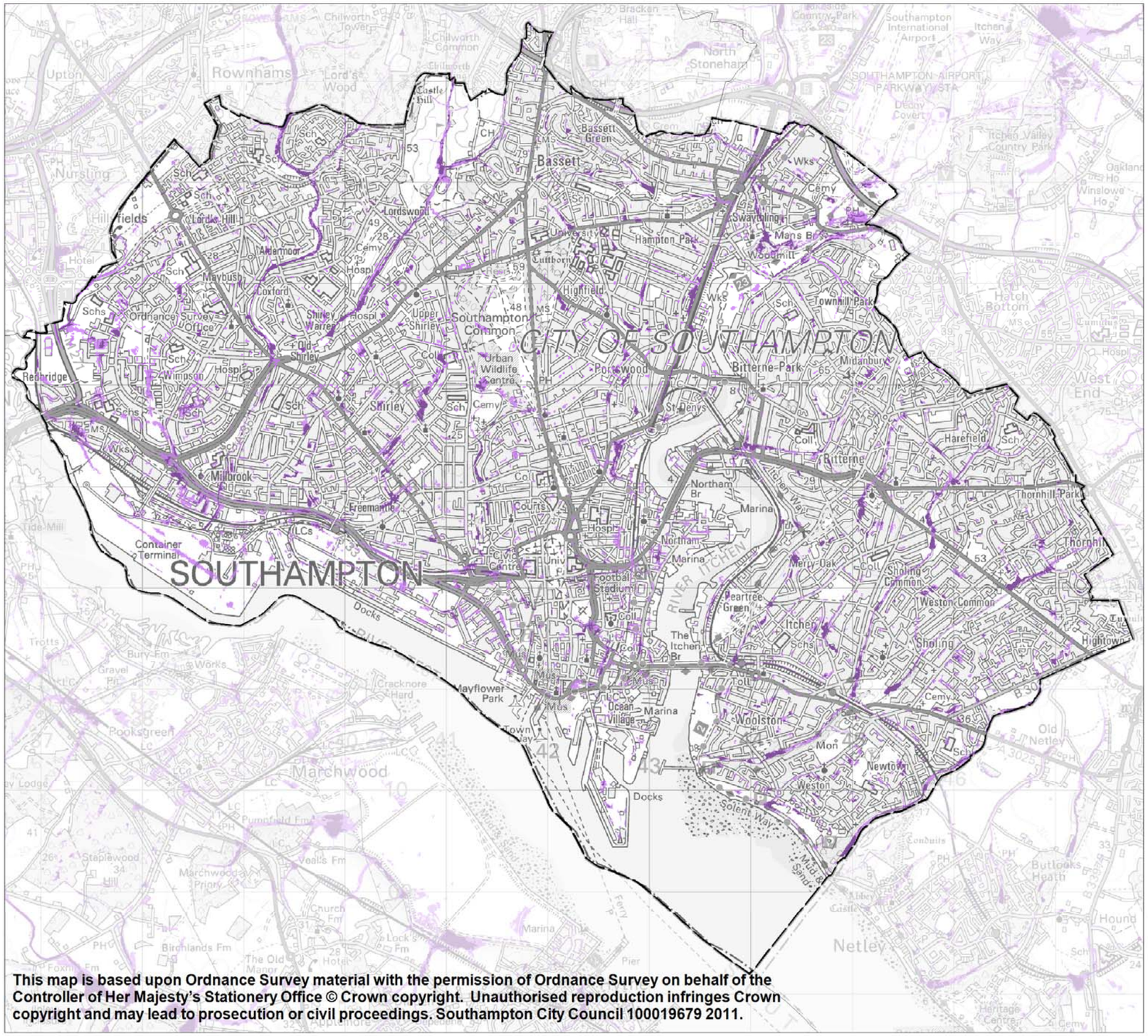
Although the broad climate change picture is clear, we have to make local decisions uncertainty. We will therefore consider a range of measures and retain flexibility to adapt. This approach, embodied within flood risk appraisal guidance, will help to ensure that we do not increase our vulnerability to flooding.

