
Bath & North East Somerset Council

Preliminary Flood Risk Assessment:

15th March 2011

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Executive Summary

This report has been prepared by Bath and North East Somerset Council to meet the requirements of the Flood Risk Regulations 2009. The Regulations transpose EU Directive 2007/60/EC into UK legislation and place a legal duty upon Lead Local Flood Authorities to prepare a Preliminary Flood Risk Assessment.

Bath and North East Somerset Council is a unitary authority and is defined as a Lead Local Flood Authority (LLFA) within the legislation.

The Preliminary Flood Risk Assessment is a high level screening exercise to identify areas of significant local flood risk from sources including surface water, groundwater, ordinary watercourses and man-made structures such as canals or sewers but excluding of main rivers. The Preliminary Flood Risk Assessment results in the production of a Preliminary Assessment Report, supporting spreadsheets and GIS map layers. The report has been prepared in accordance with the EA final guidance on Preliminary Flood Risk Assessment issued in December 2010.

Bath and North East Somerset Council has worked together with various internal and external partners including the Environment Agency, Wessex Water and Parish Councils to gather data for this report. A Memorandum of Understanding and data sharing licenses were signed between partners. A close working relationship resulted in the determination of locally agreed surface water information that best represented conditions within the Bath and North East Somerset area.

In order to develop a clear picture of local flood risk within Bath and North East Somerset, records of historic flooding events were collated and reviewed. The Environment Agency undertook a detailed computer modelling exercise for predicted future flood events, which supported the assessment of predicted flood risk events, this included production of Flood Water Maps for Surface Water.

A map of indicative flood risk areas within England and Wales was produced by the Environment Agency based on nationally available information. These are areas where significant harmful consequences are expected to occur in a flooding event. Only 10 of these areas are present within England and Wales. No stand alone indicative Flood Risk Areas fall within the Bath and North East Somerset area. The closest Indicative Flood Risk Area to Bath and North East Somerset is that of Bristol. A relatively small portion of this area (1.5%) falls within Bath and North East Somerset administrative boundary. Discussions with Bristol City Council have resulted in the agreement that they will take the lead in reviewing this indicative flood risk area on the basis that the selected location falls predominantly within their administrative boundary.

All flood events were assessed using criteria for determining significance and thresholds for defining flood risk areas with the purpose to report flood events with significant harmful consequences and subsequent flood risk areas to the EU. No flood risk areas within Bath and North East Somerset were identified as part of this Preliminary Flood Risk Assessment. However some local areas where flood risk is an issue have been identified and will be addressed in future local flood risk management strategies.

In addition procedures for recording and monitoring future flooding from local sources have been developed.

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1 Introduction to Preliminary Flood Risk Assessment

1.1 Legislative background

EU Directive 2007/60/EC on the assessment and management of flood risks (the 'Floods Directive') came into force on 26 November 2007. This Directive requires Member States to assess whether all water courses and coast lines are at risk from flooding and to map the possible flood extent.

The Flood Risk Regulations 2009 (the 'Regulations') implement the requirements of the Floods Directive and came into force in England and Wales on 10th December 2009. Part 2 of the Regulations sets out provisions in relation to the preparation of Preliminary Flood Risk Assessments (PFRA) and sets out the responsibilities for both the Environment Agency (EA) and Lead Local Flood Authorities (LLFAs).

This report presents Bath and North East Somerset Council's (LLFA) findings in relation to the preparation of the Preliminary Flood Risk Assessment and identification of Flood Risk Areas. In line with the Regulations, this report will focus on local flood risk from sources including surface runoff, groundwater and ordinary watercourses. Any interactions these sources may have with other sources of flooding such as drainage systems and canals will also be investigated. It is beyond Bath and North East Somerset's responsibilities to consider flooding associated with main rivers, seas or reservoirs. This is the responsibility of the Environment Agency.

1.2 The Study Area

Bath and North East Somerset covers an area of approximately 35,000 hectares. Two thirds of the study area is designated as a green belt. The geographical extent of the study area is illustrated in Figure 1.1.

Urban Areas

The largest urbanised areas within Bath and North East Somerset are Bath, Keynsham, Midsomer Norton and Radstock. The surrounding local government areas are Bristol, North Somerset, Somerset, South Gloucestershire, and Wiltshire. The population of the area has been growing during recent decades and at the 2001 census stood at 169,040 with approximately half the population living in the City of Bath. There are numerous villages and hamlets spread across 49 rural parishes which accommodate a substantial rural population.

Drainage

Bath and North East Somerset is drained primarily by the River Avon, the main tributaries of which are the River Chew, the Cam Brook and the Wellow Brook and is located within the Severn River Basin District.

There are a number of man made conveyance structures within Bath and North East Somerset including the Kennet and Avon Canal.

Chew Valley Lake (the fifth-largest artificial lake in the UK) is an important landscape feature and wildlife habitat within the Mendip Hills Area of Outstanding Natural Beauty. It attracts numerous visitors and accommodates a range of recreational pursuits through sensitive management by Bristol Water.

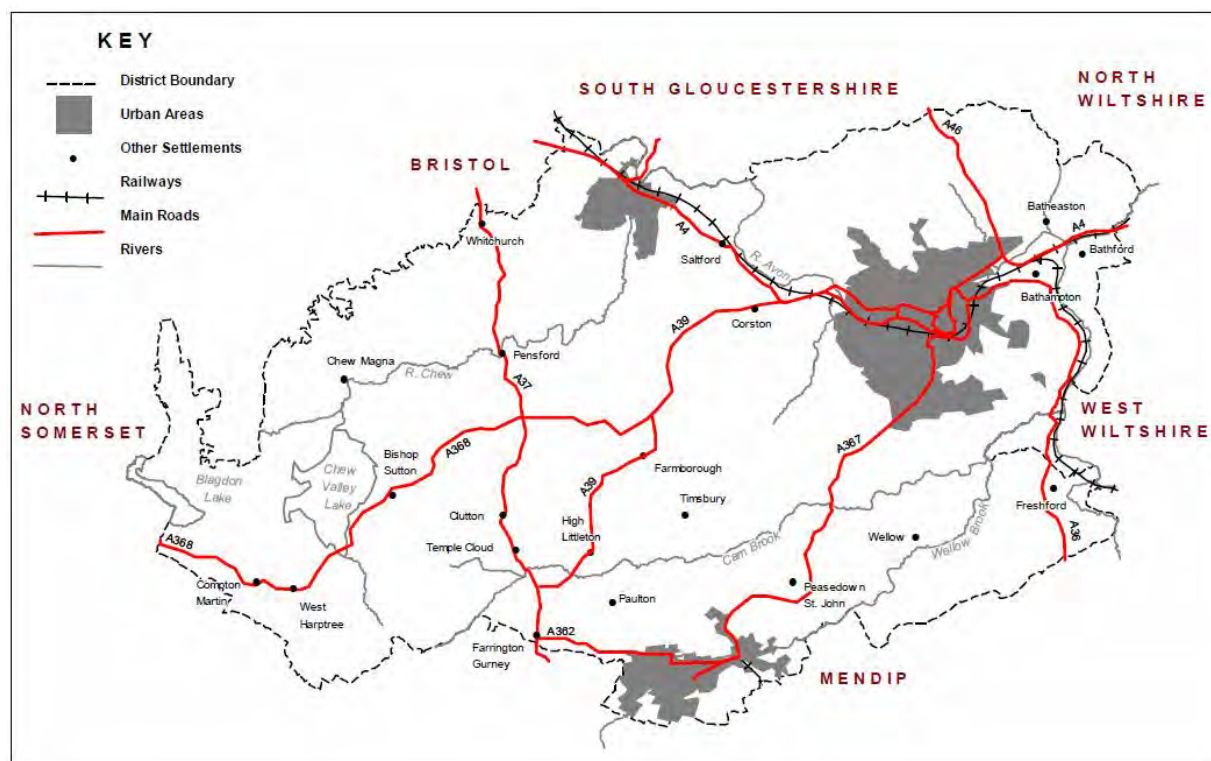


Figure 1.1: Geographical extent of Bath and North East Somerset Council

Environmental and Cultural Heritage

The rural landscape of the study area is striking and diverse. Around a quarter of the rural areas lie within designated Areas of Outstanding Natural Beauty. 30 of the villages within Bath and North East Somerset are recognised by Conservation Area status.

The City of Bath is a World Heritage site and is the location of a number of natural hot springs.

Sources of Flooding

Bath and North East Somerset Council is responsible for assessing risk from local sources of flooding other than main rivers, the sea and reservoirs. In particular this includes the following sources (definitions are taken from the Environment Agency PFRA Final guidance document, dated 7th December 2010):

- **Surface Water Runoff:** Rainwater (including snow and other precipitation) which is on the surface of the ground (whether or not it is moving), and has not entered a watercourse, drainage system or public sewer. Flood from surface water runoff is sometimes called Pluvial flooding.
- **Groundwater flooding:** Water which is below the surface of the ground and in direct contact with the ground or subsoil.
- **Ordinary watercourse flooding:** Flooding from any river, stream, ditch, cut, sluice, dyke or non-public sewer which is not a main river.
- **Artificial water bearing infrastructure:** Includes reservoirs (less than 25,000m³ in capacity), sewers, water supply systems and canals. Floods of raw sewerage caused solely, for example, by a sewer blockage do not fall under the Regulations. The Regulations also do not apply to floods from water supply systems e.g. a burst water main.

1.3 Aims and Objectives

The PFRA is designed as a high level screening exercise of all local flood risk from surface water, groundwater, ordinary watercourses and man made structures such as canals or sewers.

The purpose of this report under the Regulations is to provide the evidence for identifying Flood Risk Areas. The main objectives can be summarised as follows:

- 1) Collect information about historic flooding events within the Bath and North East Somerset area.
- 2) Collect information about predicted future floods from the Environment Agency within the Bath and North East Somerset area.
- 3) Use the data gathered in objectives 1 and 2 to investigate the recorded and estimated consequences of flooding within the Bath and North East Somerset area.
- 4) Establish indicative Flood Risk Areas identified nationally by the Environment Agency that fall within Bath and North East Somerset and review using local information in the preliminary assessment report.
- 5) Accept Indicative Flood Risk Areas falling within the Bath and North East Somerset area or make an application made to the Environment Agency to have them amended.
- 6) The data collected in objectives 1 and 2 should also support the identification of local areas where flood risk is an issue.

The PFRA will, in the future, aid in the development of a local flood risk management strategy.

1.4 Table of Abbreviations

Table 1.1: Table of Abbreviations

Abbreviation	Definition
AStGWF	Areas Susceptible to Groundwater Flooding
AStSWF	Areas Susceptible to Surface Water Flooding
Defra	Department for Environment, Food and Rural Affairs
DG5	Sewer flooding register
EA	Environment Agency
FEO	Flood Event Outline
FRIS	Flood Reconnaissance Information Service
FMfSW	Flood Map for Surface Water
GIS	Geographical Information System
HSWGW	Historical Surface water and Groundwater Geodatabase
IPPC	Integrated Pollution Prevention Control
LLFA	Lead Local Flood Authority
PFRA	Preliminary Flood Risk Assessment
MoU	Memorandum of Understanding
NRD	National Receptor Database
RFDC	Regional Flood Defence Committee
SAC	Special Area of Conservation
SMs	Scheduled Monument
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SFRA	Strategic Flood Risk Assessment
SWMP	Surface Water Management Plan
WAG	Welsh Assembly Government
WHS	World Heritage Site

2 Governance and Partnership Arrangements

2.1 Governance and Partnership Arrangements

Bath and North East Somerset Council is a Unitary Authority and is defined as a Lead Local Flood Authority within the Flood Risk Regulations 2009. Under the Flood Risk Regulations 2009 those organisations defined as Flood Risk Management bodies are required to work with Bath and North East Somerset Council while carrying out its duty as a Lead Local Flood Authority. This includes preparing this Preliminary Flood Risk Assessment.

Data and information was provided to Bath and North East Somerset Council by the following bodies and organisations:

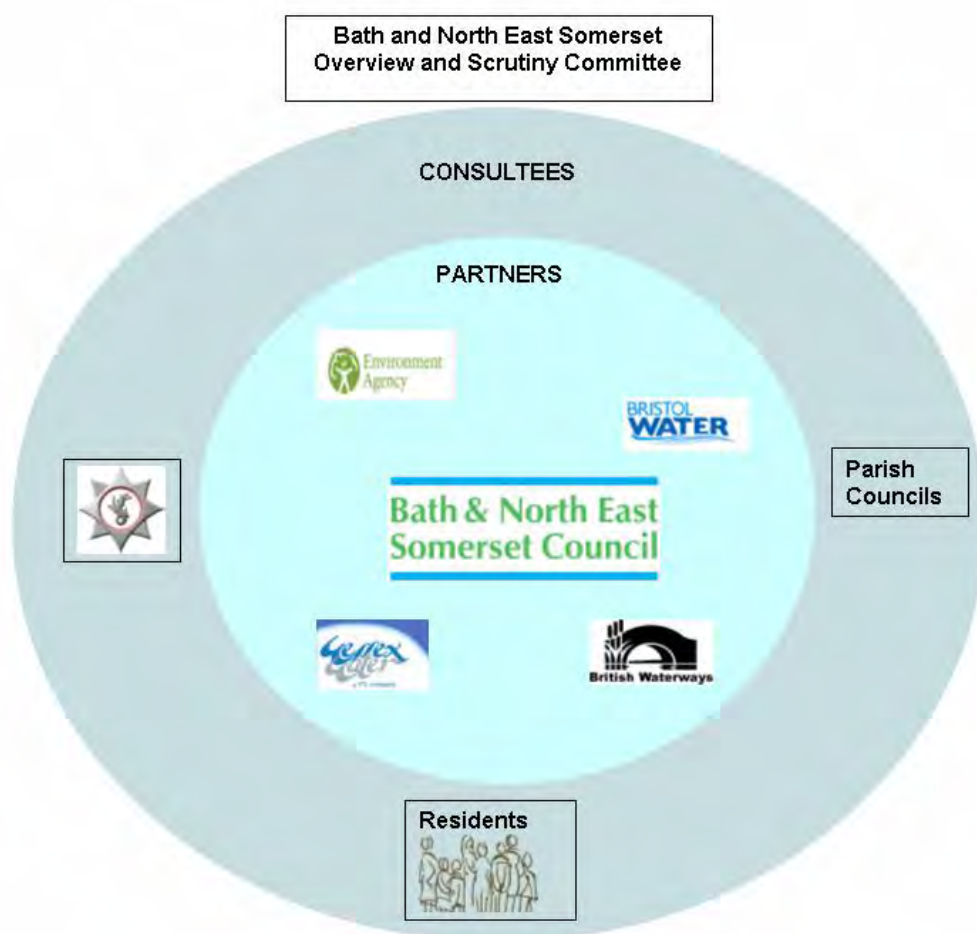


Figure 2.1: Governance and Partnership Structure

As part of the governance of the PFRA process this report will be reviewed both internally (by the Overview and Scrutiny Committee) and externally by the Environment Agency.

2.2 Communication and information sharing

A crucial part of a PFRA is the task of collating available and readily derivable data and information on flooding to provide an assessment of flood risk.

A Memorandum of Understanding (MoU) has been established between the following parties to allow Bath and North East Somerset Council to gather information for PFRA purposes:

- The Environment Agency;
- Bristol Water;
- Wessex Water; and
- British Waterways.

Information will be shared among the parties subject to necessary confidentiality constraints and safeguards and statutory bars on disclosure.

Although not party to the MOU, additional consultees included the Avon Fire and Rescue Service and local Parish Councils who have provide valuable local knowledge.

3 Methodology and Data Review

3.1 Methodology

This Preliminary Assessment Report has been prepared in line with the Environment Agency Preliminary Flood Risk Assessment Final Guidance issued in December 2010.

This report is based on relevant and existing information that is;

- in the possession of Bath and North East Somerset Council; and
- has been supplied by our partners and consultees (see section 2); and
- is available to the public.

Collation of flood risk information

Information on past and predicted future floods was gathered from the following sources:

National

- British Waterways;
- The Environment Agency;

Local

- Parish Council Records;
- Avon Fire and Rescue Services' records;
- Bath and North East Somerset Highways departments' records; and
- Wessex Water.

The data received was reviewed for quality assurance purposes and approved for use in the PFRA. Where the information was not specifically located using OS grid co-ordinates, the location of the flood event was interpreted using descriptions provided by the data supplier.

Assessment of consequences of historic floods

Where data on flood extents and conveyance routes were provided, an assessment of the consequences to the following features/flood risk indicators was made:

- Human Health;
- Economic Activity; and
- Environmental Indicators.

