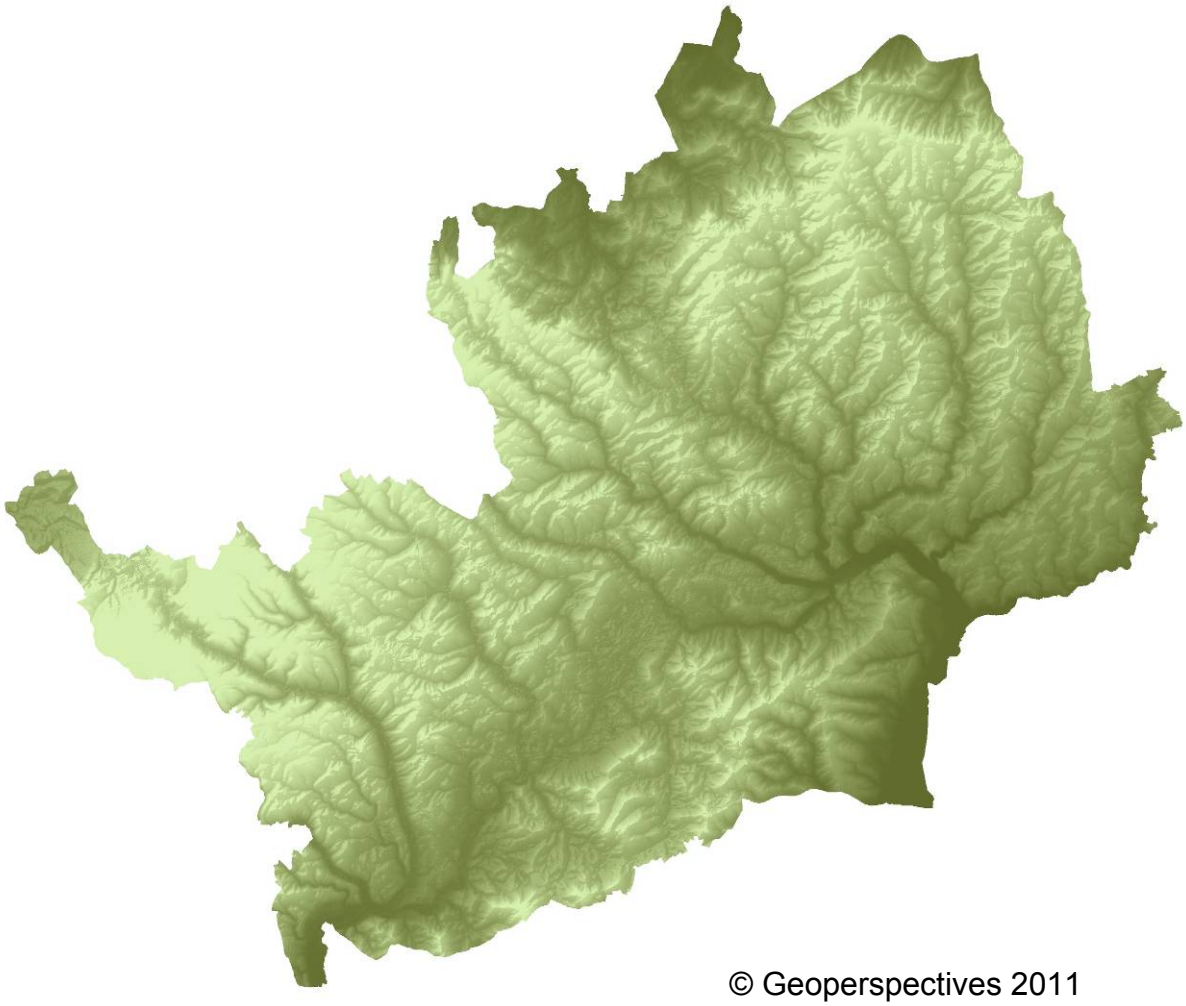
LOCAL FLOOD RISK MANAGEMENT STRATEGY FOR HERTFORDSHIRE 2013 - 2016

STRATEGY (Issues, Vision and Principles)

Part 1 of 4



Hertfordshire

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E1. Background

As Lead Local Flood Authority (LLFA), the county council has to "develop, maintain, apply and monitor" a Local Flood Risk Management Strategy for Hertfordshire. The Strategy will be produced in consultation with local partners and will focus on local sources of flooding from surface runoff, groundwater and ordinary watercourses[1]. Interactions between different forms of flooding will be done in conjunction with the Environment Agency which has responsibility for managing flood risk from main rivers, reservoirs and the sea.

The Strategy will be the means by which the LLFA will discharge its general duty to provide leadership and to co-ordinate Flood Risk Management (FRM) on a day to day basis. The Strategy will be the focal point for integrating a range of flood risk related actions across Hertfordshire.

E2. Relevance

The Local Flood Risk Management Strategy sets out measures to manage local flood risk in Hertfordshire and is therefore of relevance to everyone who lives in, works in, visits or travels through the county. The Environment Agency, District Councils, Highway Authorities and Internal Drainage Boards as "Risk Management Authorities" (RMAs) must act consistently with the Strategy when carrying out their Flood Risk Management functions and have due regard for it when delivering other functions (Water and Sewerage Providers although an RMA have a slightly different legislative status).

E3. Strategy Content

The Strategy must:-

- Set out the roles and responsibilities of the various Risk Management Authorities (RMAs) in the area.
- Define what is considered to be 'locally significant' flood risk.
- Specify the objectives for managing local flood risk.
- Identify and describe the measures (actions) proposed to deliver the objectives.
- Where relevant, provide details of the costs and benefits related to any actions, and identify a means or process as to how these may be paid for.
- Identify how the Strategy will contribute to wider environmental objectives.
- Describe and establish a review process and timetable for the Strategy.