5.3.5 Long Term Developments

It is possible that long term developments might affect the occurrence and significance of flooding. However current planning policy aims to prevent new development from increasing flood risk.

In England, Planning Policy Statement 25 (PPS25) on development and flood risk aims to "ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall."

Adherence to Government policy ensures that new development does not increase local flood risk. However, in exceptional circumstances the Local Planning Authority may accept that flood risk can be increased contrary to Government policy, usually because of the wider benefits of a new or proposed major development. Any exceptions would not be expected to increase risk to levels which are "significant" (in terms of the Government's criteria).



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NOTE:

This map gives an indication of the broad areas likely to be at risk of surface water flooding. It is not suitable for use at an individual property scale due to the method used.

LEGEND

- **SCC administrative boundary**
- **Surface Water 'Deep'**
- **Surface Water 'Shallow'**

Scale:

1 Centimetre = 0.5 Kilometres

Southampton Preliminary Flood Risk Assessment

Flood Map for Surface Water 1 in 200 Chance

Figure 5.1

Figure 5.1: Flood Map for Surface Water

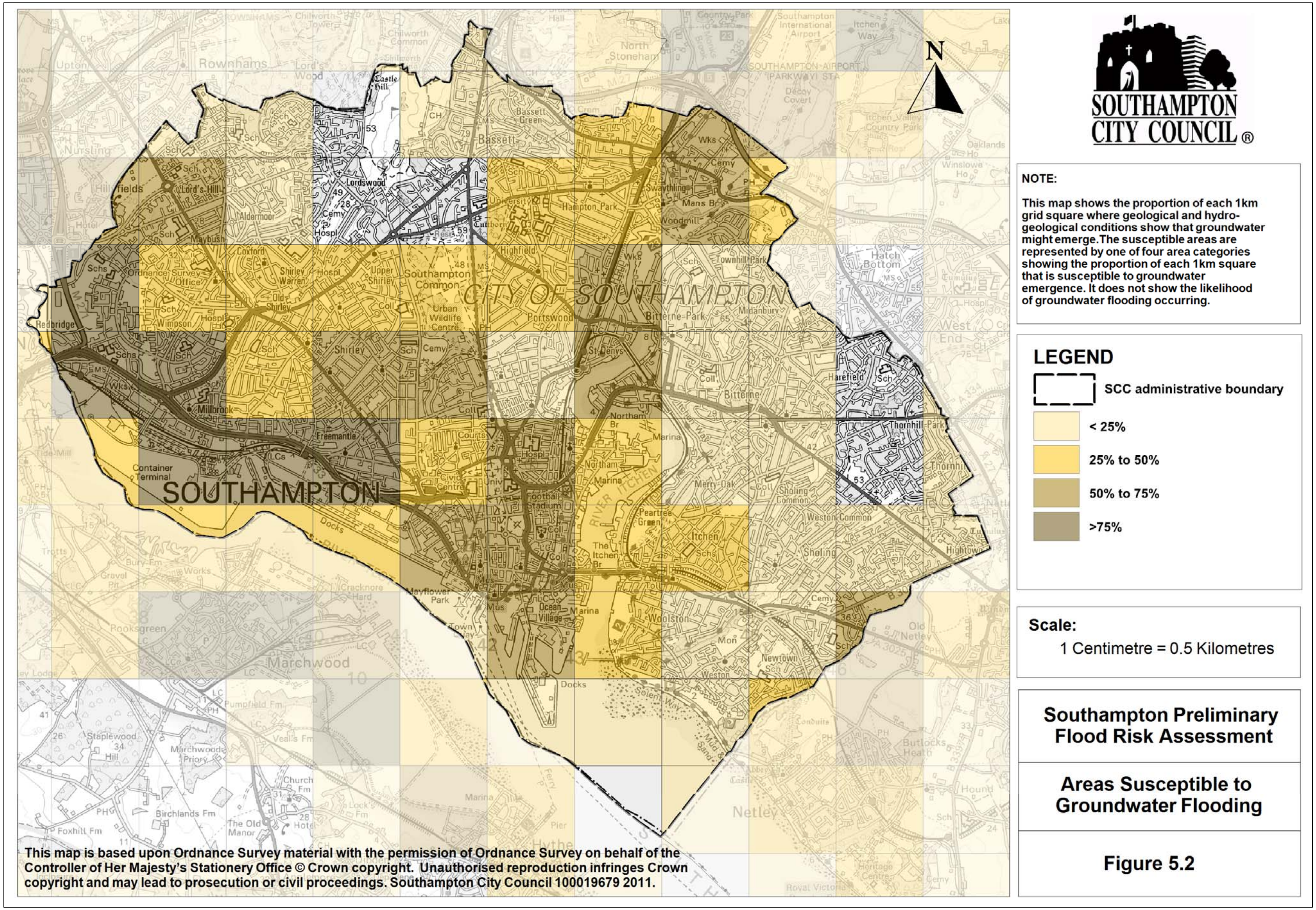

Figure 5.2: Areas Susceptible to Groundwater Flooding Map

6. Identification of Flood Risk Areas