Annex 1 of the Preliminary Assessment Spreadsheet was populated where significant harmful consequences were identified.

Assessment of consequences of future floods

The assessment of predicted future flood events has been based upon the following datasets:

- Locally agreed surface water information: the data that best represents the surface water conditions within the Bath and North East Somerset area (see section 5.3 for further explanation);
- The National Receptor Database: A dataset provided by the Environment Agency that gives the locations of properties, schools, hospitals, transport infrastructure, utilities infrastructure, environmentally designated sites and designated heritage assets;

- Future predicted flood extent maps of surface water runoff, groundwater and ordinary watercourse flood events provided by the Environment Agency.

The potential consequences of future floods were estimated by comparing the extent of predicted future floods with the locations of features on the National Receptor Database.

Nationally derived significance criteria were used for the assessment of consequences of future floods. These criteria included a series of flood risk indicators to identify the consequences of flooding specifically focusing on human health, economic activity, environment and included:

- Number of residential properties/number of people;
- Number of critical services;
- Number of non-residential properties;
- Number of internationally and nationally designated environmental sites; and
- Number of internationally and nationally designated heritage assets.

Review and Identification of Flood Risk Areas

Where a past or predicted future flood event met flood risk thresholds developed by the Department of Environment, Food and Rural Affairs (Defra) and the Welsh Assembly Government (WAG), this will be reported as a Flood Risk Area to the European Union.

To aid in the designation of Flood Risk Areas, the Environment Agency identified a set of "Indicative Flood Risk Areas". A map of indicative flood risk areas within England and Wales was produced based on nationally available information. Only 10 of these areas are present within England and Wales. No stand alone indicative Flood Risk Areas fall within the Bath and North East Somerset area. The closest Indicative Flood Risk Area to Bath and North East Somerset is that of Bristol.

3.2 Data Sources

Tables 3.1 and 3.2 catalogue the information gathered from external partners and Consultees for past and future flood events respectively and considers its appropriateness for use in the PFRA.

Table 3.1: Summary of flood risk information collated for past floods

Partner/Consultee	Data Source	Description	Availability/ Appropriate for use
National Sources			
Environment Agency	Historic Flood Map	Flood extents for records of flooding from rivers, sea and groundwater only.	EA advised no HFMs exist in LLFA area from relevant flood sources.
Environment Agency	Flood Event Outlines (FEO)	Flood extent data for records of flooding from all sources.	EA advised no FEOs exist in LLFA area from relevant flood sources
Environment Agency	Historic Surface water and Groundwater Geodatabase (HSWGW)	A database of mainly point source data submitted to the EA by fire services, local authorities and water companies.	Not available at time of assessment
Environment Agency	Flood Reconnaissance Information Service (FRIS)	A database of point source data of flooding from all sources.	Received and appropriate for use subject to filtering for relevant flood sources
British Waterways	Overtopping and Breach Events	A database of point source data of flooding from all sources.	Received and appropriate for use in PFRA
Local Sources			

Partner/Consultee	Data Source	Description	Availability/ Appropriate for use
Avon Fire and Rescue Service	Incident data	A database of point source data of flooding incidents including call outs where only 'advice' was given, where 'no action' was taken (standby) and where 'pumping out' was required. Flood sources unknown.	Received and appropriate for use subject to filtering for relevant records
Parish Councils	Anecdotal information	Email descriptions providing address locations and descriptions of past flooding events. Sources of flooding open to interpretation	Received and appropriate for use subject to filtering for relevant records
Bath and North East Somerset; Planning Department	Strategic Flood Risk Assessment (In-house report)	Point source data on GIS layer for records of flooding from groundwater, sewers, rivers and surface water.	Not appropriate as base data likely to have been superseded by more current databases
Bath and North East Somerset; Highways Department	Incident data	Call out database of point source data of flooding incidents from surface runoff and locally adopted drainage system.	Received and appropriate for consideration although not suitable for mapping
Wessex Water	DG5 Register	Point source data from foul/combined sewer flooding.	Received and appropriate for use in PFRA
Environment Agency	Bristol Avon Catchment Flood Management Plan	Point source data from all sources of flooding from FRIS database in conjunction with other data sets held by the local EA office.	Not appropriate as base data likely to have been superseded by more current databases

Table 3.2: Summary of flood risk information collated for future floods

Partner/Consultee	Data Source	Description	Availability/ Appropriate for use
National Sources			
Environment Agency	Areas Susceptible to Surface Water Flooding (ASStWF)	Flood extent data (GIS layer) of surface water flooding for one rainfall event with three susceptibility bandings.	Received and appropriate for use
Environment Agency	Flood Map for Surface Water (FMfSW)	Flood extent data (GIS layer) of surface water flooding for two rainfall events divided into two depth bandings.	Received and appropriate for use
Environment Agency	Areas Susceptible to Groundwater Flooding (ASStGWF)	Groundwater flow areas showing the proportion of each 1 km square that is susceptible to groundwater flood emergence (from consolidated aquifers and superficial deposits).	Received and appropriate for use
Environment Agency	Flood Map (for rivers and seas) Zones 2 & 3	Flood extent data (GIS layer) of flooding from rivers and seas.	Received and appropriate for use subject to filtering for larger ordinary watercourse flood extent only
Environment Agency	National Receptor Database	A national dataset containing economic, environmental and cultural receptors including property point data.	Received and appropriate for use
Environment Agency	CD of Supporting Materials	This information supports the identification of Flood Risk Areas by LLFAs. It also outlines how the indicative flood risk areas have been	Received and appropriate for use

Partner/Consultee	Data Source	Description	Availability/ Appropriate for use
produced.			
Local Sources			
Bath and North East Somerset; Planning Department	Strategic Flood Risk Assessment 2008/2009 (In-house report)	Flood extent data of surface water flooding.	Received and reviewed for consideration in locally agreed surface water information.

3.3 Data Limitations and Gaps

The available information on past flood events often does not include information on the consequences of the floods. Additionally the descriptions of the flood events can be unreliable or vague. Other limitations include:

- Determining the location of flood events can be difficult depending on how descriptive records are;
- If the source of the flooding is not recorded in the description of the flood event provided, the source of the flooding event has been recorded as unknown;
- In some instances, descriptions of flood events are anecdotal in nature and have been recalled some time after the event;
- None of the information collated recorded the extent or conveyance route of past flooding events; and
- Information provided by the Avon Fire and Rescue Service lacked detail on the source of the flooding event.

3.4 Data Management and Quality Assurance

The INSPIRE Directive (2007/2/EC) is implemented in the UK by the INSPIRE Regulations 2009. Its main purpose is to improve the quality, consistency and accessibility of spatial data sets and services for environmental data to ensure they can be integrated into applications with minimal manual intervention. As required in the EA guidance, the quality of the data sets used in the PFRA exercise has been recorded and acknowledged as approved for use (or not) in an incoming document register.

Data standards for documents which are to be submitted to the EA are prescribed in Annex 5 of the EA guidance document. This report and the accompanying spreadsheets and GIS data comply with these standards.

3.5 Data security, licensing and restrictions

The data used in this report has been collected in line with the agreement with the consultees and partners outlined in Chapter 2. The data will be stored within the Bath and North East Somerset flood risk database. The data will be used in accordance with the data providers licensing agreements.

Table 3.3 highlights the licensing details and restrictions on the use of the datasets:

Table 3.3: Summary of licensing details and data restrictions

Data Provider	Licensing and data restriction details
British Waterways	End User License provided and the use of the data is restricted to Bath and North East Somerset Council for the preparation of the PFRA.
Environment Agency	End User License provided and the use of the data is restricted to Bath and North East Somerset Council and their contractors for the preparation of the PFRA.
Wessex Water	Sewer data license in place. Data must not be exported for use in third party models or manipulated without Wessex's consent. Use of sewer information by Consultants is to be referred to Wessex Water who will issue a separate license once it is satisfied the Consultant is

Data Provider	Licensing and data restriction details
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	reputable.
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4 Past Flood Risk

4.1 Introduction

This section summarises all relevant information collated to date on past floods.

As per EA guidance, information on past floods has been retained for consideration even if the exact flooding source was unknown or if the flood occurred due to a combination of sources. Past floods that are not likely to reoccur as a result of flood alleviation schemes or drainage improvement works have not been considered.

4.2 Past Flood Events

Records of past flood events were collated from the sources described in Section 3.2. Approximately 1,300 records were collated. The majority of these records were either of poor quality or had no description of the flood event. Certain records indicated main rivers as the source of flooding or did not describe the exact location of the floods.

An initial exercise was undertaken to filter all collated records to retain only those records which:

- report flooding to residential and non-residential properties;
- report flooding to critical infrastructure such as hospitals, schools, sub-stations, pumping stations, doctors surgeries, police stations or fire and rescue services etc; and
- report flooding to A and B class roads and key access roads in and out of villages/towns.

As a result of the above exercise the number of records was reduced to approximately 110 and the locations of these past flood events are illustrated Map 1 specific to each data supplier. All maps are located in the Map section. Records are presented as point sources due to the limited information in relation to the extent or conveyance routes available. The figures only illustrate records where a flood event met the criteria described above.

Figure 4.1 below provides an example of how the filtered records were retained to develop an evidence base record for Bath and North East Somerset Council. The records were evaluated to establish whether the event was considered to have had harmful consequences or would have should the flood re-occur.

Record ID	Parish	Description of Event (including name of location)	Source of Flood (including interactions between sources)	Description of consequences	Description of potential consequences should flood reoccur (using NRD)	Significant Harmful Consequences? (Y/N)
Parish Records – Descriptions of historic flood events were provided with the occasion map from the Parish online database. Locations of the flood event were interpolated from the descriptions and referenced as a point source.						
79	Chew Magna	Description: This is a problem for properties 13-15 Tunbridge Close and was the first point of flooding in Jan 08 for those properties as water built up at the rear of the properties but got no further than the patios. Those who remember the 1968 flood state that properties adjacent to the fields in Tunbridge Close and Dumpers Lane flooded first from runoff at the rear. Location: Tunbridge Close & Dumpers Lane: 13-15 Tunbridge Close Assumed features affected: Property	Ordinary watercourse	Extent and conveyance route of flood event not supplied in dataset and is therefore unknown. As such, the event is not considered to have had harmful significant consequences.	Extent and conveyance route of flood event not supplied in dataset and is therefore unknown. An exercise to estimate consequences should the event reoccur was considered however it was concluded that no added value would be gained for informing local flood risk strategies.	No

Figure 4.1: Example records of retained past flood events

These records will prove a valuable source of information for consideration in any local flood risk management strategies which are developed as a requirement under the Regulations.

Figure 4.2 below provides a summary of past flood events recorded within Bath and North East Somerset parishes. The figure only includes Parish Councils where records met the initial filtering exercise.

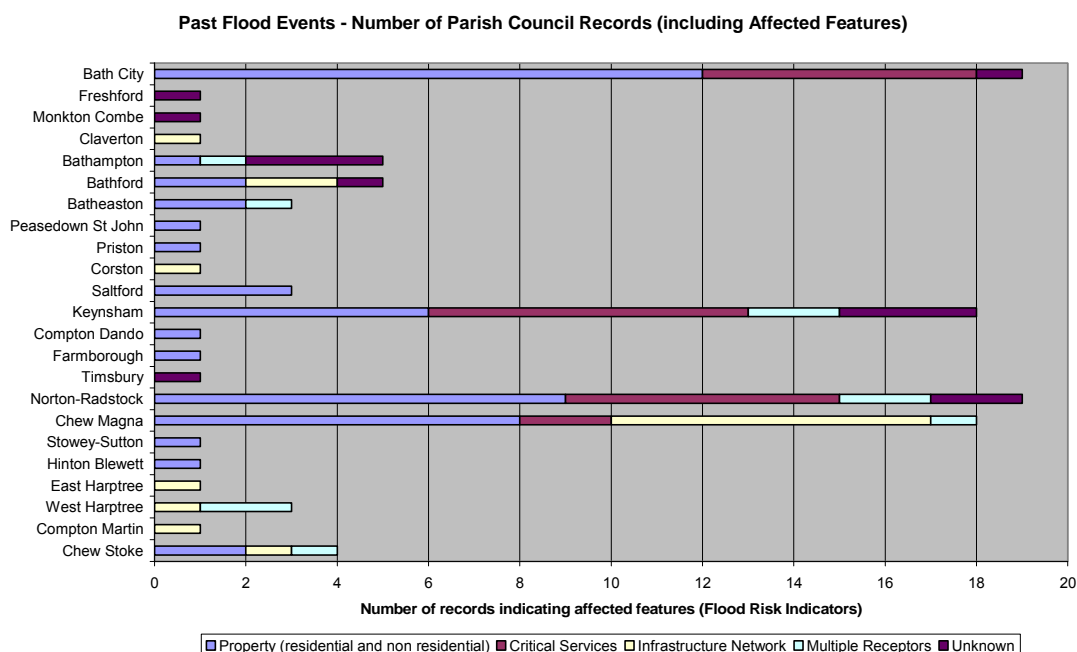


Figure 4.2: Number of Parish Council records indicating affected features

Particular attention should be paid to the following locations which warrant further consideration in a future local flood risk management strategy or flood alleviation works:

- City of Bath;
- Keynsham;
- Midsomer Norton-Radstock; and
- Chew Magna.

The following text provides a synopsis of the recorded local flood sources at key locations within Bath and North East Somerset. It is recommended that the highlighted areas be used to inform future local flood risk management strategies or flood alleviation works:

Surface Water Run-off:

Sources of historic surface water flooding were received from the EA (FRIS report information) and Parish Council records. Additionally the Strategic Flood Risk Assessment (SFRA) Levels 1 and 2 was reviewed.

The SFRA classified surface water flooding as sewer flooding. The SFRA reported that surface water flooding has occurred in the impermeable upland areas of Bath and North East Somerset, in particular along roads. The main communities affected were Bath, Keynsham, Midsomer Norton/Radstock, Chew Magna, West Harptree, Compton Martin and Priston. .

Groundwater:

Groundwater flooding was only recorded within the FRIS database in combination with other flooding sources, such as surface water flooding.

Parish Council records indicated one flood event attributing the source to groundwater (spring water flows down Ashton Hill, Corston) and one event attributing the source of the flood to a combination of sources (surface runoff and groundwater at Brook Cottage in Priston).

The Level 1 SFRA indicated that the eastern side of the area is at an elevated risk due to its slightly more permeable geology and lower topography. Overall, the risk in Bath, Keynsham and Midsomer Norton/ Radstock has been described as varying from low to medium.

Ordinary Watercourses:

Parish Councils recorded a number of flood events attributed to ordinary watercourses.

The majority of FRIS records indicated the source of flooding being of a fluvial nature (i.e. of main river classification). These were not applicable to the PFRA exercise however on occasion, the location of the flood event was not identified in close proximity to a main river. In instances where an event recorded as fluvial was located 300m or more away from a main river, the record was retained for consideration in the PFRA as the source may potentially have been from an ordinary watercourse source.

Artificial water bearing infrastructure (drainage network and canals):

Information was received from Wessex Water detailing foul/combined sewer flooding incidents relating to properties at risk of sewer surcharging.

Information was obtained from British Waterways which detailed the canal network throughout the study area including the locations of the Kennett and Avon Canal, weirs, sluices and locks. Two records of historic breaches and one overtopping event were provided and were located within the Parish of Bathampton.

Interactions of local flood sources with Main Rivers:

Numerous records provided by the EA and the Parish Councils within Bath and North East Somerset suggest historic flood events which can be attributed to more than one source including interaction with main rivers. These have been retained for consideration in the PFRA.

The largest event recorded involving interaction with main rivers was the floods of 1968 involving the Rivers Chew and Avon. Large areas in Bath and North East Somerset were affected by these floods. Some flood alleviation schemes have been implemented in the City of Bath to reduce the risk of future flooding from these main river sources.

4.3 Consequences of historic flooding

As insufficient records of flood extents and conveyance routes have been recorded, it has not been possible to ascertain whether significant harmful consequences would arise should the flood event reoccur. Definitions of significant harmful consequences were therefore not pursued. No historic flood events have been recorded in Annex 1 of the Preliminary Assessment Spreadsheet.