[1] Ordinary watercourse is a statutory designation in England and Wales which includes every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows and which the Environment Agency has not identified as a Main River (which are generally larger rivers and streams but can include smaller watercourses that have a critical drainage function).

E4. Roles and Responsibilities

The Strategy must detail the arrangements that have been put in place to undertake the flood risk responsibilities assigned under the Flood and Water Management Act 2010 (FWMA). Although it is not required by the Act, Hertfordshire County Council will work with the RMAs and other interested parties to develop appropriate partnership arrangements to underpin the delivery of the measures outlined in the Strategy.

E5. Assessing Local Flood Risk

The Strategy must assess and define what locally significant flood risk is. This will require the development of criteria to ensure that significance is determined on a consistent basis across Hertfordshire. Significance will need to be assessed in a number of different ways depending on the situation, for example through the setting of thresholds that will trigger investigations, the assessment of the effect that structures and features have on flood risk and how potential flood risk management schemes will be prioritised for funding.

The Preliminary Flood Risk Assessment (2011) (referenced in Part 4) indicates that flooding has occurred in Hertfordshire from a range of sources and is widely distributed across the county. Modelling of flood risk and climate change gives an insight into the potential impact of future flooding. Hertfordshire currently has no areas that meet the national criteria for designation as Flood Risk Areas.

E6. Objectives

The Strategy must set objectives for managing flood risk. In this first Strategy these will be a set of higher level objectives over a range of timescales together with some more detailed short-term objectives linked to service delivery and capacity building. Further detailed objectives will be added as knowledge of local flood risk improves as part of the annual review of the Strategy work programme.

High level objectives proposed in the Strategy include:-

- To reduce the potential impact and costs of flooding in the county.
- To better understand local flood risk and make best use of available information.
- To develop greater personal involvement in flood risk management amongst residents of Hertfordshire.
- To secure improvements to the water environment of Hertfordshire through the undertaking of actions associated with flood risk management.

E7. Actions to Achieve Objectives

The Strategy sets out, where relevant, what actions will be taken to achieve the objectives; including action taken by other organisations. Actions should always aim

to achieve multiple benefits, as focussing on single issue flood-orientated solutions can cause potential conflicts to be overlooked and opportunities to be missed.

Actions to be included in the Strategy are as follows:-

- Studies, assessments and plans - Developing a greater understanding of local flood risk in Hertfordshire will be critical to deploying the most effective measures for managing the risk and making the best use of limited resources.
- Information-sharing protocols - This function will be developed to understand what data is needed for, what information is available, what information is missing and how information will be shared. The data will help define 'locally significant' flood risk and set criteria for when the LLFA will investigate a flooding incident.
- Development control - It is assumed in drafting the Strategy that, in line with the previous requirements of Planning Policy Statement 25 (PPS 25) now superseded by National Planning Policy Framework (NPPF), unless there are mitigating factors new development will not generally increase flood risk either specifically in the area of a development or overall. An improving information base about local sources of flooding will help inform the determination of development proposals and support the Strategic Flood Risk Assessments produced by the local planning authorities.
- Sustainable Drainage Systems (SuDS) – SuDS have been defined as "management practices and control structures designed to drain surface water in a sustainable way". It is anticipated Hertfordshire County Council will become the SuDS Approval Body within a year of this Strategy being adopted. The Policy and Guidance supporting the Strategy will detail the local arrangements for SuDS approval and set out criteria for adoption of existing SuDS.
- Raising awareness - Individuals and communities should understand that there will always be a degree of flood risk and the role that they can play in the local management of that risk. Raising awareness will be a critical aspect of the Strategy.
- Resilience - The Strategy will explore ways in which flood risk can be reduced through individuals and communities increasing their own resilience.
- Investment and funding - The Strategy will look at the development of priorities for investment and at the same time explore opportunities for funding.

E8. How and When Actions are to be Implemented

The Strategy must detail how each action will be implemented. It is anticipated that the majority of the actions to be set out within the Strategy will be implemented through partnership working.

E9. Costs and Benefits

Actions will need to be affordable and realistic and follow the general principle set out in the National Flood Risk Management Strategy; that of being proportionate and risk based. Priorities for Hertfordshire will be set in such a way that decisions can be made about local benefit within a strategic context. Accurate identification of the

beneficiaries of measures will help with the development of appropriate funding strategies.

E10. Contribution to Wider environmental objectives

The Strategy will aim for actions, where it is appropriate, to have multiple benefits in addition to their primary purpose. This will include such things as improvements to enhance opportunities for wildlife, access and enjoyment of cultural heritage and wider environmental benefits gained through reducing diffuse pollution. The Strategy is subject to both Strategic Environmental Assessment and Habitats Regulation Assessment.

E11. Review

The initial Strategy will be subject to an early review after 3 years. This will be necessary as it is expected that many of the objectives relating to development of service delivery will be achieved in this timeframe and the overall context for the Strategy will evolve as recent legislative changes in areas related to flood risk management, start to become established.