In order to ensure a consistent national approach, Defra have identified significance criteria and thresholds to be used for defining flood risk areas. Guidance on applying these thresholds was published by Defra in December 2010. In this guidance document ("Selecting and reviewing Flood Risk Areas for local sources of flooding"), Defra have set out agreed key risk indicators and threshold values which must be used to determine Flood Risk Areas. The Environment Agency has applied the criteria and thresholds to identify Indicative Flood Risk Areas across the country.

The methodology is based on using national flood risk information to identify 1km squares where local flood risk exceeds at least one of the defined thresholds (outlined in Table 6.1); these areas within Southampton are illustrated in Figure 6.1.

Table 6.1: Places above Flood Risk Thresholds

	Flood Risk Indicators	**Threshold**
Human Health	Number of people	> 200
	Critical services	> 1
Economic Activity	Number of non-residential properties	> 20

Where a cluster of these grid squares leads to an area where flood risk is most concentrated, and the threshold values are met (outlined in Table 6.2), this area has been identified as an indicative Flood Risk Area.

Table 6.2: Indicative Flood Risk Areas Thresholds (national assessment)

	Indicator	**Threshold**
Human Health	Number of people	30,000 or greater ***(Deciding threshold)***
	Critical services	150
Economic Activity	Non-residential properties	3,000

'The indicative Flood Risk Areas are meaningful areas in which the magnitude of the flood risk in a national context justifies further investigation through maps and management in plans as required by the Regulations and the results reported to the European Commission' (Defra, 2010). Ten national Indicative Flood Risk Areas have been identified across England, illustrated in Figure 6.2.