Table 4.1 below summarises details of the past flood risk assessment, outlining when floods occurred (where available) and an assessment of their consequences:

Table 4.1: Summary table: Past flood event datasets and consequences

Information Source	Date of Records	Description of flood event information	Significant harmful consequence
Environment Agency FRIS Records	1725-2009	Records indicated source of flood event and identified features affected specifically with regards to properties. Records did not indicate extent of flood or conveyance route.	Due to limitations in records, it has not been possible to identify whether the flood events resulted in nationally significant harmful consequences and therefore have not been recorded in the Annex 1 spreadsheet.
Parish Council Records	No details provided with records	Records indicated source of flood event and indicated a descriptions of events although descriptions varied in detail. Location of flood events provided predominantly as addresses or individual properties. Locations open to interpretation. Records did not indicate extent of flood or conveyance route.	
Avon Fire and	2006-2010	Records do not indicate source of	

Information Source	Date of Records	Description of flood event information	Significant harmful consequence
Rescue Service		<p>flooding although do describe the properties affected. OS grid co-ordinates provided together with a description of the action taken by the Fire and Rescue Service.</p> <p>Records did not indicate extent of flood or conveyance route.</p>	<p>Due to limitations in records, it has not been possible to identify whether the flood events resulted in nationally significant harmful consequences and therefore have not been recorded in the Annex 1 spreadsheet.</p>
British Waterways	1998	<p>GIS layers provided of breach and overtopping events. Records describe category of event and include a brief description.</p> <p>Records did not indicate extent of flood or conveyance route.</p>	
Wessex Water	1995-2010	<p>DG5 register provided. Records indicate source of flooding and identified features affected specifically with regards to properties and curtilages of properties. Location of flood events provided as post codes. Depth and area of flood event noted where known.</p> <p>Records did not indicate extent of flood or conveyance route.</p>	

5 Future Flood Risk

5.1 Introduction

This section summarises all collated information on predicted future floods. National Datasets on predicted future floods have been produced by the Environment Agency through the use of the computer models.

5.2 Future flood risk and possible consequences

The following national datasets were provided by the EA which have been used to assess the consequences of future flood events:

- Flood Map for Surface Water (FMfSW) (a flood event dataset presenting surface water flooding extents for two rainfall events divided into two depth bands);
- Areas Susceptible to Surface Water Flooding (ASfSWF) (a flood event dataset presenting surface water flooding extents for one rainfall event with three susceptibility bandings); and
- Areas Susceptible to Groundwater Flooding (ASfGWF) (a broad scale map showing groundwater flood areas on a 1km² grid).

Predicted flood extents relating to ordinary watercourses were derived from the EA Flood Maps for Zones 2 and 3.

British Waterways are currently carrying out work to better understand flood risk from canal breach however this was not available at the time of preparation of this report.

Surface Water Management Plans have not been produced for the study area. Local information does not exist in relation to future groundwater flood risk however groundwater rebound is not believed to be an issue in the study area.

Communications with Wessex Water suggests that their surface water network maybe at risk of surcharge as a result of water levels in the River Avon. This information has not been considered any further in the PFRA.

5.3 National Receptor Database

The Regulations require consideration of the possible harmful consequences of floods on human health, economic activity and the environment (including cultural heritage). To assess the consequences of future flood events, the EA have provided the National Receptor Database (NRD). The NRD provides data on the following features (also known as flood risk indicators):

- Residential properties;
- Non-residential properties;
- Critical services;
- Active sites holding IPPC licenses;
- Sites of Special Scientific Interest (SSSI);

-
- Special Areas of Conservation (SAC);
 - Special Protection Areas (SPA);
 - World Heritage Sites (WHS);
 - Scheduled Monuments (SMs);
 - Listed buildings; and
 - Registered Parks and Gardens.

At this stage, no local environmentally designated sites (such as Local Nature Reserves, Sites of Importance for Nature Conservation) or conservation areas have been considered in the PRFA.

5.4 Summary of Future Flood Risk

Table 5.1 provides a summary of the future flood risk assessment and includes the number of features from the NRD affected by each of the flood events in the datasets described in section 5.2:

Summary maps are provided on Maps 3.0 to 5.0 and can be located in the Maps section. These illustrate flood risk indicators in relation to the FMfSW 1 in 200 year rainfall event, deep scenario. The remaining flood event maps have been created however have not been reproduced for the purposes of this report but are stored centrally on the Bath and North East Somerset server.

The EA provided figures in relation to residential and non-residential property numbers for the FMfSW (1 in 200, deep) and the AStSWF (less and intermediate) datasets. These numbers utilized a detailed GIS method for calculating property numbers (based on building outlines). All remaining figures were calculated by Bath and North East Somerset using the simple GIS method (based on property points). It should be noted that use of the simple GIS method leads to fewer properties being identified as those potentially at risk from future flooding.

Table 5.1: Summary table: Future flood event datasets and consequences on flood risk indicators

Dataset	Consideration of possible consequences of flood on....		
	Human health (no: of residential properties & no: of critical services)*	Economic activity (no: of non-residential properties)*	Environment (consequences of pollution, impact on designated environmental and heritage sites)
AStSWF – Less	10,400 residential properties; 100 critical services	3,400 non residential properties	1 Pollution Site; 9 Special Areas of Conservation; 1 Special Protection Areas; 28 Sites of Special Scientific Interest; 1 World Heritage Site; 24 Scheduled Monuments; 307 Listed Buildings; 12 Registered Parks and Gardens
AStSWF – Intermediate	5,100 residential properties; 100 critical services	1,900 non residential properties	1 Pollution Site; 5 Special Areas of Conservation; 1 Special Protection Areas; 22 Sites of Special Scientific Interest; 1 World Heritage Site; 13 Scheduled Monuments; 178 Listed Buildings; 10 Registered Parks and Gardens
AStSWF – More	1,000 residential properties; 36 critical services (not rounded to nearest 100)	800 non residential properties	1 Pollution Site; 3 Special Areas of Conservation; 1 Special Protection Areas; 14 Sites of Special Scientific Interest; 1 World Heritage Site; 8 Scheduled Monuments; 71 Listed Buildings; 5 Registered Parks and Gardens
FMfSW – 1 in 30 shallow	3,300 residential properties; 100 critical services	1,400 non residential properties	0 Pollution Sites; 6 Special Areas of Conservation; 1 Special Protection Areas; 23 Sites of Special Scientific Interest; 1 World Heritage Site; 21 Scheduled Monuments; 150 Listed Buildings; 11 Registered Parks and Gardens
FMfSW – 1 in 30 deep	1,200 residential properties; 31 critical services (not rounded to nearest 100)	600 non residential properties	0 Pollution Sites; 3 Special Areas of Conservation; 1 Special Protection Areas; 17 Sites of Special Scientific Interest; 1 World Heritage Site; 12 Scheduled Monuments; 64 Listed Buildings; 6 Registered Parks and Gardens
FMfSW – 1 in 200 shallow	19,600 residential properties; 100 critical services	5,000 non residential properties	0 Pollution Sites; 7 Special Areas of Conservation; 1 Special Protection Areas; 30 Sites of Special Scientific Interest; 1 World Heritage Site; 23 Scheduled Monuments; 301 Listed Buildings; 12 Registered Parks and Gardens
FMfSW – 1 in 200 deep	8,100 residential properties; 49 critical services (not rounded to nearest 100)	2,400 non residential properties	0 Pollution Sites; 3 Special Areas of Conservation; 1 Special Protection Areas; 17 Sites of Special Scientific Interest; 1 World Heritage Site; 18 Scheduled Monuments; 148 Listed Buildings; 10 Registered Parks and Gardens
AStGWF (>50%)	8,100 residential properties; 100 critical services	2,100 non residential properties	1 Pollution Site; 0 Special Areas of Conservation; 1 Special Protection Areas; 3 Sites of Special Scientific Interest; 1 World Heritage Site; 4 Scheduled Monuments; 597 Listed Buildings; 5 Registered Parks and Gardens
Flood Map Zone 3 (Ordinary)	100 residential properties; 5 critical	100 non residential properties	0 Pollution Sites; 0 Special Areas of Conservation; 1 Special Protection Areas; 6 Sites of Special Scientific Interest; 1 World Heritage Site; 3 Scheduled Monuments; 11 Listed Buildings; 1 Registered Parks and

Dataset	Consideration of possible consequences of flood on....		
	Human health (no: of residential properties & no: of critical services)*	Economic activity (no: of non-residential properties)*	Environment (consequences of pollution, impact on designated environmental and heritage sites)
watercourses)	services (not rounded to nearest 100)		Gardens
Flood Map Zone 2 (Ordinary watercourses)	100 residential properties; 5 critical services (not rounded to nearest 100)	100 non residential properties	0 Pollution Sites; 0 Special Areas of Conservation; 1 Special Protection Areas; 5 Sites of Special Scientific Interest; 1 World Heritage Site; 3 Scheduled Monuments; 12 Listed Buildings; 1 Registered Parks and Gardens

*Numbers are rounded to the nearest 100 unless otherwise stated. Environment (including heritage assets) are actual estimated numbers.

Flood risk indicator figures calculated for the AStGWF dataset were only considered for grid squares where greater than 50% of the proportion of each 1km square is susceptible to groundwater flood emergence.

Future flood event consequences are recorded in Annex 2 of the Preliminary Assessment Spreadsheet. All mandatory fields have been populated in addition to the majority of optional fields.

5.5 Locally agreed surface water information

To assess the potential impacts of future flooding events, Bath and North East Somerset Council determined “locally agreed surface water information.” This is surface water flood data that best describes the conditions prevalent in the Bath and North East Somerset area.

In accordance with the Environment Agency guidance, the following datasets were used to review and agree locally agreed surface water information:

Local Data Sources

- Strategic Flood Risk Assessment Level 1 and 2

National Data Sources

- Flood Map for Surface Water (FMfSW), provided by the Environment Agency (an allowance for sewer capacity of 12mm/hr was deemed appropriate for the Bath and North East Somerset area)
- Area Susceptible to Surface Water Flooding (ASStWF), provided by the Environment Agency (a less refined model that does not include allowances for drainage capacity).

The Strategic Flood Risk Assessment Level 1 and 2 was deemed inappropriate for use as the modeling undertaken was less accurate than that conducted by the Environment Agency for the FMfSW dataset.

The Flood Map for Surface Water (1 in 200 year rainfall event, deep scenario) was chosen as the most appropriate dataset that reflects the “locally agreed surface water information”. This was agreed with the Environment Agency and Wessex Water at a meeting held on the 24th February 2011.

Map 3.0 located in the Maps Section illustrates this information.

5.6 The impacts of climate change and long term development

The Regulations require that the assessment of possible consequences of future floods takes into account the current and predicted impact of climate change and any other long term developments.

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%.

Key Projections for Severn 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 12% (very likely to be between 2 and 26%)
- Precipitation on the wettest day in winter up by around 9% (very unlikely to be more than 22%)
- Relative sea level at Bristol 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 9 and 18%

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

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 along the Severn and its tributaries. 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.

Drainage systems in the district have been modified to manage water levels and could help in adapting locally to some impacts of future climate on flooding, but may also need to be managed differently. Rising sea or river levels may also increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses.

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.

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.

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."

In Wales, Technical Advice Note 15 (TAN15) on development and flood risk sets out a precautionary framework to guide planning decisions. The overarching aim of the precautionary framework is "to direct new development away from those areas which are at high risk of flooding."

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).

6 Review of Indicative Flood Risk Areas

6.1 Overview of Indicative Flood Risk Areas

It is a requirement of the Regulations to determine Flood Risk Areas both on a national scale by the Environment Agency and on local level by the LLFA. A map of indicative flood risk areas was produced by the Environment Agency. These are areas where there is significance associated with a flood event and only 10 of these areas are present within England and Wales. No stand alone indicative Flood Risk Areas fall within the Bath and North East Somerset area.

The closest Indicative Flood Risk Area to Bath and North East Somerset is that of Bristol. A relatively small portion of this area (1.5%) falls within Bath and North East Somerset administrative boundary. Figure 6.1 illustrates the extent of overlap of this indicative Flood Risk Area within the study area:

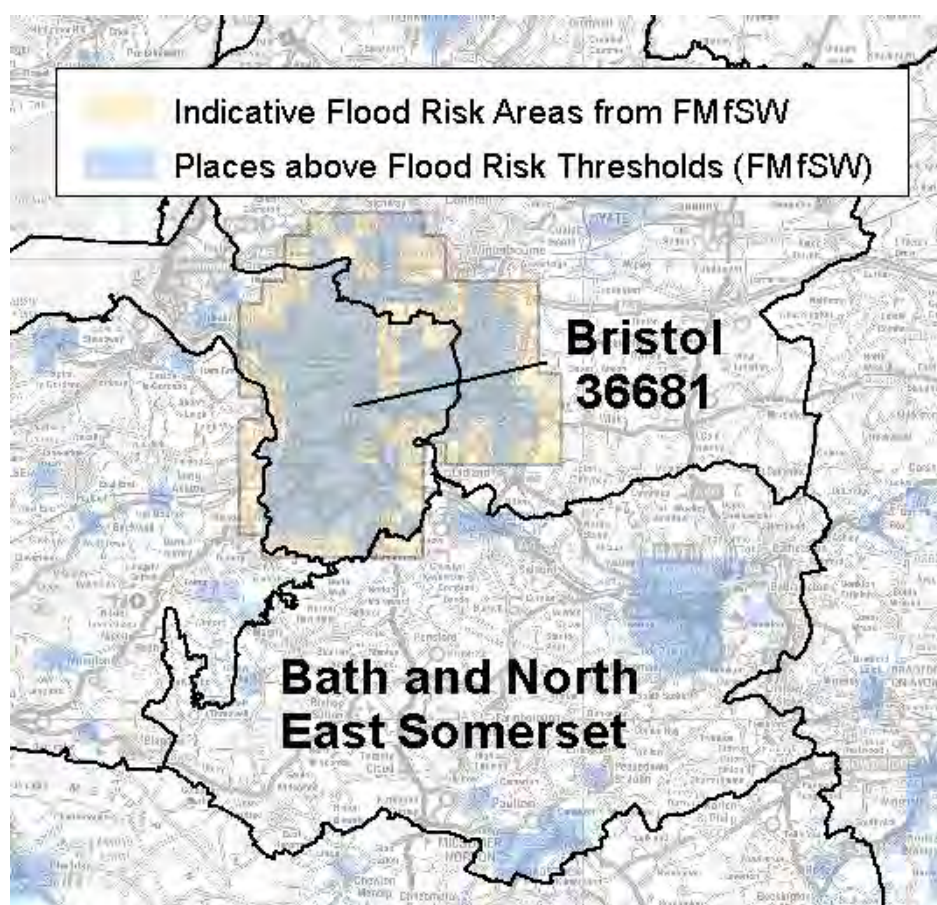


Figure 6.1: Indicative Flood Risk Area; Bristol

Discussions with Bristol City Council have resulted in the agreement that they will take the lead in reviewing this indicative flood risk area on the basis that the selected location falls predominantly within their administrative boundary and the area of encroachment encompasses land that falls within their rainfall catchment area. Bath and North East Somerset will only reference the indicative flood risk area within this Preliminary Assessment report.

7 Identification of Flood Risk Areas

As Bath and North East Somerset Council is not identified as 1 of the 10 Indicative Flood Risk Areas and we do not meet the national criteria for creating any new areas, in accordance with Defra and WAG Guidance, no amendments are proposed

As a result no Flood Risk Areas have been recorded in Annex 3 of the Preliminary Assessment Spreadsheet.

8 Next Steps

8.1 Review Procedures

The review of PFRA is important to ensure both a consistent approach and that quality standards have been met i.e. that the most appropriate sources of information have been used (national and local) and the most significant flood risk areas have been identified for attention in the next stages of the 6 year cycle.

The review procedures will follow a two tier approach and are described below:

Lead Local Flood Authority Review

The LLFA review will be in accordance with Bath and North East Somerset's internal review procedures.

These involve consideration of the Preliminary Assessment Report and Spreadsheet by the Overview and Scrutiny Committee and will ensure Bath and North East Somerset Council is satisfied that both are fit for purpose in meeting the Regulation requirements.

Internal approval will be obtained prior to the submittal of the above documents to the EA by the 22nd June 2011.

Environment Agency Review

Under the Regulations, the EA has been given a role in reviewing, collating and publishing all of the PFRA once submitted. The EA national review will focus on the Flood Risk Areas, in particular where the indicative areas have been amended in order to check any changes are justified, nationally consistent and meet European reporting requirements.

A 10 step review checklist has been compiled by the EA for completion by the LLFAs. This is provided in Annex 4 and demonstrates compliance with the consistent reporting approach required by the EA and European Commission.