Table 1. How the Strategy Addresses the Required Elements

Requirement	How it is covered	Relevant Section(s)
Roles and responsibilities of the various Risk Management Authorities (RMAs) in the area.	A summary of RMAs direct flood risk management functions and other related activity by RMAs and other organisations including individuals and the wider community.	Annex 2
What is 'locally significant' flood risk?	There is no single definition of locally significant as significance depends on context. Separate definitions will be determined for investigations, the register of structures and features, priorities for funding.	Part 2 – Procedures
Objectives for managing local flood risk.	There will be no significant increase in flood risk from new development. Decisions are based on sound data as the understanding of local flood risk (potential causes and impacts) is improved. Organisations and individuals are able to play an appropriate role in management of local flood risk.	Part 1 – Issues, Vision and Principles
Measures proposed to achieve the objectives.	Proportionate and risk based measures will be detailed in the work programme linked to the Strategy.	Part 3 – Implementation
Costs and benefits of the measures and how they will be paid for.	At this stage benefits are difficult to quantify as it is not possible to calculate the potential reduction in flood risk.	Implementation Process

How the Strategy contributes to wider environmental objectives.	The impact of the Strategy is assessed in the accompanying Environmental Report which is a combination of the Strategic Environmental Assessment and Habitat Regulations Assessment reports.	Accompanying Environmental Report Part 2 – SuDS Policy
A review process.	The Strategy will be reviewed in 2015 and thereafter to coincide with European reporting requirements	Part 3 – Implementation

1. Introduction

Flooding[2] due to intense or prolonged rainfall is a natural phenomenon which depending on the area where it occurs may have positive or negative consequences. It is an external risk that we need to understand so appropriate steps can be taken to manage potential impacts.

The impact of flooding can be highly stressful and disruptive, with serious economic and social costs. In extreme cases it has meant that people have been unable to return to their home for an extended period, while they wait for it to be repaired. So in addition to damage and material loss there is potential for ongoing disruption of peoples lives which may have an impact on schooling work, caring responsibilities, and general well being.

When someone has suffered flooding there are a number of questions they may ask such as; why they didn't know that they were at risk of flooding? what is the likelihood of flooding reoccurring? and what can be done to prevent it happening again?

The majority of people understand the general mechanism of flooding, in that water ends up in places where it is not usually found and that the water may have come from one or more of a range of sources (including rainfall, rivers, the sea or through the failure of a manmade structure such as a reservoir, sewer or a water main). There may not be a similar understanding of the detail of the potential mechanisms of flooding or the respective roles of organisations that are involved in the management of flood risk.

For some, awareness will come from news coverage of flooding events on a regional or national scale, for others it will be the personal experience of the misery and disruption caused when water enters a building. As a consequence, for some the risk of flooding will be a remote consideration and for others with personal experience, it is something that causes apprehension whenever heavy rain is forecast.

Perhaps because most reporting of flooding focuses on large or catastrophic events where intervention is required by agencies and authorities, there is an assumption that these bodies are "responsible" for dealing with all things relating to flooding and that individuals or their communities have no role to play outside the immediate period of flood events. Whilst these organisations may have a role to play in management of flood risk they cannot "solve" flooding; people need to be encouraged and supported to play an active role in managing their own flood risk as individuals and within communities.

[2] Flooding may also be a result of failure of infrastructure, e.g. a blocked sewer or a burst water main - the risks of which are managed through utility providers' asset maintenance and replacement programmes. The sea and conditions of rapid thaw following snow or hail are acknowledged as causes but are not covered in this document. Hertfordshire is landlocked and well inland of any coastal influence and the impacts of floods following freezing conditions will not be considered specifically as they have similarities with those caused by rain but introduce further variables which introduce some unique flooding scenarios which are difficult to predict or mitigate.

A range of legislation gives powers and duties to agencies and authorities to manage aspects of flood risk, with each organisation having a remit which covers one or more specific sources of flooding. Whilst the division of roles is necessary for practicality and accountability it has the potential to fragment available resources, confuse and interfere with communication.

Up until now there has been no consistent approach to local flood risk management across Hertfordshire. Work on managing flood risk has been carried out by a number of organisations through discretionary powers set out in a range of legislation.

Sir Michael Pitt's review of the flooding events in the summer of 2007 identified that flood risk management activity and planning was compartmentalised and fragmented. Amongst his recommendations was that there should be coordination of flood risk management at a local level, supported by changes in legislation. Coordination of planning and activity at a local level will help to make the best use of limited resources and this is one of the major functions of the Local Flood Risk Management Strategy.

2. Flood Risk in Hertfordshire

Hertfordshire is at risk from a variety of sources of flooding which are known to interact with each other. The main sources of flood risk include surface water, groundwater, rivers and other watercourses. As well as events caused by a single source there may be in combination effects, for example, elevated river levels impeding surface water drainage which then results in flooding, where the state of the river and volumes of surface water in isolation would not have been problematic. Flooding from all these sources is expected to increase in frequency or severity as a result of climate change.

Flooding is a natural process which plays an important part in shaping the environment, but it can also be affected and manipulated by man-made processes and land use. Flooding can cause substantial physical, financial and emotional damage, adversely affecting quality of life. It is therefore important to understand flood risk within Hertfordshire and how the impacts can be avoided or reduced.

Historic records of flooding vary greatly, making it difficult to provide a consistent picture of past flooding within Hertfordshire. Historic records are not consistent across the county, and data is held by a number or organisations in a variety of forms. Where information is more comprehensive, this is generally for only the past 30 years or so. This is probably due to how the current organisations with an interest in flood risk management and legislation have evolved. The structure of local government was revised in the mid 1970s and responsibility for local drainage passed from councils to the Water and Sewerage Companies formed in the 1990s.

A number of plans and assessments have recently sought to identify flood risk from a variety of sources. These include the Catchment Flood Management Plans (CFMP) for Thames and Great Ouse, Hertfordshire County Council's Preliminary Flood Risk Assessment (PFRA), Environment Agency mapping of fluvial flood zones, areas

susceptible to surface water and groundwater flooding, and district and borough council Strategic Flood Risk Assessments (SFRA).

2.1 Surface Water Flooding

Surface water flooding is caused by overland flow during periods of sustained or heavy rainfall, causing ponding of water where it becomes obstructed or collects in low lying areas. Local drainage capacity and infiltration is unable to cope with the volume of water experienced. The risk of surface water flooding will potentially increase as the extent of built-up areas and impermeable hard surfacing (such as driveways, car parking, paths and extensions) is added to across the county, unless there is suitable mitigation such as Sustainable Drainage Systems (SuDS).