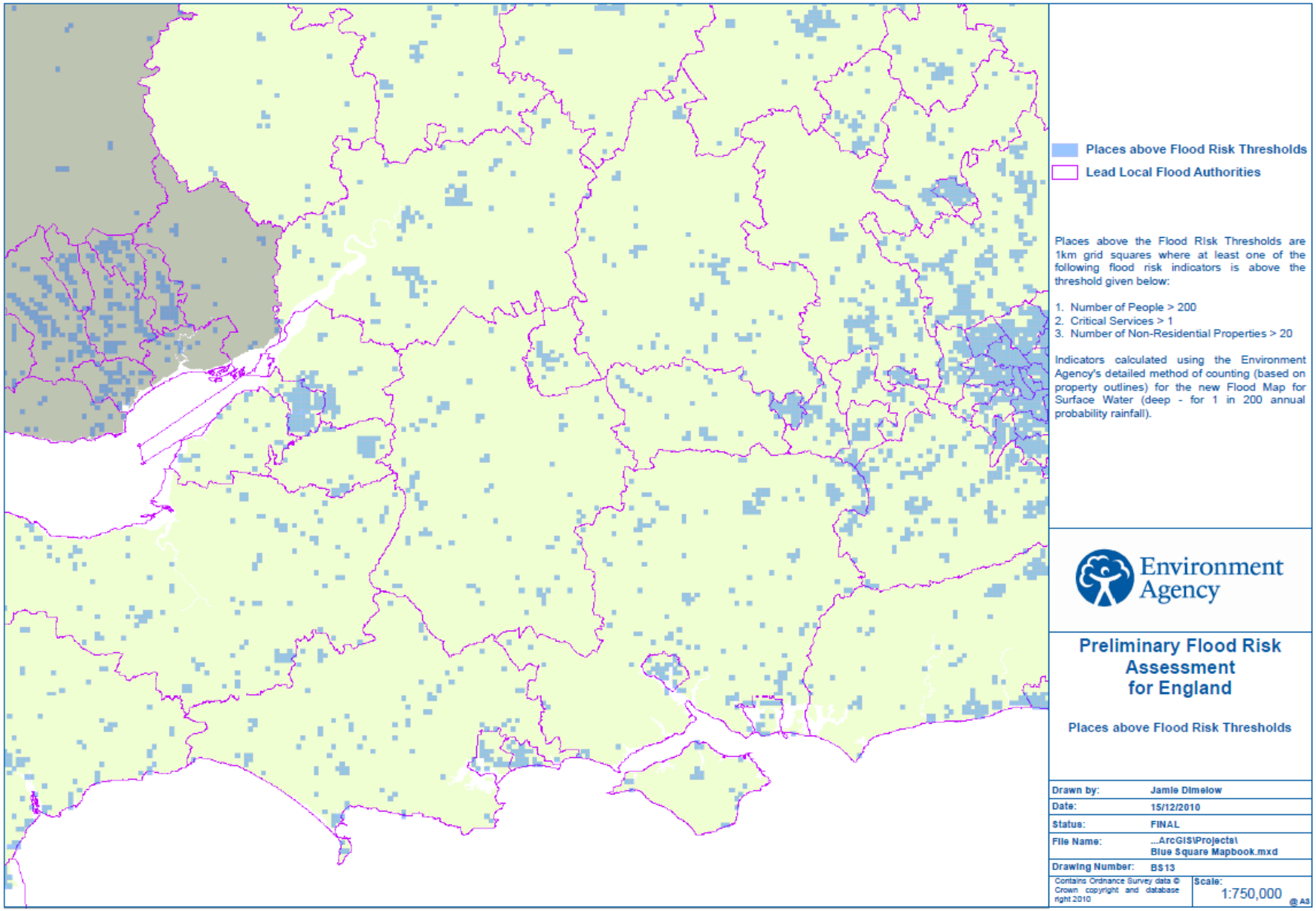

Figure 6.1: Areas above Flood Risk Threshold

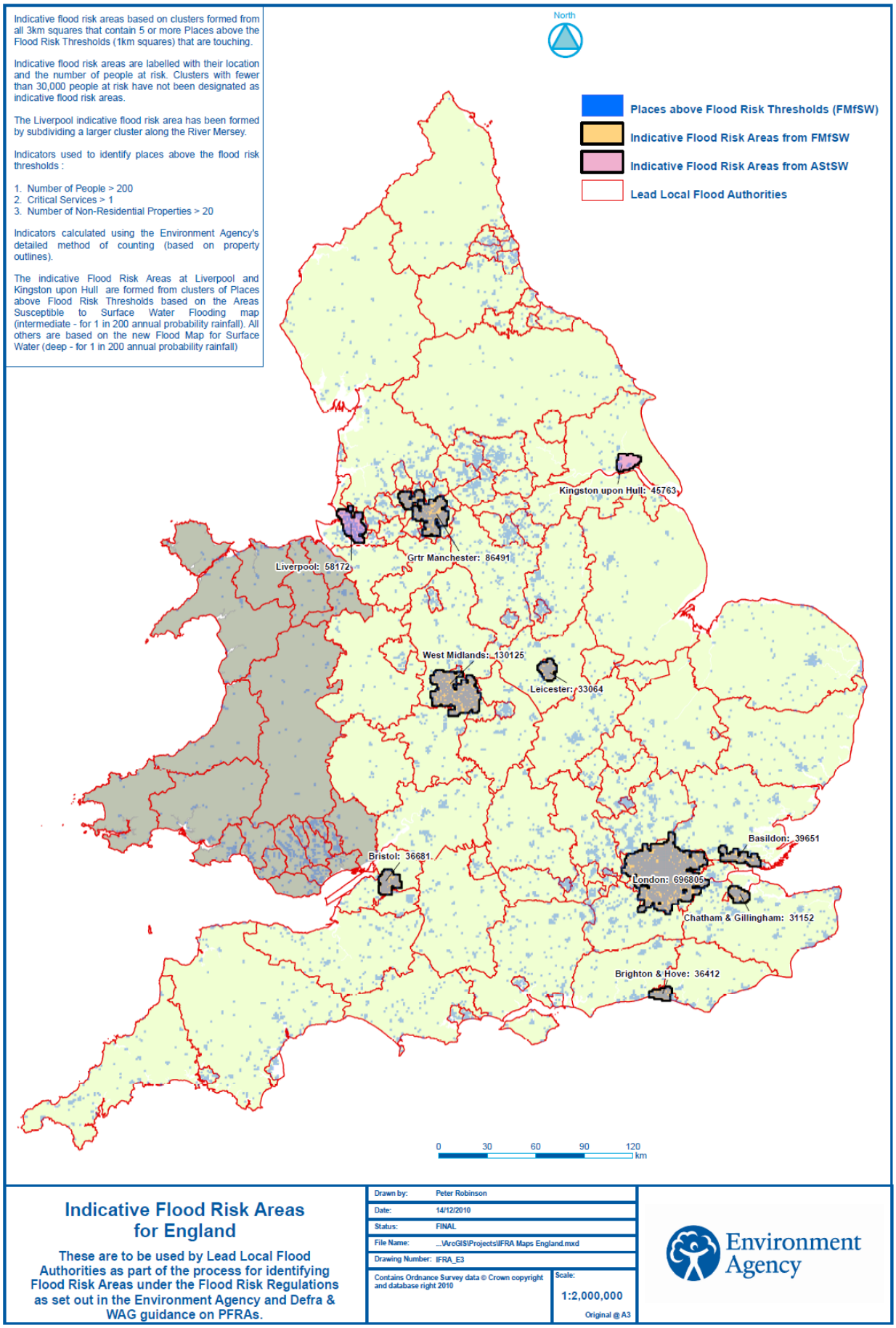

Figure 6.2: Indicative Flood Risk Areas in England

As illustrated in Figure 6.2, none of the ten identified indicative Flood Risk Areas fall within the administrative boundary of Southampton. The estimated potential consequences of future flood risk from local sources in Southampton do not exceed the identified significance criteria and thresholds and the information gathered during the PFRA has not shown any local factors which would justify change to the national assessment, hence why no indicative Flood Risk Area has been identified within Southampton. It is not necessary to complete a review of the indicative Flood Risk Areas since they are not relevant to Southampton and therefore subsequent stages of the Flood Risk Regulations are not required to be completed by Southampton City Council during this cycle.

Although a Flood Risk Area has not been identified in Southampton, it must be noted that the risk of flooding from local sources within the city will be managed through the Local Flood Risk Management Strategy.

7. Next steps

7.1 Future Data Management Arrangements

In order to continue to fulfil the role as Local Lead Flood Authority, Southampton City Council are required to investigate future flood events and ensure continued collection, assessment and storage of flood risk data and information. It is crucial that all records of flood events are documented consistently and in accordance with the INSPIRE Directive (2007/2/EC). It is proposed that a centralised database will be kept up to date by Southampton City Council. This can be used as an evidence base to inform future assessments and reviews, for input into the development of the Local Flood Risk Management Strategy and the next cycle of the PFRA in 6 years.

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