The EA review panel will make recommendations to the relevant Regional Flood Defence Committee (RFDC) for endorsement. Once endorsed, the relevant EA Regional Director will sign off the PFRA prior to the collation, publishing and submission to the European Commission by 22nd December 2011.

8.2 PFRA Stages 3 & 4/Future cycles of PFRA

The next two stages of the PFRA process require the preparation of flood risk maps and flood hazard maps (Stage 3) and flood risk management plans (Stage 4). As no indicative flood risk areas have been identified in the Bath and North East Somerset area, we are not required to undertake the further two stages of the Preliminary Flood Risk Assessment. However, as some places at local flood risk level have been identified within the study area it is recommended that flood risk maps, flood hazard maps and flood risk management plans be compiled as part of the local flood risk management strategy.

Following completion of the remaining two stages of this first cycle of the PFRA, the second cycle will commence (2017). It is important to ensure that flood event records are maintained and on a regular basis for use in this future cycle as more mandatory information will be required for floods that occur after 22 December 2011.

8.3 Data Management and Maintenance

In order to continue to fulfill their responsibilities as a LLFA, Bath and North East Somerset Council are required to investigate future flood events and ensure continued and consistent collation and storage of flood risk information. All future records should take cognisance of the requirements of the INSPIRE Directive (2007/2/EC). A strategy for recording, collation and storage of future flood risk information will be developed going forward and the following points are highlighted for further consideration:

- Lead responsibility for collating and ensuring periodic update of future flood information is undertaken is to be assigned to the party best resourced to manage and implement this process;
- A centralised storage location is to be identified for the collation and periodic update of future flood information;
- The recording of future flood information should be developed in a manner that will adhere to European Commission reporting requirements;
- Development of a photographic library to increase the evidence base and supplement the recorded descriptions; and
- The regularity of updates and identification of personnel responsible for ensuring the updates are undertaken and confirming compliance with reporting standards needs to be discussed and agreed with all relevant data partners;

Bath and North East Somerset Council will investigate the most appropriate method for the collation of flood risk information however it is likely that they will take lead responsibility for maintenance and keeping up to date a centralised database, with input from individual Parish Councils. This will be used as an evidence base for future assessments such as SWMP and SFRA, for the next stages of the PFRA process where appropriate and for the next PFRA cycle.

Information will be required from the following parties (but will not be limited to) continuing the partnership arrangements implemented at the start of the PFRA:

- Environment Agency;
- Parish Councils;
- Highways Authority;
- Wessex Water;
- British Waters; and
- Avon Fire and Rescue Service.

8.4 Development of a Local Flood Risk Management Strategy

LLFAs are required to develop, maintain, apply and monitor a local strategy for flood risk management in its administrative area. The local strategy will build upon information such as national risk assessments and will use consistent risk based approaches across different local authority areas and catchments. The effects of climate change and long term developments will be taken into consideration during development of this strategy.

LLFA are able to choose the management approach they feel is most appropriate for their areas. Map 6 illustrates local flood risk areas which will inform the development of Bath and North East Somerset's local flood risk management strategy. These places, denoted as 'blue squares' on the figure; have been identified by the Environment Agency using national significance criteria. The figure also illustrates the records of past flood events. On review, these historical records generally agree with the 'blue square' locations which will be used by Bath and North East Somerset to inform the local flood risk management strategy and any future flood alleviation schemes.

It is important to undertake some level of public engagement when formulating the risk management strategy. It is recommended Bath and North East Somerset Council follow the guidelines set out in the EA 'Building Trust with Communities' document. This provides useful

advice in how to communicate causes, probability and consequences of flooding to the general public and forums such as local resilience forums.

9 Conclusions

The PFRA process undertaken and the review of the data collected as part of the PFRA process have drawn a number of common conclusions:

The Preliminary Flood Risk Assessment was a high level screening exercise which resulted in the production of a Preliminary Assessment Report, supporting spreadsheets and GIS layers. The assessment has been based on the existing and commonly available information. No additional modelling has been undertaken as part of this process. The main aim of this assessment was the understanding of the local flood risk within Bath and North East Somerset Council from local sources including surface water flooding, groundwater flooding, ordinary watercourses flooding and flooding from man-made structures (excluding Main Rivers).

No nationally Significant Indicative Flood Risk Areas have been identified.

A number of local flood risk areas within Bath and North East Somerset Council have been identified as being at risk of surface water flooding. It is recommended that those sites will be addressed within the Future Local Flood Risk Management Strategy.

All of these areas should also be investigated further to determine whether any improvements works can be implemented to manage or to reduce the risk in the future. Further work may include a site specific assessment of the areas and feasibility studies, including further modelling of the surface water drainage capacity or preparation of Surface Water Management Plans.

The records of historic flood data were viewed with some caution regarding their accuracy. An initial recommendation would therefore be to promote the recording all flooding incidents from local sources. This would require cooperation between the partners, but would result in a very useful tool to assist in the targeting of future local flooding management and surface water management initiatives.

The PFRA highlights the importance of data sharing between the different authorities and partners. Consultation with partners and sharing of the mapping was very important to incorporate additional knowledge, fill in any gaps in the data and verify the data that have been recorded. Cooperation with our partners has resulted in better understanding of local flood risk and closer working relationship between various organisations.

Bath and North East Somerset Council will work closely its partners to promote the joint approach to tackling local flooding issues. In areas where flooding is occurring due to the combination of a various flooding sources a comprehensive flood management approach will be undertaken.

10 References

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- Charlcombe Parish Council (September 2010) email correspondence regarding historical flood events;
- Chew Magna Parish Council; email correspondence regarding historical flood events;
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Hinton Blewett Parish Council; email correspondence regarding historical flood events;

Hinton Charterhouse Parish Council (October 2010) email correspondence regarding historical flood events;

Keynsham Town Council (August 2010) email correspondence regarding historical flood events;

Monkton Combe Parish Council (October 2010) email correspondence regarding historical flood events;

Nempnett Thrubwell Parish Council; email correspondence regarding historical flood events;

Newton St Loe Parish Council (July 2010) email correspondence regarding historical flood events;

Paulton Parish Council (October 2010) email correspondence regarding historical flood events;

Priston Parish Council; email correspondence regarding historical flood events;

Saltford Parish Council (September 2010) email correspondence regarding historical flood events;

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Whitchurch Parish Council (October 2010) email correspondence regarding historical flood events.

Annex 1 – Records of Past Floods and their significant consequences

As discussed in Section 3.3, due to limitations in the historic flood information no flood events have been considered to have significant harmful consequences. No entries have therefore been made to the Preliminary Assessment Spreadsheet Annex 1.

Annex 1 Past floods

ANNEX 1: Records of past floods and their significant consequences (preliminary assessment report spreadsheet)																	
Field:	Flood ID	Summary description	Name of Location	National Grid Reference	Location Description	Start date	Days duration	Probability	Main source of flooding	Additional source(s) of flooding	Confidence in main source of flooding	Main mechanism of flooding	Main characteristic of flooding	Significant consequences to human health	Human health consequences - residential properties	Property count method	Other human health consequences
Mandatory / optional: Format:	Mandatory Unique number between 1-9999	Mandatory Max 5,000 characters	Mandatory Max 250 characters	Mandatory 12 characters: 2 letters, 10 numbers	Optional Max 250 characters	Optional for first cycle 'yyyy' or 'yyyy-mm' or 'yyyy-mm-dd'	Optional for first cycle Number with two decimal places	Optional for first cycle Max 25 characters	Optional for first cycle Pick from drop-down	Optional Max 250 characters, same source terms	Optional Pick from drop-down	Optional for first cycle Pick from drop-down	Optional for first cycle Pick from drop-down	Mandatory Pick from drop-down	Optional Number between 1-10,000,000	Optional Pick from drop-down	Optional Max 250 characters
Notes:	A sequential number starting at 1 and incrementing by 1 for each record.	Description of the flood and its adverse or potentially adverse consequences. Where available, information from other fields (<u>Start date</u> , <u>Days duration</u> , <u>Probability</u> , <u>Main source</u> , <u>Main mechanism</u> , <u>Main characteristics</u> , <u>Significant consequences</u>) should be repeated here.	Name of the locality associated with the flood, using recognised postal address names such as streets, towns, counties. If the flood affected the whole LLFA, then record the name of the LLFA.	National Grid Reference of the centroid (centre point, falls within polygon) of the flood extent, or of the area affected if there is no extent information.	A description of the general location that was flooded.	The date when the flood commenced - when land not normally covered by water became covered by water.	The number of days (duration) of the flood - that land not normally covered by water was covered by water. Values should be within the range 0.01 - 999.99 (permitting records to the nearest quarter of an hour, where appropriate).	The chance of the flood occurring in any given year - record X from "a 1 in X chance of occurring in any given year". Where this is difficult to estimate, a range can be recorded.	Pick the source from which the majority of flooding occurred. Refer to the PFRA guidance for definitions of sources.	If flooding occurred from, or interacted with, any other sources (other than the <u>Main source of flooding</u>), report the source(s) here, using the same source terms.	Pick a broad level of confidence in the <u>Main source of flooding</u> , from; 'High' (compelling evidence of source - about 80% confident that source is correct), 'Medium' (some evidence of source but not compelling - about 50% confident that source is correct) or 'Unknown'.	Pick a mechanism from; 'Natural exceedance' (of capacity), 'Defence exceedance' (floodwater overtopping defences), 'Failure' (of natural or artificial defences or infrastructure, or of pumping), 'Blockage or restriction' (natural or artificial blockage or restriction of a conveyance channel or system), or 'No data'.	Pick a characteristic from; 'Flash flood' (rises and falls quite rapidly with little or no advance warning), 'Natural flood' (due to significant precipitation, at a slower rate than a flash flood), 'Snow melt flood' (due to rapid snow melt), 'Debris flow' (conveying a high degree of debris), or 'No data'. Most UK floods are 'Natural floods'.	Were there any significant consequences to human health when the flood occurred, or would there be if it were to re-occur?	Record the number of residential properties where the building structure was affected either internally or externally by the flood, or that would be so affected if the flood were to re-occur.	Where residential or non-residential properties have been counted, it is important to record the method of counting, to aid comparisons between counts. Choose from: 'Detailed GIS' (using property outlines, as per Environment Agency guidance), 'Simple GIS' (using property points), 'Estimate from map', or 'Observed number'.	If there were other <u>Significant consequences to human health</u> , describe them including information such as the number of critical services flooded.
Example:		1 On the 14 April 1998 an intense storm system produced surface water flooding across Essex, concentrated in the west of the county. The flooding lasted about 6 hours, and 23 residential properties were recorded as suffering internal flooding, in Epping and North Weald. The surface runoff exceeded the drainage capacity in several places, and so probably had a 1 in 30 to 1 in 50 chance of occurring in any given year.	Essex	SX1234512345	Several towns and villages across west Essex	1998-04-15		0.25 20-50	Surface runoff		High	Natural exceedance	Natural flood	Yes	23	Observed number	
Records begin here:	1																

Annex 1 Past floods

ANNEX 1: Records of past floods and their significant consequences (preliminary assessment report spreadsheet)																	
Field:	Flood ID	Summary description	Name of Location	National Grid Reference	Location Description	Start date	Days duration	Probability	Main source of flooding	Additional source(s) of flooding	Confidence in main source of flooding	Main mechanism of flooding	Main characteristic of flooding	Significant consequences to human health	Human health consequences - residential properties	Property count method	Other human health consequences
Mandatory / optional: Format:	Mandatory Unique number between 1-9999	Mandatory Max 5,000 characters	Mandatory Max 250 characters	Mandatory 12 characters: 2 letters, 10 numbers	Optional Max 250 characters	Optional for first cycle 'yyyy' or 'yyyy-mm' or 'yyyy-mm-dd'	Optional for first cycle Number with two decimal places	Optional for first cycle Max 25 characters	Optional for first cycle Pick from drop-down	Optional Max 250 characters, same source terms	Optional Pick from drop-down	Optional for first cycle Pick from drop-down	Optional for first cycle Pick from drop-down	Mandatory Pick from drop-down	Optional Number between 1-10,000,000	Optional Pick from drop-down	Optional Max 250 characters
Notes:	A sequential number starting at 1 and incrementing by 1 for each record.	Description of the flood and its adverse or potentially adverse consequences. Where available, information from other fields (<u>Start date</u> , <u>Days duration</u> , <u>Probability</u> , <u>Main source</u> , <u>Main mechanism</u> , <u>Main characteristics</u> , <u>Significant consequences</u>) should be repeated here.	Name of the locality associated with the flood, using recognised postal address names such as streets, towns, counties. If the flood affected the whole LLFA, then record the name of the LLFA.	Reference of the centroid (centre point, falls within polygon) of the flood extent, or of the area affected if there is no extent information.	A description of the general location that was flooded.	The date when the flood commenced - when land not normally covered by water became covered by water.	The number of days (duration) of the flood - that land not normally covered by water was covered by water. Values should be within the range 0.01 - 999.99 (permitting records to the nearest quarter of an hour, where appropriate).	The chance of the flood occurring in any given year - record X from "a 1 in X chance of occurring in any given year". Where this is difficult to estimate, a range can be recorded.	Pick the source from which the majority of flooding occurred. Refer to the PFRA guidance for definitions of sources.	If flooding occurred with, any other sources (other than the <u>Main source of flooding</u>), report the source(s) here, using the same source terms.	Pick a broad level of confidence in the <u>Main source of flooding</u> from; 'High' (compelling evidence of source - about 80% confident that source is correct), 'Medium' (some evidence of source but not compelling - about 50% confident that source is correct) 'Low' (source assumed - about 20% confident that source is correct) or 'Unknown'.	Pick a mechanism from; 'Natural exceedance' (of capacity), 'Defence exceedance' (floodwater overtopping defences), 'Failure' (of natural or artificial defences or infrastructure, or of pumping), 'Blockage or restriction' (natural or artificial blockage or restriction of a conveyance channel or system), or 'No data'.	Pick a characteristic from; 'Flash flood' (rises and falls quite rapidly with little or no advance warning), 'Natural flood' (due to significant precipitation, at a slower rate than a flash flood); 'Snow melt flood' (due to rapid snow melt), 'Debris flow' (conveying a high degree of debris), or 'No data'. Most UK floods are 'Natural floods'.	Were there any significant consequences to human health when the flood occurred, or would there be if it were to re-occur?	Record the number of residential properties where the building structure was affected either internally or externally by the flood, or that would be so affected if the flood were to re-occur.	Where residential or non-residential properties have been counted, it is important to record the method of counting, to aid comparisons between counts. Choose from; 'Detailed GIS' (using property outlines, as per Environment Agency guidance), 'Simple GIS' (using property points), 'Estimate from map', or 'Observed number'.	If there were other <u>Significant consequences to human health</u> , describe them including information such as the number of critical services flooded.
Example:		1 On the 14 April 1998 an intense storm system produced surface water flooding across Essex, concentrated in the west of the county. The flooding lasted about 6 hours, and 23 residential properties were recorded as suffering internal flooding, in Epping and North Weald. The surface runoff exceeded the drainage capacity in several places, and so probably had a 1 in 30 to 1 in 50 chance of occurring in any given year.	Essex	SX1234512345	Several towns and villages across west Essex	1998-04-15		0.25 20-50	Surface runoff		High	Natural exceedance	Natural flood	Yes	23	Observed number	
Records begin here:	1																