Modelling the potential impact of storm events gives an insight into the risk of future flooding. It is difficult to accurately predict where surface water flooding will happen as it is dependant on ground levels, rainfall, and the local drainage network. Hertfordshire's PFRA identified that the Environment Agency's Flood Map for Surface Water (FMfSW) 2010 was the best available indication of predicted surface water flood risk within Hertfordshire. Based on this information, over 53,000 properties are in areas where there is potential for flooding up to 0.3m in an event which has a 0.5% probability (1 in 200 chance) of occurring in any year. However, the information in this map is indicative only and will need to be reviewed when data is available that better represents local conditions.

The potential for surface water flooding is predicted in most of Hertfordshire's major settlements; see Map 1. Extent of Flood Map for Surface Water in Hertfordshire in Annex 1.

2.2 Groundwater Flooding

Groundwater flooding occurs when the water held underground rises to a level where it breaks the surface in areas away from usual channels and drainage pathways. It is generally a result of exceptional extended periods of heavy rain, but can also occur as a result of reduced abstraction, underground leaks or the displacement of underground flows. Once groundwater flooding has occurred, the water can be in situ for a lengthy period of time.

The presence of the chalk aquifer in Hertfordshire and other underground water bearing areas such as the river gravel deposits mean that there is potential for groundwater flooding in Hertfordshire. There are confirmed cases, both widespread and in settlements known to be at particular risk.

Areas with the potential for groundwater emergence are shown by the Areas Susceptible to Groundwater Flooding (AStGF) maps; see Map 2, Areas Susceptible to Groundwater Flooding for Hertfordshire in Annex 1. The AStGF is based on 1 kilometre squares where the percentage of the area where there is the potential for groundwater emergence is above 25%. The majority of Hertfordshire is not shown to

be at risk above this level, with very few kilometre squares with a percentage greater than 50%.

2.3 Fluvial Flooding

Fluvial flooding occurs when the capacity of a watercourse is reached, causing water to spill out of the channel onto adjoining areas, known as the floodplain.

In some areas, the floodplain of the river may be undeveloped or have flood compatible uses such as farming[3], but in some areas development has occurred within floodplains.

Within Hertfordshire 8,017 dwellings fall in Flood Zone 2 (1 in 1000 chance of flooding in any year) and 4,879 in Flood Zone 3 (1 in 100 chance in any year). Significant levels of fluvial flood risk are seen in the south and south eastern parts of the county in particular, see Maps 3 and 4, Extent of Flood Zone 2 and 3 in Hertfordshire in Annex 1.

There have been intermittent occurrences of fluvial flooding across the county in the past few years, with notable events in February 2009 and October 2001.

2.4 Sewer or Highway Flooding

Sewer or highway flooding is caused when a blockage occurs or by excess surface water entering the drainage network, exceeding available capacity. This generally occurs during periods of heavy rainfall when the drainage network becomes overwhelmed.

Water Companies keep a record of property flooding called the DG5[4] register. Between 1997 and 2007 there were 291 records of sewer flooding within Hertfordshire, of which 77 were attributed to surface water and 25 to combined sewers.[5] As the records are only referenced to broad areas by postcode district it is not possible to provide a spatial representation of this.

2.5 Canal Flooding

Canal flooding is caused by overtopping or breach of the canal network. There are a number of canals within Hertfordshire including the Grand Union Canal, the Lee Navigation and the Stort Navigation.

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[3] Flooding can have a negative impact on farmed and semi natural areas depending on the land management practices, timing and duration. In some areas flooding during the winter months is desirable as seen in the traditional practice of managing water meadows or creating wetlands for birds. In other circumstances it can have a devastating impact resulting in the loss of animals and crops.

[4] The water companies are regulated by OfWAT and have a range of service indicators called DG (Director General) Registers covering all aspects of their activity. DG5 relates to flooding from sewers (as a further example DG6 relates to response to billing queries).

[5] Combined sewers collect rainwater from both roofs and yards, and foul sewage.

The Canal and Rivers Trust (formerly British Waterways) is currently investigating the potential for flooding from the canal network. Current records indicate only two minor breach events on record within Hertfordshire on the Grand Union Canal. Dacorum Borough Council's Level 2 SFRA includes an assessment of potential flood risk associated with a raised section of the Grand Union Canal. It is considered that there are no significant flood risks associated expressly with the canals.

2.6 Reservoir Flooding

Reservoir flooding occurs when a reservoir structure is overtopped or fails due to damage or collapse of the reservoir structure.

The Environment Agency has produced reservoir maps to show the largest area that might be flooded if a reservoir that holds over 25,000 cubic metres of water were to fail. Hertfordshire has 24 reservoirs which hold in excess of 25,000 cubic metres of water. The chance of reservoir failure is very unlikely as reservoirs are regularly inspected and there is an extremely good safety record in the UK with no loss of life due to reservoir flooding since 1925.

3. Climate Change Implications

As well as looking at flood risk using past events the future risk of flooding needs to be assessed. This is especially relevant because of the need to consider the potentially significant effects arising from climate change.

Changes in climatic conditions can affect local flood risk in several ways; however, impacts will depend on local conditions and vulnerability. Wetter winters and more intense rainfall may increase river flooding in both rural and urban catchments. More intense rainfall causes greater 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 the county needs to be prepared for the risks arising from unexpected flash flooding.

There is a risk of flooding from groundwater-bearing chalk aquifers across the county. Generally wetter winters would potentially increase levels of ground water but it is difficult to predict in detail as much depends on the nature of the rainfall as, once the ground is saturated or the intensity of rain exceeds the rate of infiltration, water runs off and is not available for groundwater recharge.

Many drainage systems in the county have been modified to manage water levels and could help in adapting locally to some impacts of future climate on flooding. However changing intensity of weather patterns may mean that these assets could need to be managed differently.