Annex 2 – Records of Future Floods and their consequences

ANNEX 2: Records of future floods and their consequences (preliminary assessment report spreadsheet)																	
Field:	Flood ID	Description of assessment method	Name of Location	National Grid Reference	Location Description	Name	Flood modelled	Probability	Main source of flooding	Additional source(s) of flooding	Confidence in main source of flooding	Main mechanism of flooding	Main characteristic of flooding	Significant consequences to human health	Human health consequences - residential properties	Property count method	Other human health consequences
Mandatory / optional: Format:	Mandatory Unique number between 1-9999	Mandatory Max 1,000 characters	Mandatory Max 250 characters	Mandatory 12 characters: 2 letters, 10 numbers	Optional Max 250 characters	Optional Max 250 characters	Optional Max 250 characters	Mandatory Max 25 characters	Mandatory Pick from drop-down	Optional Max 250 characters, same source terms	Optional Pick from drop-down	Mandatory Pick from drop-down	Mandatory Pick from drop-down	Mandatory Pick from drop-down	Optional Number between 1-10,000,000	Optional Pick from drop-down	Optional Max 250 characters
Notes:	A sequential number starting at 1 and incrementing by 1 for each record.	Description of the future flood information and how it has been produced. Cover Regulation 12(6) requirements of (a) topography, (b) the location of watercourses, (c) the location of flood plains that retain flood water, (d) the characteristics of watercourses, and (e) the effectiveness of any works constructed for the purpose of flood risk management. Information from other relevant fields (<u>Probability</u> , <u>Main source</u> , <u>Name</u>) should be repeated here.	Name of the locality associated with the flood, using recognised postal address names such as streets, towns, counties. If the flood affects the whole LLFA, then record the name of the LLFA.	Reference of the centroid (centre point, falls within polygon) of the flood extent, or of the area affected if there is no extent information. If the flood affects the whole LLFA, then record the centroid of the LLFA.	A description of the general location that could be flooded.	Name of the model or map product or project which produced the future flood information	Background, or additional information on the probability of the flood modelled - such as whether <u>Probability</u> refers to probability of rainfall or water on the ground.	The chance of the flood occurring in any given year - record X from "a 1 in X chance of occurring in any given year".	Pick the source which generates the majority of flooding. Refer to the PFRA guidance for definitions of sources.	If the flood is generated by, or interacts with, any other sources (other than the <u>Main source of flooding</u>), report the source(s) here, using the same source terms.	Pick a broad level of confidence in the <u>Main source of flooding</u> , from: 'High' (compelling evidence of source - about 80% confident that source is correct), 'Medium' (some evidence of source but not compelling - about 50% confident that source is correct) or 'Unknown'.	Pick a mechanism from: 'Natural exceedance' (of capacity), 'Defence exceedance' (floodwater overtopping defences), 'Failure' (of natural or artificial defences or infrastructure, or of pumping), 'Blockage or restriction' (natural or artificial blockage or restriction of a conveyance channel or system), or 'No data'.	Pick a characteristic from: 'Flash flood' (rises and falls quite rapidly with little or no advance warning), 'Natural flood' (due to significant precipitation, at a slower rate than a flash flood), 'Snow melt flood' (due to rapid snow melt), 'Debris flow' (conveying a high degree of debris), or 'No data'. Most UK floods are 'Natural floods'.	Would there be any significant consequences to human health if the future flood were to occur?	Record the number of residential properties where the building structure would be affected either internally or externally if the flood were to occur.	Where residential or non-residential properties have been counted, it is important to record the method of counting, to aid comparisons between counts. Choose from: 'Detailed GIS' (using property outlines, as per Environment Agency guidance), 'Simple GIS' (using property points), 'Estimate from map', or 'Observed number'.	If there would be other <u>Significant consequences to human health</u> , describe them including information such as the number of critical services flooded.
Example:		1 See records below for examples of description of assessment method.	Essex	SX1234512345		Flood Map for Surface Water - 1 in 200 deep	Probability refers to the probability of the rainfall event, in this case producing flooding of greater than 0.3m depth.	200	Surface runoff		High	Natural exceedance	Natural flood	Yes	12000	Detailed GIS	
Records begin here:		1 • Topography is derived from LIDAR (in larger urban areas, on 1, 2 and 3m grids; original accuracy ± 0.15m) and Geoperspective data (original accuracy ± 1.5m), processed to remove buildings and vegetation, then degraded to a composite 5m DTM. Manual edits applied where flow paths clearly omitted e.g. below bridges. • Flow routes dictated by topography; no allowance made for manmade drainage. The DTM may miss flow paths below bridges. • Areas that may flood are defined by dynamically routing a 6.5 hour duration storm with 1 in 200 chance of occurring in any year, over the DTM using JBA's JFLOW–GPU model. • Manning's n of 0.1 is used throughout, to allow broad scale effects of buildings and other obstructions to be approximated. • No allowance made for drainage, pumping or other works constructed for the purpose of flood risk management. • The 'less susceptible' layer shows where modelled flooding is 0.1-0.3m deep; you must not interpret this as depth of flooding, rather as indicative of susceptibility to flooding because of	Bath and North East Somerset	ST6575461994		Areas Susceptible to Surface Water Flooding (ASiSWF) - Less	Probability refers to the probability of the rainfall event. This identifies areas which are 'less susceptible' to surface water flooding. For more information refer to "What are Areas Susceptible to Surface Water Flooding" Environment Agency December 2010.	200	Surface runoff		High	Natural exceedance	Natural flood	Yes	10,400	Detailed GIS	100 critical services
		2 • Topography is derived from LIDAR (in larger urban areas, on 1, 2 and 3m grids; original accuracy ± 0.15m) and Geoperspective data (original accuracy ± 1.5m), processed to remove buildings and vegetation, then degraded to a composite 5m DTM. Manual edits applied where flow paths clearly omitted e.g. below bridges. • Flow routes dictated by topography; no allowance made for manmade drainage. The DTM may miss flow paths below bridges. • Areas that may flood are defined by dynamically routing a 6.5 hour duration storm with 1 in 200 chance of occurring in any year, over the DTM using JBA's JFLOW–GPU model. • Manning's n of 0.1 is used throughout, to allow broad scale effects of buildings and other obstructions to be approximated. • No allowance made for drainage, pumping or other works constructed for the purpose of flood risk management. • The 'intermediate susceptibility' layer shows where modelled flooding is 0.3-1.0m deep; you must not interpret this as depth of flooding, rather as indicative of susceptibility to	Bath and North East Somerset	ST6575461994		Areas Susceptible to Surface Water Flooding (ASiSWF) - Intermediate	Probability refers to the probability of the rainfall event. This identifies areas with 'intermediate susceptibility' to surface water flooding.	200	Surface runoff		High	Natural exceedance	Natural flood	Yes	5,100	Detailed GIS	100 critical services
		3 • Topography is derived from LIDAR (in larger urban areas, on 1, 2 and 3m grids; original accuracy ± 0.15m) and Geoperspective data (original accuracy ± 1.5m), processed to remove buildings and vegetation, then degraded to a composite 5m DTM. Manual edits applied where flow paths clearly omitted e.g. below bridges. • Flow routes dictated by topography; no allowance made for manmade drainage. The DTM may miss flow paths below bridges. • Areas that may flood are defined by dynamically routing a 6.5 hour duration storm with 1 in 200 chance of occurring in any year, over the DTM using JBA's JFLOW–GPU model. • Manning's n of 0.1 is used throughout, to allow broad scale effects of buildings and other obstructions to be approximated. • No allowance made for drainage, pumping or other works constructed for the purpose of flood risk management. • The 'more susceptible' layer shows where modelled flooding is >1.0m deep; you must not interpret this as depth of flooding, rather as indicative of susceptibility to flooding because of	Bath and North East Somerset	ST6575461994		Areas Susceptible to Surface Water Flooding (ASiSWF) - More	Probability refers to the probability of the rainfall event. This identifies areas which are 'more susceptible' to surface water flooding.	200	Surface runoff		High	Natural exceedance	Natural flood	Yes	1000	Simple GIS	36 critical services (not rounded to nearest 100)
		4 • Topography is derived from 64.5% LIDAR (on 0.25m-2m grids; original accuracy ± 0.15m) and 35.5% NEXTMap SAR (on 5m grid; original accuracy ± 1.0m), processed to remove buildings & vegetation, then combined on a 2m grid; buildings added with an arbitrary height of 5m based on OS MasterMap 2009 building footprints, then resampled to a 5m grid DTM. Manual edits applied where flow paths clearly omitted e.g. below bridges. • Flow routes dictated by topography; a uniform allowance of 12mm/hr has been made for manmade drainage in urban areas. Infiltration allowance reduces runoff to 39% in rural areas and 70% in urban areas. • Areas that may flood are defined by dynamically routing a 1.1 hour duration storm with 1 in 30 chance of occurring in any year over the DTM using JBA's JFLOW–GPU model. • Manning's n of 0.1 in rural areas; 0.03 in urban areas, to reflect explicit modelling of buildings in urban areas. • No allowance made for local variations in drainage, pumping or other works constructed for the purpose of flood risk management.	Bath and North East Somerset	ST6575461994		Flood Map for Surface Water (FMFSW) - 1 in 30	Probability refers to the probability of the rainfall event, in this case producing flooding of greater than 0.1m depth.	30	Surface runoff		High	Natural exceedance	Natural flood	Yes	3300	Simple GIS	100 critical services
		5 • Topography is derived from 64.5% LIDAR (on 0.25m-2m grids; original accuracy ± 0.15m) and 35.5% NEXTMap SAR (on 5m grid; original accuracy ± 1.0m), processed to remove buildings & vegetation, then combined on a 2m grid; buildings added with an arbitrary height of 5m based on OS MasterMap 2009 building footprints, then resampled to a 5m grid DTM. Manual edits applied where flow paths clearly omitted e.g. below bridges. • Flow routes dictated by topography; a uniform allowance of 12mm/hr has been made for manmade drainage in urban areas. Infiltration allowance reduces runoff to 39% in rural areas and 70% in urban areas. • Areas that may flood are defined by dynamically routing a 1.1 hour duration storm with 1 in 30 chance of occurring in any year over the DTM using JBA's JFLOW–GPU model. • Manning's n of 0.1 in rural areas; 0.03 in urban areas, to reflect explicit modelling of buildings in urban areas. • No allowance made for local variations in drainage, pumping or other works constructed for the purpose of flood risk management.	Bath and North East Somerset	ST6575461994		Flood Map for Surface Water (FMFSW) - 1 in 30 deep	Probability refers to the probability of the rainfall event, in this case producing flooding of greater than 0.3m depth.	30	Surface runoff		High	Natural exceedance	Natural flood	Yes	1200	Simple GIS	31 critical services (not rounded to nearest 100)

Annex 2 Future floods

6	<ul style="list-style-type: none">• Topography is derived from 64.5% LIDAR (on 0.25m-2m grids; original accuracy ± 0.15m) and 35.5% NEXTMap SAR (on 5m grid; original accuracy ± 1.0m), processed to remove buildings & vegetation, then combined on a 2m grid; buildings added with an arbitrary height of 5m based on OS MasterMap 2009 building footprints, then resampled to a 5m grid DTM. Manual edits applied where flow paths clearly omitted e.g. below bridges.• Flow routes dictated by topography; a uniform allowance of 12mm/hr has been made for manmade drainage in urban areas. Infiltration allowance reduces runoff to 39% in rural areas and 70% in urban areas.• Areas that may flood are defined by dynamically routing a 1.1 hour duration storm with 1 in 200 chance of occurring in any year over the DTM using JBA's JFLOW-GPU model.• Manning's n of 0.1 in rural areas; 0.03 in urban areas, to reflect explicit modelling of buildings in urban areas.• No allowance made for local variations in drainage, pumping or other works constructed for the purpose of flood risk management.	Bath and North East Somerset	ST6575461994	Flood Map for Surface Water (FMFSW) - 1 in 200	Probability refers to the probability of the rainfall event, in this case producing flooding of greater than 0.1m depth.	200 Surface runoff	High	Natural exceedance	Natural flood	Yes	19,600 Detailed GIS	100 critical services	
7	<ul style="list-style-type: none">• Topography is derived from 64.5% LIDAR (on 0.25m-2m grids; original accuracy ± 0.15m) and 35.5% NEXTMap SAR (on 5m grid; original accuracy ± 1.0m), processed to remove buildings & vegetation, then combined on a 2m grid; buildings added with an arbitrary height of 5m based on OS MasterMap 2009 building footprints, then resampled to a 5m grid DTM. Manual edits applied where flow paths clearly omitted e.g. below bridges.• Flow routes dictated by topography; a uniform allowance of 12mm/hr has been made for manmade drainage in urban areas. Infiltration allowance reduces runoff to 39% in rural areas and 70% in urban areas.• Areas that may flood are defined by dynamically routing a 1.1 hour duration storm with 1 in 200 chance of occurring in any year over the DTM using JBA's JFLOW-GPU model.• Manning's n of 0.1 in rural areas; 0.03 in urban areas, to reflect explicit modelling of buildings in urban areas.• No allowance made for local variations in drainage, pumping or other works constructed for the purpose of flood risk management.	Bath and North East Somerset	ST6575461994	Flood Map for Surface Water (FMFSW) - 1 in 200 deep	Probability refers to the probability of the rainfall event, in this case producing flooding of greater than 0.3m depth.	200 Surface runoff	High	Natural exceedance	Natural flood	Yes	8,100 Detailed GIS	49 critical services (not rounded to nearest 100)	
8	<ul style="list-style-type: none">• Areas Susceptible to Groundwater Flooding (ASTGWF) is a strategic scale map showing groundwater flood areas on a 1km square grid• This data has used the top two susceptibility bands of the British Geological Society (BGS) 1:50,000 Groundwater Flood Susceptibility Map, which was developed on a 50m grid from:<ul style="list-style-type: none">• NEXTMap 5m grid DTM.• National Groundwater Level data on a 50m grid• BGS 1:50 000 geological mapping, with classifications of permeability• It covers consolidated aquifers (chalk, limestone, sandstone etc.) and superficial deposits.• Flood plains are not explicitly identified; the mapping identifies where groundwater is likely to emerge, and not where the water is subsequently likely to flow or pond.• No allowance is made for engineering works, or for groundwater rebound or abstraction to prevent groundwater rebound.• Shows the proportion of each 1km grid square which is susceptible to groundwater emergence, using four area categories.	Bath and North East Somerset	ST6575461994	Areas Susceptible to Groundwater Flooding (ASTGWF)	Does not describe a probability, but shows places where groundwater emergence more likely to occur.	Unknown	Groundwater	High	Natural exceedance	Natural flood	Yes	8100 Simple GIS	100 critical services
9	<ul style="list-style-type: none">• Modelling developed from combination of national (2004) and local (generally 1998-2010) modelling.• Topography derived from LIDAR (on 0.25m-2m grids; original accuracy ± 0.15m), NEXTMap SAR (on 5m grid; original accuracy ± 1.0m), processed to remove buildings & vegetation. For local modelling, topography may include ground survey.• Location of watercourses and tidal flow routes dictated by topographic survey.• Areas that may flood are defined for catchments >3km² by routing appropriate flows for that catchment through the model to ascertain water level and thus depth and extent.• Manning's n of 0.1 used for national fluvial modelling; variable (calibrated) values for national tidal modelling; appropriate values selected for local modelling. Channel capacity assumed as QMED for national fluvial modelling; local survey methods used for local modelling.• For the purpose of flood risk management, models assume that there are no raised defences.	Bath and North East Somerset	ST6575461994	Flood Map (for rivers and sea) - flood zone 3	Fluvial 1 in 100, tidal 1 in 200	100 Main rivers	Sea, ordinary watercourses	Medium	Natural exceedance	Natural flood	Yes	100 Simple GIS	5 critical services (not rounded to nearest 100)
10	<ul style="list-style-type: none">• Modelling developed from combination of national (2004) and local (generally 2004-2010) modelling.• Topography derived from LIDAR (on 0.25m-2m grids; original accuracy ± 0.15m), NEXTMap SAR (on 5m grid; original accuracy ± 1.0m), processed to remove buildings & vegetation. For local modelling, topography may include ground survey.• Location of watercourses and tidal flow routes dictated by topographic survey.• Areas that may flood are defined for catchments >3km² by routing appropriate flows for that catchment through the model to ascertain water level and thus depth and extent.• Manning's n of 0.1 used for national fluvial modelling; variable (calibrated) values for national tidal modelling; appropriate values selected for local modelling. Channel capacity assumed as QMED for national fluvial modelling; local survey methods used for local modelling.• For the purpose of flood risk management, models assume that there are no raised defences.	Bath and North East Somerset	ST6575461994	Flood Map (for rivers and sea) - flood zone 2	Extreme flood outline is 1 in 1000, and includes some historic where judged that this gives an indication of areas at risk of future flooding.	1000 Main rivers	Sea, ordinary watercourses	Medium	Natural exceedance	Natural flood	Yes	100 Simple GIS	5 critical services (not rounded to nearest 100)

Annex 2 Future floods

Significant economic consequences	Number of non-residential properties flooded	Property count method	Other economic consequences	Significant consequences to the environment	Environment consequences	Significant consequences to cultural heritage	Cultural heritage consequences	Comments	Data owner	Area flooded	Confidence in modelled outline	Model date	Model Type	Hydrology Type	Lineage	Sensitive data	Protective marking descriptor	European Flood Event Code
Mandatory Pick from drop-down	Optional Number between 1-10,000,000	Optional Pick from drop-down	Optional Max 250 characters	Mandatory Pick from drop-down	Optional Max 250 characters	Mandatory Pick from drop-down	Optional Max 250 characters	Optional Max 1,000 characters	Optional Max 250 characters	Optional Number with two decimal places The total area of the land flooded, in km ²	Optional Pick from drop-down	Optional 'yyyy' or 'yyyy-mm' or 'yyyy-mm-dd'	Optional Max 250 characters	Optional Max 250 characters	Optional Max 250 characters	Optional Pick from drop-down	Optional Max 50 characters	Auto-populated Max 42 characters
Would there be any significant economic consequences if the future flood were to occur?	Record the number of non-residential properties where the building structure would be affected either internally or externally if the flood were to occur.	Where residential or non-residential properties have been counted, it is important to record the method of counting, to aid comparisons between counts. Choose from: 'Detailed GIS' (using property outlines, as per Environment Agency guidance), 'Simple GIS' (using property points), 'Estimate from map', or 'Observed number'.	If there would be other <u>Significant economic consequences</u> , describe them including information such as the area of agricultural land flooded, length of roads and rail flooded.	Would there be any significant consequences to the environment if the future flood were to occur?	If there would be <u>Significant consequences to the environment</u> , describe them including information such as national and international designated sites flooded, and pollution sources flooded.	Would there be any significant consequences to cultural heritage if the future flood were to occur?	If there would be <u>Significant consequences to cultural heritage</u> , describe them including information such as the number and type of heritage assets flooded.	Any additional comments about the future flood record.			Pick a broad level of confidence in the modelled flood outline from: 'High' (good match to past flood extents - about 80% confident that outline is correct), 'Medium' (reasonable match - about 50% confident that outline is correct), 'Low' (poor match, sparse data - about 20% confident that outline is correct) or 'Unknown'.		Type of software used to create future flood information.	Type of hydrology method used to create future flood information.	Lineage is how and what the data is made from. Has this data been created by using data owned or derived from data owned by 3rd party (external) organisations? If yes please give details.	Has the information been classified under the Government's Protective Marking Scheme? Include protective marking time limit where known. Note: If "Approved for Access" then report "Unmarked".	For use where organisations apply the Government's Protective Marking Scheme.	This field will autopopulate using the LLFA name provided on the "Instructions" tab, and the Flood_ID. It is an EU-wide unique identifier and will be used to report the flood information. Format: UK<ONS Code><P or F><LLFA Flood ID>. "ONS Code" is a unique reference for each LLFA. "P or F" indicates if the event is past or future. "LLFA Flood ID" is a sequential number beginning with 0001.
No				No		No			Epping Forest District Council		Medium-Low	2008-08	2D-TuFlow	FEH (Revised Rainfall Runoff)	Ordnance Survey AddressPoint, CEH 1:50k River Centreline; NextMap DTM.	Unmarked	Private	UKE10000012F0001
Yes	3,400 Detailed GIS		Unknown	Yes	1 Pollution Source; 9 SACs, 1 SPA, 28 SSSIs	Yes	1 WHS, 24 SMs, 307 Listed Buildings, 12 Registered Parks and Gardens		JBA Consulting (distributed by Environment Agency under licence)		Low	2009-07	JFLOW-GPU	Depth-duration-frequency curves derived from FEH CD-ROM, from centre of each 5km model, with areal reduction factor applied to convert point rainfall estimate to more representative figure. Curve then used to derive 6.5 hr, 1:200 chance rainfall depth; this is converted to hyetograph, using summer rainfall profile.		Protect	Commercial	UKE06000022F0001
Yes	1,900 Detailed GIS		Unknown	Yes	1 Pollution Source; 5 SACs, 1 SPA, 22 SSSIs	Yes	1 WHS, 13 SMs, 178 Listed Buildings, 10 Registered Parks and Gardens		JBA Consulting (distributed by Environment Agency under licence)		Low	2009-07	JFLOW-GPU	Depth-duration-frequency curves derived from FEH CD-ROM, from centre of each 5km model, with areal reduction factor applied to convert point rainfall estimate to more representative figure. Curve then used to derive 6.5 hr, 1:200 chance rainfall depth; this is converted to hyetograph, using summer rainfall profile.		Protect	Commercial	UKE060000022F0002
Yes	800 Simple GIS		Unknown	Yes	1 Pollution Source; 3 SACs, 1 SPA, 14 SSSIs	Yes	1 WHS, 8 SMs, 71 Listed Buildings, 5 Registered Parks and Gardens		JBA Consulting (distributed by Environment Agency under licence)		Low	2009-07	JFLOW-GPU	Depth-duration-frequency curves derived from FEH CD-ROM, from centre of each 5km model, with areal reduction factor applied to convert point rainfall estimate to more representative figure. Curve then used to derive 6.5 hr, 1:200 chance rainfall depth; this is converted to hyetograph, using summer rainfall profile.		Protect	Commercial	UKE060000022F0003
Yes	1400 Simple GIS		Unknown	Yes	0 Pollution Sources; 6 SACs, 1 SPA, 23 SSSIs	Yes	1 WHS, 21 SMs, 150 Listed Buildings, 11 Registered Parks and Gardens		Environment Agency		Medium-Low	2010-11	JFLOW-GPU	Depth-duration-frequency curves derived from FEH CD-ROM, from centre of each 5km model, with areal reduction factor applied to convert point rainfall estimate to more representative figure. Curve then used to derive 1.1 hr, 1:30 chance rainfall depth; this is converted to hyetograph, using summer rainfall profile. See "Description of assessment method" for allowances for infiltration and drainage.	Rainfall Hyetograph, EA 2m Composite DTM, OSMM Topography	Unmarked		UKE060000022F0004
Yes	600 Simple GIS		Unknown	Yes	0 Pollution Sources; 3 SACs, 1 SPA, 17 SSSIs	Yes	1 WHS, 12 SMs, 64 Listed Buildings, 6 Registered Parks and Gardens		Environment Agency		Medium-Low	2010-11	JFLOW-GPU	Depth-duration-frequency curves derived from FEH CD-ROM, from centre of each 5km model, with areal reduction factor applied to convert point rainfall estimate to more representative figure. Curve then used to derive 1.1 hr, 1:30 chance rainfall depth; this is converted to hyetograph, using summer rainfall profile. See "Description of assessment method" for allowances for infiltration and drainage.	Rainfall Hyetograph, EA 2m Composite DTM, OSMM Topography	Unmarked		UKE060000022F0005

Annex 2 Future floods

Yes	5,000 Detailed GIS	Unknown	Yes	0 Pollution Sources; 7 SACs, 1 SPA, 30 SSSIs	Yes	1 WHS, 23 SMs, 301 Listed Buildings, 12 Registered Parks and Gardens		Environment Agency	Medium-Low	2010-11	JFLOW-GPU	Depth-duration-frequency curves derived from FEH CD-ROM, from centre of each 5km model, with areal reduction factor applied to convert point rainfall estimate to more representative figure. Curve then used to derive 1.1 hr, 1:200 chance rainfall depth; this is converted to hyetograph, using summer rainfall profile. See "Description of assessment method" for allowances for infiltration and drainage.	Rainfall Hyetograph, EA 2m Composite DTM, OSMm Topography	Unmarked		UKE06000022F0006
Yes	2,400 Detailed GIS	Unknown	Yes	0 Pollution Sources; 3 SACs, 1 SPA, 17 SSSIs	Yes	1 WHS, 18 SMs, 148 Listed Buildings, 10 Registered Parks and Gardens		Environment Agency	Medium-Low	2010-11	JFLOW-GPU	Depth-duration-frequency curves derived from FEH CD-ROM, from centre of each 5km model, with areal reduction factor applied to convert point rainfall estimate to more representative figure. Curve then used to derive 1.1 hr, 1:200 chance rainfall depth; this is converted to hyetograph, using summer rainfall profile. See "Description of assessment method" for allowances for infiltration and drainage.	Rainfall Hyetograph, EA 2m Composite DTM, OSMm Topography	Unmarked		UKE06000022F0007
Yes	2100 Simple GIS	Unknown	Yes	1 Pollution Source; 0 SACs, 1 SPA, 3 SSSIs (figures calculated for grids >50% only)	Yes	1 WHS, 4 SMs, 597 Listed Buildings, 5 Registered Parks and Gardens (figures calculated for grids >50% only)	Data developed specifically for PFRA, and is unlikely to be suitable for any other purposes.	Environment Agency	Low	2010-11	ArcGIS	Uses data which is developed from published BGS groundwater level contours, groundwater levels in BGS WellMaster database and some river levels. No probability is associated with this data.	British Geological Society (BGS) DiGMapGB-50 [Susceptibility to Groundwater Flooding].	Unmarked		UKE06000022F0008
Yes	100 Simple GIS	Unknown	Yes	0 Pollution Sources; 0 SACs, 1 SPA, 6 SSSIs	Yes	1 WHS, 3 SMs, 11 Listed Buildings, 1 Registered Park and Garden	Data updated quarterly. To understand the likelihood of future flooding, taking account of defences, refer to Areas Benefitting from Defences and National Flood Risk Assessment (NaFRA) data. Marked 'Protect' for complete national dataset only.	Environment Agency	Medium	2010-11	Varies but mainly JFLOW, ISIS, HEC-RAS, TUFLOW for fluvial, and HYDROF for tidal.	National methodology described in "National Generalised Modelling for Flood Zones - Fluvial & Tidal Modelling Methods - Methodology, Strengths and Limitations". A national dataset (for England and Wales) of fluvial flood peak estimates was derived from the Flood Estimation Handbook (FEH) to generate a 1 in 100 chance fluvial flood. Local fluvial modelling uses FEH methods. Peak tidal water levels from either Dixon & Tawn (DT3) or local data sets to derive 1 in 200 chance tide levels including surge from POL CSX model.	NextMap SAR DTMe, UKHO Admiralty Charts, 1:50K CEH River Centre Line, CEH FEH Q(T) Grids, POL CSX Peak Extreme Water Levels, POL CS3 Astronomical Tides, UKHO Admiralty Tide Time-Series Calibration Locations, OS 1:10 Boundary Line MHW	Protect	Commercial	UKE06000022F0009
Yes	100 Simple GIS	Unknown	Yes	0 Pollution Sources; 0 SACs, 1 SPA, 5 SSSIs	Yes	1 WHS, 3 SMs, 12 Listed Buildings, 1 Registered Park and Garden	Data updated quarterly. To understand the likelihood of future flooding, taking account of defences, refer to National Flood Risk Assessment (NaFRA) data. Marked 'Protect' for complete national dataset only.	Environment Agency	Medium	2010-11	Varies but mainly JFLOW, ISIS, HEC-RAS, TUFLOW for fluvial, and HYDROF for tidal.	National methodology described in "National Generalised Modelling for Flood Zones - Fluvial & Tidal Modelling Methods - Methodology, Strengths and Limitations". A national dataset (for England and Wales) of fluvial flood peak estimates was derived from the Flood Estimation Handbook (FEH) to generate a 1 in 1000 chance fluvial flood. Local fluvial modelling uses FEH methods. Peak tidal water levels from either Dixon & Tawn (DT3) or local data sets to derive 1 in 1000 chance tide levels including surge from POL CSX model.	NextMap SAR DTMe, UKHO Admiralty Charts, 1:50K CEH River Centre Line, CEH FEH Q(T) Grids, POL CSX Peak Extreme Water Levels, POL CS3 Astronomical Tides, UKHO Admiralty Tide Time-Series Calibration Locations, OS 1:10 Boundary Line MHW, Historic Flood Map	Protect	Commercial	UKE06000022F0010

Annex 3 – Records of Flood Risk Areas and their rationale

No entries have therefore been made to the Preliminary Assessment Spreadsheet Annex 3.

Annex 3 Flood Risk Areas

ANNEX 3: Records of Flood Risk Areas and their rationale (preliminary assessment report spreadsheet)														
Field:	Flood Risk Area ID	Name of Flood Risk Area	National Grid Reference	Main source of flooding	Additional source(s) of flooding	Confidence in main source of flooding	Main mechanism of flooding	Main characteristic of flooding	Significant consequences to human health	Human health consequences - residential properties	Property count method	Other human health consequences	Significant economic consequences	Number of non-residential properties flooded
Mandatory / optional: Format:	Mandatory Unique number between 1-9999	Mandatory Max 250 characters	Mandatory 12 characters: 2 letters, 10 numbers	Mandatory Pick from drop-down	Optional Max 250 characters, same source terms	Optional Pick from drop-down	Mandatory Pick from drop-down	Mandatory Pick from drop-down	Mandatory Pick from drop-down	Optional Number between 1-10,000,000	Optional Pick from drop-down	Optional Max 250 characters	Mandatory Pick from drop-down	Optional Number between 1-10,000,000
Notes:	A sequential number starting at 1 and incrementing by 1 for each record.	Name of the locality associated with the Flood Risk Area; a town, city, or county.	National Grid Reference of the centroid (centre point, falls within polygon) of the Flood Risk Area.	Pick the source from which there is a significant flood risk. Refer to the PFRA guidance for definitions of sources.	If there is also significant flood risk generated by another source (other than the <u>Main source of flooding</u>), report the source(s) here, using the same source terms.	Pick a broad level of confidence in the <u>Main source of flooding</u> from; 'High' (compelling evidence of source - about 80% confident that source is correct), 'Medium' (some evidence of source but not compelling - about 50% confident that source is correct) 'Low' (source assumed - about 20% confident that source is correct) or 'Unknown'.	Pick a mechanism from; 'Natural exceedance' (of capacity), 'Defence exceedance' (floodwater overtopping defences), 'Failure' (of natural or artificial defences or infrastructure, or of pumping), 'Blockage or restriction' (natural or artificial blockage or restriction of a conveyance channel or system), or 'No data'.	Pick a characteristic from; 'Flash flood' (rises and falls quite rapidly with little or no advance warning), 'Natural flood' (due to significant precipitation, at a slower rate than a flash flood), 'Snow melt flood' (due to rapid snow melt), 'Debris flow' (conveying a high degree of debris), or 'No data'. Most UK floods are 'Natural floods'.	Has the Flood Risk Area been identified as a result of significant consequences to human health?	Record the number of residential properties where the building structure would be affected either internally or externally by the flood.	Where residential or non-residential properties have been counted, it is important to record the method of counting, to aid comparisons between counts. Choose from; 'Detailed GIS' (using property outlines, as per Environment Agency guidance), 'Simple GIS' (using property points), 'Estimate from map', or 'Observed number'.	If the Flood Risk Area has been identified as a result of other <u>Significant consequences to human health</u> , describe them (such as information about the number of critical services flooded).	Has the Flood Risk Area been identified as a result of significant economic consequences?	Record the number of non-residential properties where the building structure would be affected either internally or externally by the flood.
Example:	1	London	SX1234512345	Surface runoff	NA	High	Natural exceedance	Natural flood	Yes	50000	Detailed GIS		No	
Records begin here:														

Annex 3 Flood Risk Areas

Property count method	Other economic consequences	Significant consequences to the environment	Environment consequences	Significant consequences to cultural heritage	Cultural heritage consequences	Origin of Flood Risk Area	Amended Flood Risk Area rationale	New Flood Risk Area rationale	Rationale detail	European Flood Risk Area Code
Optional Pick from drop-down	Optional Max 250 characters	Mandatory Pick from drop-down	Optional Max 250 characters	Mandatory Pick from drop-down	Optional Max 250 characters	Mandatory Pick from drop-down	Mandatory Pick from drop-down	Mandatory Pick from drop-down	Mandatory Max 1,000 characters	Auto-populated Max 42 characters
Where residential or non-residential properties have been counted, it is important to record the method of counting, to aid comparisons between counts. Choose from; 'Detailed GIS' (using property outlines, as per Environment Agency guidance), 'Simple GIS' (using property points), 'Estimate from map', or 'Observed number'.	If the Flood Risk Area has been identified as a result of other <u>Significant economic consequences</u> , describe them (such as information about the area of agricultural land flooded, length of roads and rail flooded).	Has the Flood Risk Area been identified as a result of significant consequences to the environment?	If the Flood Risk Area has been identified as a result of <u>Significant consequences to the environment</u> , describe them (such as information about national and international designated sites flooded, and pollution sources flooded).	Has the Flood Risk Area been identified as a result of significant consequences to cultural heritage?	If the Flood Risk Area has been identified as a result of <u>Significant consequences to cultural heritage</u> , describe them (such as information about the number and type of heritage assets flooded).	Pick the origin from either; 'Indicative' Flood Risk Area, 'Amended' Flood Risk Area (in which case <u>Amended Flood Risk Area rationale</u> is mandatory), or 'New' Flood Risk Area (in which case <u>New Flood Risk Area rationale</u> is mandatory).	Pick the main rationale from either; 'Geography', 'Past floods', or 'Future floods'. Then provide further detail in <u>Rationale detail</u> . This is not mandatory if the Flood Risk Area was an indicative Flood Risk Area.	Pick the main rationale from either 'Past floods', or 'Future floods'. Then provide further detail in <u>Rationale detail</u> . This is not mandatory if the Flood Risk Area was an indicative Flood Risk Area.	Summarise the rationale for amending an indicative Flood Risk Area, or identifying a new Flood Risk Area. Refer to Defra & WAG guidance to LLFAs on "Selecting and reviewing Flood Risk Areas for local sources of flooding". If the Flood Risk Area was an indicative Flood Risk Area and has not been amended, record "indicative Flood Risk Area".	This field will autopopulate using the LLFA name provided on the "Instructions" tab, and the <u>Flood Risk Area ID</u> . It is an EU-wide unique identifier and will be used to report the Flood Risk Area information. Format: UK<ONS Code><A><LLFA Flood ID>. "ONS Code" is a unique reference for each LLFA. "A" indicates it is a Flood Risk Area. "LLFA Flood ID" is a sequential number beginning with 0001.
		No		No		Indicative	NA	NA	indicative Flood Risk Area	UKE1000012A0001