A range of climate change scenarios have been developed and it seems likely that overall flood risk will increase as flooding may happen more often and / or to a greater depth, depending on the flooding source and mechanism.

Where appropriate, the Strategy will be promoting local studies to enable a better understanding of potential climate impacts on flooding as well as looking at the detail of the effects from other factors like land use change. The implementation of sustainable development and sustainable drainage will help us adapt to climate change locally and should contribute to the mitigation and management of the risks that could arise from damaging floods in the future.

4. National Context

There are currently two major pieces of law related to flood risk management.

4.1 Flood Risk Regulations 2009

The Flood Risk Regulations (FRR) 2009 implements the European Floods Directive into UK law. Responsibilities for Lead Local Flood Authorities (LLFAs) under the FRR are consistent with those under the Flood and Water Management Act 2010 (FWMA). A six year cycle requires the LLFA to assess flood risk from local sources and undertake a management plan in areas where there is a significant flood risk, defined as affecting more than 30,000 people within a 'cluster' of mapped square kilometres (none of these exist in Hertfordshire).[6]

The first stage of the six year cycle is the publication of a Preliminary Flood Risk Assessment (PFRA) by the LLFA. The PFRA must include details of significant historical flooding, predicted future flood risk and the assessment of any significant Flood Risk Areas within the LLFA boundary. Where a Flood Risk Area is identified, the second and third stages producing flood hazard and risk maps and a management plan must also be completed.

4.2 Flood and Water Management Act 2010

The FWMA created a new framework for flood and water management. It designated upper tier local authorities, such as county and unitary councils, as LLFAs. The act also designated a number of other bodies such as the Environment Agency and district councils as Risk Management Authorities (RMAs).

[6] These "Flood Risk Areas" were identified using a methodology applicable for a national assessment. In absolute terms Hertfordshire has in the order of 53,000 properties in areas where there is a potential risk of surface water flooding which will put Hertfordshire in the top five when ranked with other authorities. This is partly a function of the number of people in the county which, at something over 1,000,000, is one of the largest authorities (by population) in the country. Some early funding was given based on more local assessment of flood risk by settlement (ranking in the order of 4,000 settlements nationally) and Hertfordshire received funding for two Surface Water Management Plans based on this assessment.

As LLFA, the county council has to "develop, maintain, apply and monitor" a Local Flood Risk Management Strategy for Hertfordshire. The Strategy will be produced in consultation with local partners and will focus on local sources of flooding from surface runoff, groundwater and ordinary watercourses[7]. Interactions between different forms of flooding will be done in conjunction with the Environment Agency which has responsibility for managing flood risk from main rivers, reservoirs and the sea.

The Strategy will be the means by which the LLFA will discharge its general duty to provide leadership and to co-ordinate Flood Risk Management (FRM) on a day to day basis. The Strategy will be the focal point for integrating a range of flood risk related actions across Hertfordshire.

The Environment Agency is responsible under the act for management of flooding from 'Main Rivers', i.e. significant watercourses that have been identified and their status recorded on the main river map. Local authorities are responsible for management of flooding from 'ordinary watercourses' i.e. smaller rivers, ditches and brooks.

The FWMA will, when the required secondary legislation is developed, update the Reservoirs Act 1975 by reducing the capacity at which a reservoir is regulated from 25,000m³ to 10,000m³; requiring all undertakers with reservoirs over 10,000m³ to register their reservoirs; and requiring all incidents at reservoirs to be reported.

4.3 National Strategy - Guiding Principles

The FWMA states that Local Strategies must be consistent with the National Strategy. Principally, this refers to consistency with the overall aims and objectives, and in particular with the six guiding principles below.

Community focus and partnership working

RMAs need to help communities understand the risks of flooding, and encourage them to have direct involvement in decision-making and risk management actions.

Working in partnership to develop and implement local strategies will enable better sharing of information and expertise, and the identification of efficiencies in managing risk.

A catchment based approach

In understanding and managing risk, it is essential to consider the impacts on other parts of the catchment. Activities must seek to avoid passing risk on to others within the catchment without prior agreement.

[7] Ordinary watercourse is a statutory designation in England and Wales which includes every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows and which the Environment Agency has not identified as a Main River (generally larger rivers and streams and smaller watercourses with a critical drainage function).

In developing local strategies LLFAs should ensure that neighbouring LLFAs within catchments are involved in partnerships and decision making. Strategic plans such as Catchment Flood Management Plans (CFMPs) and Regional Flood and Coastal Committees will have an important role in coordinating LLFAs.

Sustainability

LLFAs should aim to support communities by managing risks in ways that take account of all impacts of flooding (for instance on people, properties, cultural heritage, infrastructure, environment and the local economy) and the whole-life costs of investment in risk management.

Where possible, opportunities should be taken to enhance the environment and work with natural processes.

Risk management measures should take account of potential risks that may arise in the future and being adaptable to climate change.

Proportionate, risk-based approaches

It is not technically, economically or environmentally feasible to prevent flooding altogether. A risk-based management approach targets resources to those areas where they have greatest effect. All aspects of risk management, including the preparation and implementation of local strategies, should be carried out in a proportionate way that reflects the size and complexity of risk. The assessment of risk should identify where the highest risks are and therefore the priorities for taking action. The Local Strategy provides an opportunity to agree a local framework for risk based decisions and interventions with local communities and stakeholders.

Multiple benefits

As well as reducing the risks to people and property, FRM can bring significant economic, environmental and social benefits. In developing and implementing local strategies, LLFAs should help deliver broader benefits by working with natural processes where possible and seeking to provide environmental benefit, including those required by the Habitats, Birds and Water Framework Directives.