Annex 4 – Review checklist

LLFAs should complete the pale blue sections with the relevant information, and send to their Environment Agency Local Area Contact along with the Preliminary Assessment Report and Annexes. Yellow and green boxes on this coversheet are for Environment Agency completion

Preliminary Flood Risk Assessment Review

LLFA Name	Bath and North East Somerset
If collaboration, list other LLFAs	N/A
LLFA Lead contact name	Steve Moore
Email address	<u>Steve_Moore@BATHNES.gov.uk</u>
Contact telephone number	
Date sent to Environment Agency	

Documents submitted

	LLFA	EA date received
Preliminary Assessment Report	Yes	
Annex 1 - Past floods reporting template	Yes	
Annex 2 - Future floods reporting template	Yes	
Annex 3 - Flood Risk Area reporting template	Yes	
Annex 4 - Review checklist	Yes	

Flood Risk Areas

Was there an indicative Flood Risk Area?	No
Is a Flood Risk Area proposed?	No

Approvals

LLFA approval

Name	
Title	
Date	

For completion by Environment Agency

Region		
Area		
Lead contact name		
	Review date	Recommendation
Environment Agency area		
National review panel		
RFCC/FRMW		
Regional Director Sign-off		
Ministerial referral (if applicable)		

Preliminary Flood Risk Assessment Checklist					
LLFA Name:					
Checklist questions		Notes for completion	LLFA	Environment Agency area review	Environment Agency national review
Step 1 Set up governance and develop partnerships					
1.1	Have appropriate governance and partnership arrangements been set up?	Refer to section 2.3 of guidance. Governance and partnership arrangements should be to the satisfaction of the LLFA.	Yes		
1.2	Who in the LLFA reviewed the PFRA and when was it done?	Please state the review and approval process and when approval was gained e.g. Officer, Scrutiny Committee, Cabinet. Refer to Section 5 of the guidance.	Overview & Scrutiny Committee; 21st March 2011		
Step 2 Determine appropriate data systems					
2.1	Has a data management system been established and implemented?	See Annex 5 for information about data standards	Yes		
Step 3 Collate information on past and future floods and their consequences					
3.1	Has information been requested from all relevant partners?	See Flood Risk Regulations Part 6 Co-operation.	Yes		
3.2	Are there any gaps in available information? (This could include gaps which could have been filled but weren't, or gaps which couldn't be filled because the information wasn't available)	LLFAs - Are there gaps in certain locations, or for certain events that you are aware of, or for certain sources of flooding (such as groundwater). Respond with Yes/No and provide comments on any missing information. EA Review - Has all available information has been gathered and included?	Yes. Collated data on historical flood events was limited in terms of reporting extents of flooding and conveyance routes.		
Step 4 Determining locally agreed surface water information					
4.1	Which dataset (or combination of datasets) has been determined as "locally agreed surface water information"?	LLFAs - Select from drop down. Refer to "Locally agreed surface water information" text box in section 3.5.1 (p.17) of guidance. EA review - Has this been agreed?	Flood Map for Surface Water		
4.2	Has the locally agreed surface water information been clearly stated and presented (on a map) in the Preliminary Assessment Report?	LLFAs - Select Yes/No from drop down list. Refer to "locally agreed surface water information" text box in section 3.5.1 (p.17) of guidance.	Yes		
4.3	If available, what is the total property count for locally agreed surface water information in the LLFA?	If known, please enter the total number of properties at risk in the LLFA.	10500		
4.4	If applicable, has the method for counting properties been described in the Preliminary Assessment Report?	Refer to text box on page 17 of guidance	Yes		
4.5	Has available information on local drainage capacity (where used to inform the determination of locally agreed surface water information) been included in the report?	Refer to text box on page 17 of guidance. Information provided on drainage may inform options for any future improvements to the Flood Map for Surface Water.	No		

Preliminary Flood Risk Assessment Checklist					
LLFA Name:					
Checklist questions		Notes for completion	LLFA	Environment Agency area review	Environment Agency national review
Step 5 Complete Preliminary Assessment Report Document					
5.1	Does the Preliminary Assessment Report cover all the content described in Annex 1 of the Environment Agency's PFRA guidance?	LLFAs - If the Preliminary Assessment Report contains all the content described in Annex 2 of the PFRA guidance, respond with a 'Yes'. If there are some elements missing, please provide a brief explanation. EA Review - Include comments on any missing content.	Yes		
5.2	Has a summary table of flood events been produced?	Refer to section 3.4 and 3.5 of guidance	Yes		
5.3	Has a description of past flood events been included?	Refer to section 3.4 and 3.5 of guidance	Yes		
5.4	Has additional information been included on climate change and long term developments?	Refer to 3.6 of guidance. Standard text has been provided for Preliminary Assessment Reports which meets the minimum requirements of the Flood Risk Regulations. Please respond with Yes or No, and if additional information has been included, please state the information source(s)	No		
Step 6 Record information on past and future floods with significant consequences in spreadsheet					
6.1	Are records of past flooding with significant harmful consequences recorded on the Preliminary Assessment Report spreadsheet (Annex 1 of Preliminary Assessment Report) ?	LLFAs - past flooding should be recorded on the spreadsheet and included as Annex 1 of the Preliminary Assessment Report. EA review - Are all the mandatory fields complete?	No		
6.2	Are there any past floods with significant harmful consequences that have not been recorded? If so, please explain why not.	LLFAs - Respond with Yes or No. If No, provide additional information e.g. anecdotal information on flood, but not enough evidence to include EA review - Do you agree with LLFA response and comments?	N/A		
6.3	Have any additional records of future flooding (other than the national dataset information which is already completed) been recorded on the future flooding Preliminary Assessment Report spreadsheet (Annex 2 of Preliminary Assessment Report)	LLFAs - future flooding information should be recorded on the spreadsheet and included as Annex 2 of the Preliminary Assessment Report. EA review - Are all mandatory fields complete?	No		
Step 7 Illustrate information on past and future floods					
7.1	Have summary maps been produced for past and future floods?	Refer to section 3.4 and 3.5 of guidance	Yes		
Step 8 Review indicative Flood Risk Areas					
8.1	Is your LLFA within an indicative Flood Risk Area?	Indicative Flood Risk Areas were provided to LLFAs by the Environment Agency in December 2010.	No		
8.2	If the answer to 8.1 is yes, have you reviewed it using the locally agreed surface water information, and relevant local information in the Preliminary Assessment Report?	Refer to section 4 of guidance. LLFAs should identify whether they have reviewed against local information or just used the indicative Flood Risk Area information provided by the Environment Agency.	N/A		

Preliminary Flood Risk Assessment Checklist					
LLFA Name:					
Checklist questions		Notes for completion	LLFA	Environment Agency area review	Environment Agency national review
Step 9 Identify Flood Risk Areas					
9.1	Is a Flood Risk Area proposed?	LLFA - select a response from the drop down list and then complete the relevant questions 9.1.1 - 9.1.5. (NB. Indicative Flood Risk Areas can be amended due to Geography, past flooding and/or future flooding.)	No - no Flood Risk Area is proposed (go to question 9.3)		
9.1.1	If the proposed Flood Risk Area is exactly the same as the indicative Flood Risk Area, please confirm.	LLFA - please confirm that the boundary of the indicative Flood Risk Area has not been changed and no change has been made to the flood risk indicators. EA review - please confirm	N/A		
9.1.2	If changes have been made to the indicative Flood Risk Area because of geography, please identify what changes have been made.	Use the drop down list to identify the reasons for the change. Options are the same as the table on page 26 of the PFRA guidance. EA review - please confirm evidence supports change			
9.1.3	If changes have been made to the indicative Flood Risk Area because of past / historic flooding, please indicate the changes and the reasons why.	LLFA - identify the scale of the changes made e.g. major/minor increase or decrease in size of Flood Risk Area and the source of information used e.g. records of historic flooding. EA review - confirm scale of the changes made and provide indication of confidence in the evidence provided e.g. anecdotal evidence versus detailed report on flooding event.	N/A		
9.1.4	If changes have been made to the indicative Flood Risk Areas because of future flooding, please indicate the changes and the reasons why.	LLFA - identify the scale of the changes made e.g. major/minor increase or decrease in size of Flood Risk Area and the source of information used e.g. detailed modelling as part of SWMP. EA review - confirm scale of the changes made and indication of confidence in the evidence	N/A		
9.1.5	If a new Flood Risk Area is being proposed, does it meet the Defra / WAG thresholds?	Criteria and thresholds are set out in the Defra/WAG guidance on selecting and reviewing Flood Risk Areas for local sources of flooding EA review - identify the evidence provided to support this and indicate degree of confidence in the evidence.	N/A		
9.2	Does the proposed Flood Risk Area include flooding from interactions with main river, reservoirs or the sea?	LLFAs should respond with Yes or No. EA Review - Summarise the location and nature of interactions i.e. river or sea.	N/A		
9.3	Has an indicative Flood Risk Area been deleted?	LLFA - Respond with Yes/No and if an indicative Flood Risk Area has been deleted please provide a short description why. EA - confirm the evidence presented to support this is aligned to 'locally agreed surface water information'	No. The indicative Flood Risk Area for Bristol encroaches into the Bath and North East Somerset administrative boundary. This encroachment equates to ~ 1.5% of the total		
Step 10 Record information including rationale - ONLY COMPLETE IF ANSWER TO 9.1 IS YES					
10.1	If proposing Flood Risk Areas, have the mandatory fields in the spreadsheet been completed?	LLFAs - the spreadsheet indicates mandatory columns to be completed. EA Review - Are all mandatory fields complete?	N/A		
10.2	Has a rationale and evidence for amending/adding/deleting Flood Risk Areas been included in the Preliminary Assessment Report?	LLFAs - Refer to Table 5 on page 26 of the PFRA guidance and Annexes A-D of the Defra/WAG Guidance. Rationale should be included in "Identification of Flood Risk Areas" section of Preliminary Assessment Report. EA Review - Confirm that supporting evidence for any amendments/additions/deletions has been provided in the Preliminary Assessment Report and annexes	N/A		

Annex 5 – GIS layer of Flood Risk Area(s)

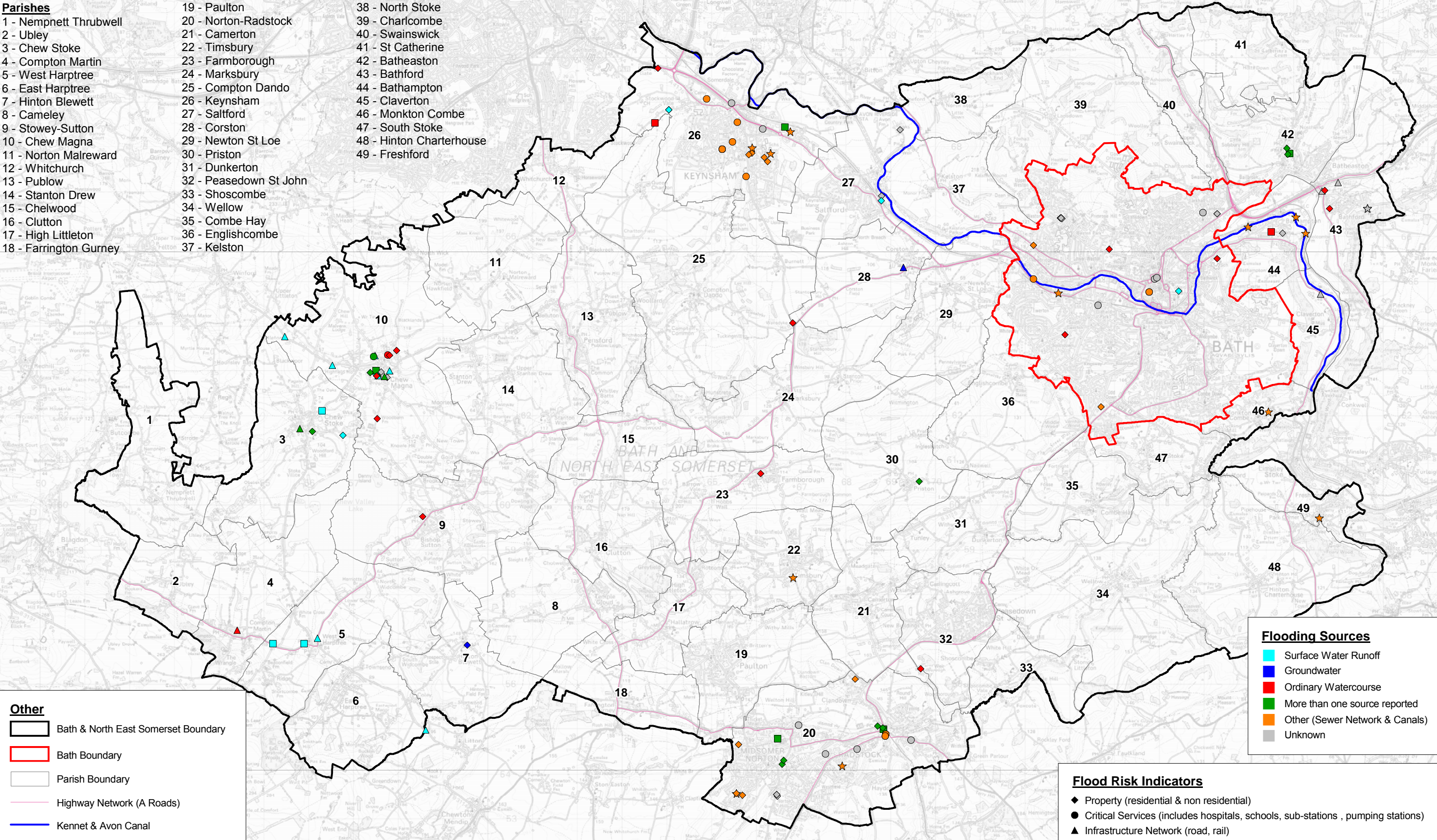
No amendments or new Flood Risk Areas are proposed in the first cycle of the PFRA process. No GIS layers of flood risk area(s) are included in this submission.

Maps

HISTORIC FLOOD EVENTS

Based on records recieved from FRIS, Parish Councils, Avon Fire Service, British Waterways and Wessex Water.