Measures such as the use of Sustainable Drainage Systems (SuDS) to manage risk should be considered wherever possible as they can also deliver benefits for amenity, recreation, pollution reduction and water capture. Further benefits can be realised in relation to regeneration, growth and emergency planning.

Beneficiaries should be allowed and encouraged to invest in local risk management

The benefits achieved when flood risks are managed can be both localised and private, through the protection of specific individuals, communities and businesses.

In developing local strategies, LLFAs should consider opportunities to seek alternative sources of funding for managing local flood risk rather than relying solely on Government funds.

However, LLFAs should consider the balance they wish to achieve in relation to major river based schemes, where the scale of local contributions required to make up partial national funding may be much more significant than that usually needed for surface water management schemes.

5. Regional Context

Strategic planning has been carried out by the Environment Agency through their Catchment Flood Management Plans (CFMPs) related to river catchments.

5.1 Catchment Flood Management Plans

The Thames and Great Ouse CFMPs classify catchments into sub-areas depending on their characteristics. The plans then identify how best to manage the flood risk for those sub-areas in the long term. Hertfordshire is categorised largely as towns and villages in open floodplain or chalk and rural downland catchments, with some scattered rural areas.

For the most part, sub-areas in Hertfordshire are considered to be at low to moderate risk where flood risk is generally being managed effectively, although there is a need for some further work to keep pace with climate change and take action to reduce flood risk in some areas. The Lower Lee is an area of moderate to high fluvial flood risk where further action has been explored and will be implemented via the Lower Lee Flood Risk Management Strategy.

The Plans list a number of actions for each sub-area that may be used to better manage flood risk. Actions include floodplain management: including the need to adapt the urban environment to make space for water; safeguarding the existing undeveloped floodplain; opening up river corridors in town centres and identifying locations for the storage of flood waters; and resilience and resistance measures. These actions will be taken into account as part of the vision for Hertfordshire.

5.2 Thames River Basin Management Plan

The Thames River Basin Management Plan (RBMP) was prepared under the Water Framework Directive (WFD) Regulations 2003. The WFD aims to prevent deterioration in water quality; improve and protect inland waters and groundwater; encourage more sustainable use of water as a natural resource; create better habitats for wildlife that live in and around water and help reduce the effects of floods and droughts. Section 17 of the WFD Regulations requires any ‘public body’ to have regard to the RBMP for that area and any supplementary plans prepared.

RBMPs are statutory plans which will summarise a 'programme of measures' required in order to meet the objectives of the WFD. Hertfordshire falls across two river basin districts: the Thames, which contains the majority of the county and the Greater Ouse which covers only a small extent of the county around Hitchin.

River morphology, water quantity and water quality are all significant issues in Hertfordshire. The Strategy will, through implementation via Surface Water Management Plans (SWMPs) and Sustainable Drainage Systems (SuDS) schemes, further the implementation of WFD objectives, by addressing water quantity and quality issues.

6. Local Context

6.1 Risk Management Authorities

In addition to designating Lead Local Flood Authorities (LLFAs), the Flood and Water Management Act 2010 (FWMA) identifies certain organisations as 'Risk Management Authorities' (RMAs) which have specified responsibilities, duties and powers related to local flood risk management. Some responsibilities are new, and others are existing duties and powers set out in previous legislation. Table 2 sets out the risk management authorities in Hertfordshire and Annex 2 details their specific roles and responsibilities.

Table 2. Flood Risk Management Authorities in Hertfordshire

FWMA designation	Risk Management Authorities in Hertfordshire
The Environment Agency	Environment Agency South East Region (North East area) Environment Agency Anglian Region (Central area)
Lead Local Flood Authority	Hertfordshire County Council
District councils	Broxbourne Borough Council Dacorum Borough Council East Hertfordshire District Council Hertsmere Borough Council North Hertfordshire District Council St Albans City & District Council Stevenage Borough Council Three Rivers District Council Watford Borough Council Welwyn Hatfield Borough Council
Internal Drainage Boards	Bedford and Ivel Internal Drainage Boards (IDBs)
Water (and Sewerage) Companies	Anglian Water Services Ltd Thames Water Utilities Ltd

FWMA designation	Risk Management Authorities in Hertfordshire
Highway Authorities	Hertfordshire County Council Highways Agency

6.2 Other Key Stakeholders

As well as the RMAs there are a number of other key stakeholders with interests in key infrastructure and service provision. Table 3 sets out those organisations that are seen to be key stakeholders in the Strategy and a full description of their respective roles and responsibilities (along with RMAs) is set out in Annex 3.

Table 3. Key Local Flood Risk Management Strategy Infrastructure Stakeholders in Hertfordshire

Organisation	Infrastructure
National Grid / EDF	Distribution network, sub stations, ground level transformers etc.
Transco	Gas pipelines and associated pumping stations
Network Rail	Various rail lines running through Hertfordshire which radiate from London and include the East, West and Midland mainlines.
Affinity Water (Central)	Pumping stations and treatment works throughout Hertfordshire supplying water. A large proportion of supplied water comes from groundwater sources.
British Waterways	Grand Union Canal, Stort Navigation Lee Navigation, Tring Reservoirs.
Lee Valley Regional Park Authority	Manages recreation and environmental assets associated with large water bodies in the Lee Valley.

Emergency response to flooding incidents is coordinated through the Hertfordshire Resilience Forum which publishes a Multi Agency Flood Plan. The plan identifies potential impacts of flooding and sets out how emergency response will be organised to deal with major incidents. It was tested through a local event run during the period of a national flood response exercise (Operation Watermark) run in 2011.

6.3 Opportunities

Sustainable Drainage Systems Approval Body

The FWMA required the county council to set up a Sustainable Drainage Systems (SuDS) Approving Body or 'SAB' to:

- Evaluate and approve SuDS proposals where new development or redevelopment will have drainage implications, and
- Adopt and maintain SuDS on schemes that meet the evaluation criteria set out in the National SuDS Standards.

Drainage for approval by any SAB must be designed to comply with the current edition of the National Standards for SuDS published by the Department for Environment, Food and Rural Affairs (Defra). These Standards have been designed to accord with Schedule 3 of the Act and cover 'designing, constructing, operating and maintaining drainage for surface runoff'. However, as well as ensuring all schemes comply with the National Standards, which focus on the quantity and quality elements of SuDS, the SAB will seek to secure SuDS schemes which demonstrate best practice and maximise amenity, biodiversity and other benefits to the local area.

The county council consulted on the Interim SuDS Policy Statement in 2012. The guidance provides an interpretation of how schemes should demonstrate compliance with the National Standards in a Hertfordshire context.

Land Use Planning

All local authorities have a number of essential roles linked to managing current and future flood risk including land use planning, building control and emergency planning. Land use planning is an essential tool in managing flood risk. The National Planning Policy Framework (NPPF) requires that:

> *"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing risk elsewhere. (Paragraph 100, NPPF)."*

Effective land use planning can:

- protect the floodplain from development;
- ensure enough space is provided for water within urban areas, including areas being redeveloped;
- ensure critical infrastructure is located away from floodplains; and
- ensure multiple benefits are realised in areas with development potential, particularly objectives identified in the Water Framework, Habitats and Birds Directives.

Planning can also promote flood resilience in developments to reduce flood damages and create opportunities for better co-ordination between land use planning and emergency planning.

Local Plans should be supported by a Strategic Flood Risk Assessment (SFRA) and develop policies to manage flood risk from all sources. Accurate and up to date SFRA's are essential in identifying and managing flood risk in the county. As knowledge and data held within the county improves, SFRA's should become more accurate.

Multiple benefits

Flood risk management offers unique opportunities to achieve a range of social and environmental benefits. These multiple benefits generally arise out of a need to protect the floodplain from development or create flood storage areas, usually through the planning system. Techniques such as SuDS also offer potential to achieve multiple benefits. These benefits include:

- Creation of multi-use, open green space;
- Amenity enhancement through the creation of attractive landscape features such as swales and bunds and marginal planting;
- Habitat Creation and enhancement;
- Recreation Features e.g. open spaces such as flood storage areas;
- Reduction in Pollutants entering waterways – such as metals and hydrocarbons from roads and car parks, meaning that water entering a watercourse is cleaner;
- Passive cooling which helps mitigate any increase in temperatures due to climate change.

Surface Water Management Plans

A Surface Water Management Plan (SWMP) is a plan that outlines the preferred long term strategy for managing surface water in a particular location. It aims to develop a better understanding of surface water flooding in a given area and further develop partnership working within the area. Outputs will include: development of a sound evidence base including a detailed risk assessment; mapping of vulnerable areas; and an action plan which explores the most cost effective way of managing surface water flood risk in the long term. SWMPs will help identify and prioritise practical actions to mitigate flood risk and will also have other applications e.g. for planners and others involved in the development process.

7. A Collaborative Approach

Flood risk management is the responsibility of everyone, not solely the organisations identified by the Flood and Water Management Act. No single body has the means to reduce all flood risk. Effective management will involve various bodies each with a range of relevant duties and powers. For example, planning authorities have produced Strategic Flood Risk Assessments (SFRA's) which are used to guide local land use planning. Surface Water Management Plans (SWMPs) will help to improve the evidence base for SFRA's and in turn the development control process may help to facilitate practical flood risk reduction measures. The more that the relevant

organisations are able to find opportunities to work together and with the community, the better use will be made of their capacity and resources.

There are a wide range of organisations and individuals with an interest in flood risk management across Hertfordshire. These range from the risk management authorities to local flood management groups. Finding an appropriate way for this wide range of interested parties to be involved in and interact with the Local Flood Risk Management Strategy is a priority for the Lead Local Flood Authority (LLFA).

To facilitate focused cross-organisational working the strategy is proposing to develop partnerships to support a strategic overview and local delivery. This will include those bodies with a cross-county interest in flood management and will serve to support the strategic elements of the strategy. It is anticipated that the initial representation on the strategic group will include the following bodies:-

- Hertfordshire County Council (as LLFA)
- Environment Agency (South-East Region in liaison with Anglian)
- Thames Water Utilities Ltd
- Affinity Water
- Anglian Water Services Ltd
- Hertfordshire Highways and Highways Agency
- District Council representatives

This strategic group would meet on at least a biannual basis to look at the implementation and review of the Local Flood Risk Management Strategy. In addition it would serve to examine other strategic flood risk issues as they emerge.

The Strategy is proposing appropriate local partnership structures focussed on local issues and delivery be established where required. The default position would be a local partnership operating on district council boundaries, membership to include:-

- Hertfordshire County Council (LLFA)
- District councils
- Risk Management Authorities (RMAs)
- Interested community groups

These local partnerships would focus on looking at issues related to flood risk management in the local area and how these might be addressed. It would also examine possible schemes and scheme funding where appropriate. These local partnerships will support the development and implementation of district based SWMPs which will be the means by which local flood risk is assessed and potential mitigations are identified.

8. Vision for Flood Risk Management in Hertfordshire

8.1 A Vision for Hertfordshire

As part of this strategy a vision for flood risk management has been created to set the strategic direction for Hertfordshire. The vision describes an ideal (proportionate and risk based) approach that is needed in order to make sound decisions about managing flood risk in the county.

It has been developed by consultation with key stakeholders who contributed to a written 'issues and options' consultation as well as a number of workshops.

The Local Strategy also needs to be consistent with the National Strategy which outlines six guiding principles (see section 4.3 above) for flood risk management in England. These principles have been embraced in the local strategy for Hertfordshire.