Map : 1.0
Scale : 1:80,000
Author : B Stone
Date : 14/03/2011

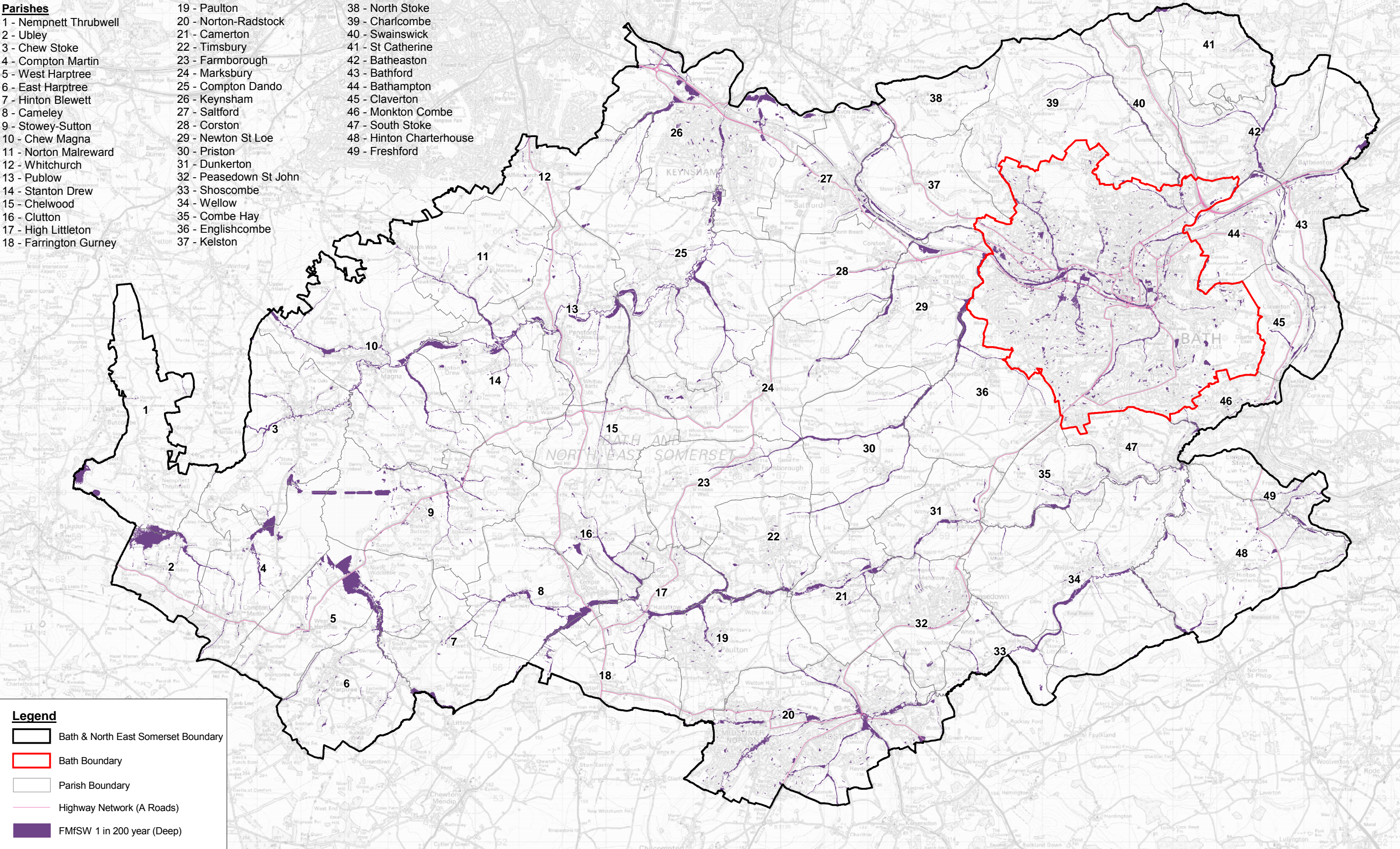


Notes: 1. Information received to date from all available and readily derivable sources does not indicate the extent or conveyance route of the flood. Flood events are indicated as point sources only.
2. Location of flood events uses grid references or Ordnance Survey co-ordinates where provided. Where this is unavailable (Parish records), the event was interpolated from the recorded descriptions.

LOCALLY AGREED SURFACE WATER INFORMATION

Based on the Environment Agency Flood Map for Surface Water (1 in 200 year Deep)

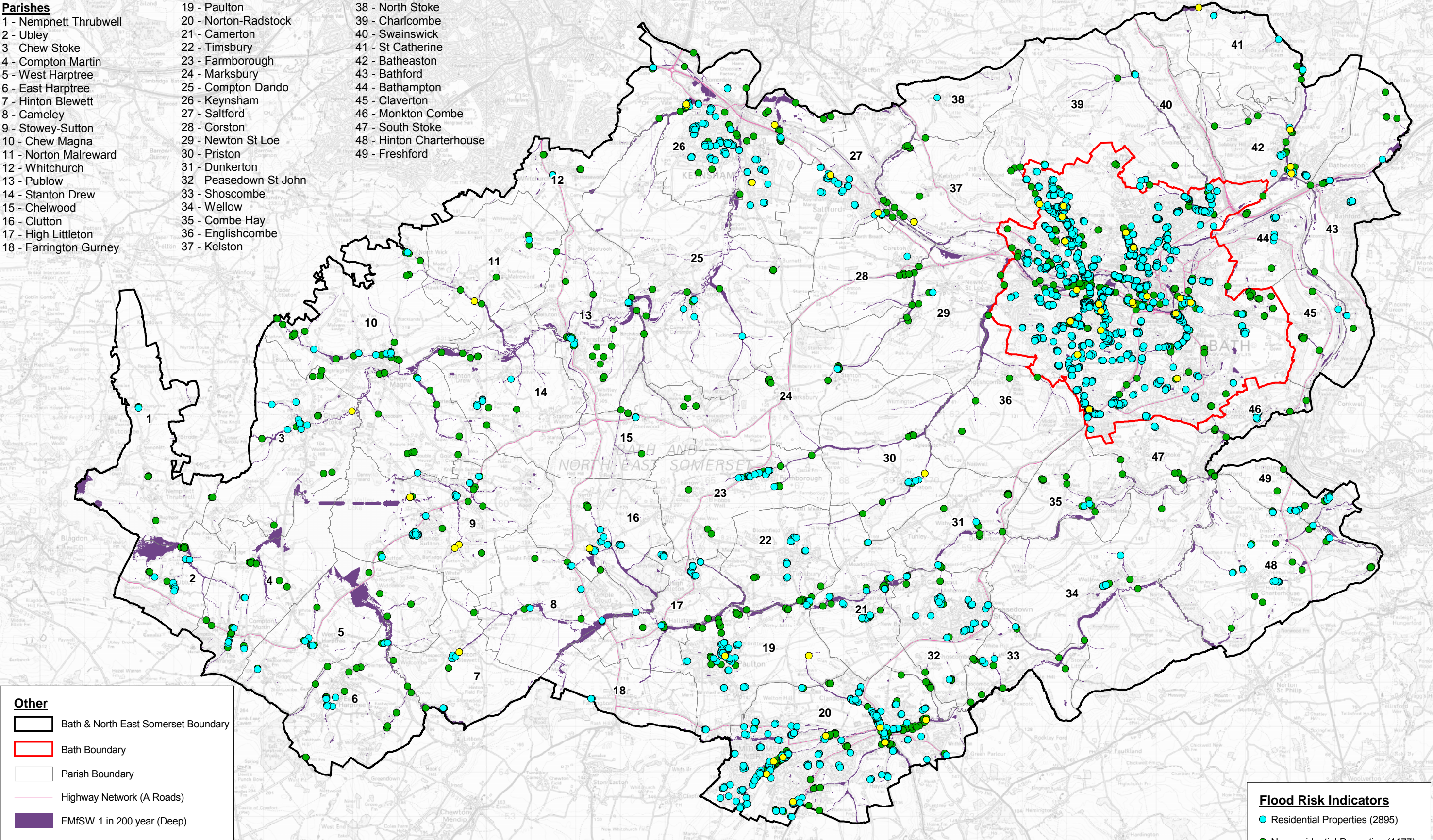
Map : 2.0
Scale : 1:80,000
Author : B Stone
Date : 14/03/2011



RESIDENTIAL, NON-RESIDENTIAL AND CRITICAL SERVICE INDICATORS

Based on the Environment Agency Flood Map for Surface Water (1 in 200 year Deep)

Map : 3.0
Scale : 1:80,000
Author : B Stone
Date : 14/03/2011

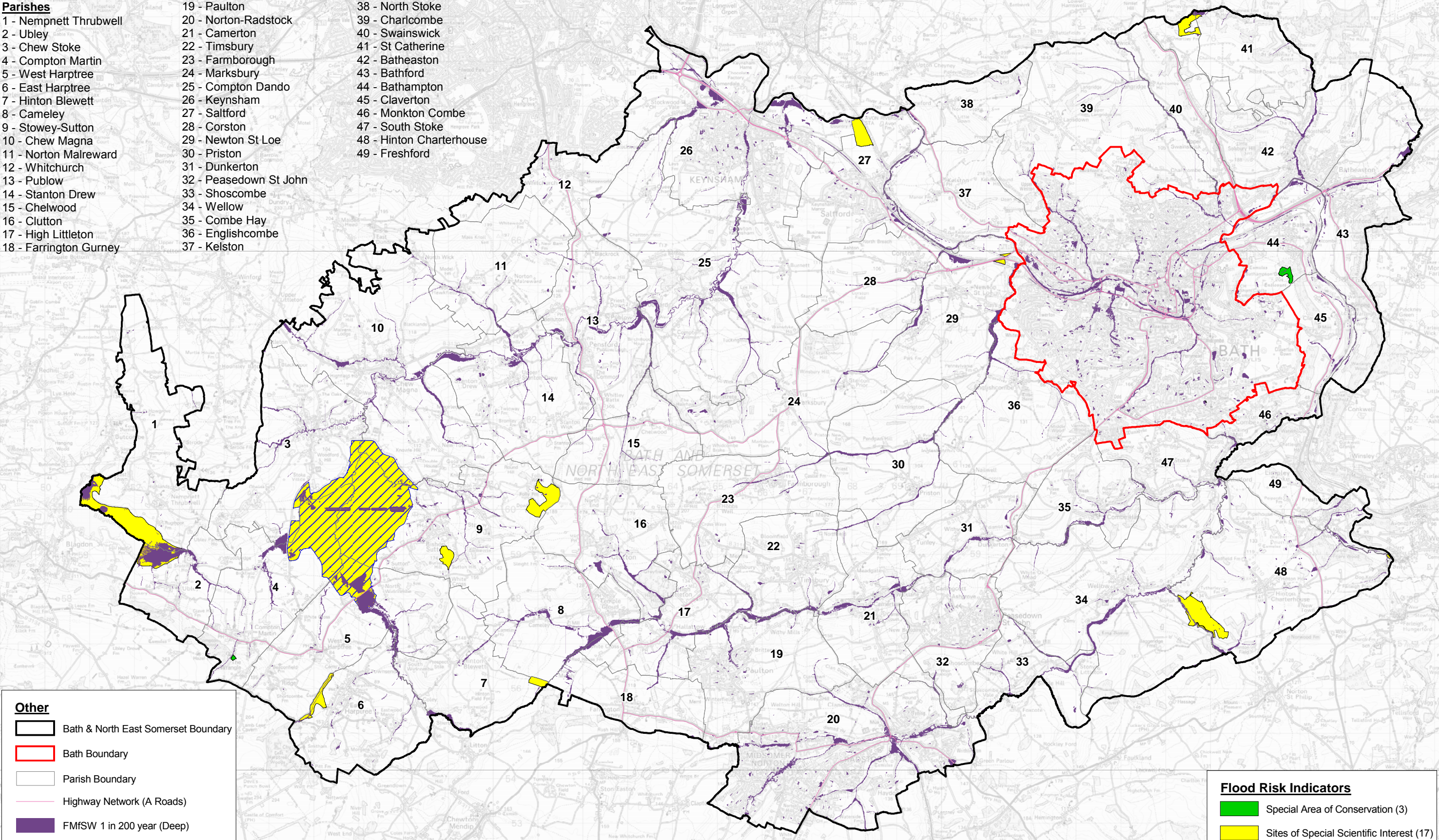


Notes: 1. Flood risk indicators illustrated where these intersect with future flood event.
2. Future flood event information provided by the Environment Agency under license.

ENVIRONMENTAL INDICATORS

Based on the Environment Agency Flood Map for Surface Water (1 in 200 year Deep)

Map : 4.0
Scale : 1:80,000
Author : B Stone
Date : 14/03/2011

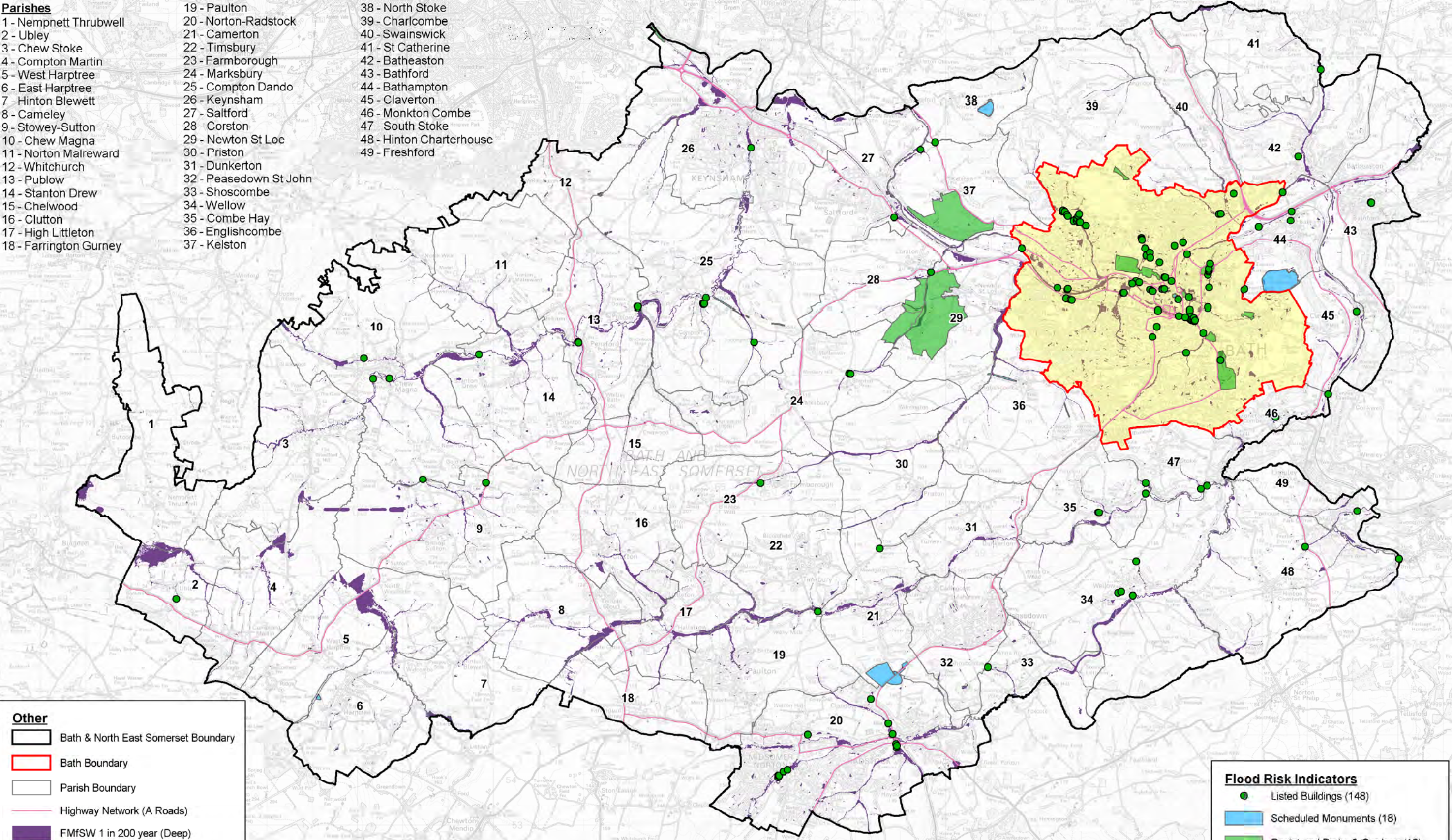


Notes: 1. Flood risk indicators illustrated where these intersect with future flood event.
2. Future flood event information provided by the Environment Agency under license.

CULTURAL AND HERITAGE INDICATORS

Based on the Environment Agency Flood Map for Surface Water (1 in 200 year Deep)

Map : 5.0
Scale : 1:80,000
Author : B Stone
Date : 14/03/2011



Notes: 1. Flood risk indicators illustrated where these intersect with future flood event.
2. Future flood event information provided by the Environment Agency under license.

LOCAL FLOOD RISK AREAS

Based on information provided by the Environment Agency
and information collected from partners

Map: 6.0
Scale : 1:80,000
Author : B Stone
Date : 14/03/2011



- Notes:
- Places above Flood Risk Thresholds are 1km grid squares where at least one of the following flood risk indicators is above the threshold given below:
(a) Number of People > 200 (b) Critical Services > 1 (c) Number of Non-residential Properties > 20
Indicators calculated using the Environment Agency's detailed method of counting (based on property outlines) for the new Flood Map for Surface Water (deep - for 1 in 200 annual probability rainfall)
 - Indicative Flood Risk Areas (green squares) based on clusters formed from all 3km squares that contain 5 or more places above the Flood Risk Thresholds (1km squares) that are touching. Indicative flood risk areas are labelled with their location and the number of people at risk. Clusters with fewer than 30,000 people at risk have not been designated as indicative flood risk areas.