The key principles underpinning the Hertfordshire Local Flood Risk Management Strategy are as follows:

1) There will be a strategic understanding of flood risk from all sources.

Information on sources of flood risk in Hertfordshire will improve and better records will be available for historic flooding, to provide a clearer understanding of the overall flood risk in the county. Flooding information will be risk based, with areas shown to be at significant risk analysed in more detail as part of a prioritised programme. This information will form the evidence base to help focus local resources and funding.

2) Communities understand the information available on flood risk and are supported towards self-sufficiency for flood preparedness and resilience and as beneficiaries of flood alleviation schemes.

As improved information becomes available this will be effectively conveyed to local communities to ensure they have a full understanding of the flood risk in their area, allowing them to make informed decisions for managing their own flood risk. As part of the new partnership funding mechanisms for flood defence, local contributions are likely to be required for flood alleviation schemes to go ahead. Where local flood alleviation schemes are identified, communities will be engaged via local stakeholders in the project process to influence the design, bring in contributions and maximise the schemes potential.

3) Local flood risk is managed to ensure there is no new flood risk created and where possible opportunities to reduce local flood risk are taken.

Local flood risk will be managed via a risk-based and evidence-based programme, incorporating proportionate and practical measures. Measures used should be multi-beneficial as far as possible, integrating flood risk

management solutions alongside sustainable development and social and environmental benefits. Risk Management Authorities (RMAs) will be required to ensure that the principle of 'no new flood risk' is taken into account as part of new developments and infrastructure, managing the effects of climate change and further reducing flood risk where possible.

4) Hertfordshire has a partnership approach to flood risk management, and co-operates with other partnerships on working across catchments.

A valuable partnership will be formed for Hertfordshire both with risk management authorities and affected local communities to target resources and provide co-ordination of expertise and funding. The partnership will recognise that management of flood risk may need to be brought together across the catchment and authority boundaries, whilst continuing to recognise local priorities. A partnership approach will provide opportunities to build links with wider plans, avoid transfer of flood risk elsewhere and provide multi-benefit schemes.

5) Information on local flood risk will be made available to assist in preparing for flood events, roles and responsibilities in a flood event will be clear and well-rehearsed and the cause of flood events will be effectively investigated.

The improved information on flood risk will be used to ensure that emergency responders better understand the nature of local flood risk and can use the information to improve preparedness for flood events. There will be a partnership approach to flood response ensuring that roles are clear. Hertfordshire County Council as Lead Local Flood Authority (LLFA) will undertake investigations into flood events where it is necessary to understand the cause of flooding. Communities and individuals will be supported to take part in preparing for flood events, forming local action groups and planning for future flood risks.

6) Flood risk management funding is directed to areas most at need or where solutions will be most effective, and flood risk management will guide other funding decisions and be appropriately prioritised alongside other needs.

Information on local flood risk will be used to allow informed decisions to be made on the level of funding allocated to flood risk management resources within Hertfordshire. Potential funding for flood risk management projects will be prioritised according to cost-benefit and a range of weighting factors to take into account the evidence of flooding and sustainability of the proposed solution. This will ensure that resources are dedicated in areas where it will be most effective.

8.2 Future flood management in Hertfordshire

Given these guiding principles the overall position that Hertfordshire is striving to achieve is as follows:-

- There is a strategic overview of flood risk from all sources.
- The potential impacts of climate change are understood.
- No new significant flood risk is created due to development.
- Flood risk is managed (and reduced).
- Areas where flood risk is significant have been analysed in more detail.
- Potential for measures to reduce flood risk have been assessed.
- Where possible proportionate opportunities to reduce flood risk are taken.
- Multiple benefits are achieved through the management of flood risk.
- Effective partnership arrangements are in place.
- Hertfordshire works with other flood risk management partnerships.
- Information is made available so flood risk is understood by the community and businesses.
- Communities are supported to be resilient and participate in reducing flood risk.
- Opportunities to develop funding for risk reduction measures are actively being sought.
- Flood risk management work informs the planning of emergency responses.

8.3 Current Baseline

It is important to recognise our current position in order to understand the key steps that will need to be taken to improve flood risk management in Hertfordshire. The current position is as follows:-

- Hertfordshire County Council has a new coordinating role with new powers and responsibilities.
- We know that there is flood risk from a range of sources in Hertfordshire.
- There is no consistent approach to local flood risk management.
- There is no consistent flood risk data for local sources of flooding.
- Limited capacity and skills in local authorities (with some exceptions).
- Data held in a range of forms in a range of places.
- Some insight into local flood risk through early work on two Surface Water Management Plans (SWMPs).
- Receiving some funding from the government.
- Systems are being developed for reporting, recording and investigation of flooding, regulation of ordinary watercourses and to develop a register of structures and features that have a significant effect on local flood risk.
- Emergency response well developed.
- No widespread community involvement in flood risk management.
- Water management and flood risk management related activity compartmentalised – traditionally led by the Environment Agency and as a consequence has had a fluvial focus / bias.

- Planning system taking account of flood risk through the National Planning Policy Framework (NPPF) and Strategic Flood Risk Assessments (SFRAs).
- Local Flood Risk Management Strategy.

It is also important to recognise and understand that there has been flooding in Hertfordshire in the past and that we know there will be flooding in the future.

Records show that areas have been flooded from a range of sources; surface water, groundwater, ordinary watercourses, rivers and sewers. Flooding may have had a single cause or at times could have resulted from an interaction between or combination of sources. The historical flooding data is not a consistent record over time or in geographical coverage. It comes in a variety of forms ranging from pictures and news accounts in the past to more recently well referenced computerised records.

Modelling the potential impact of storm events gives an insight into the risk of future flooding. Recent modelling suggests that 50,000 properties are located in areas where there is approximately a 0.5% probability (1 in 200 chance) in any one year of surface water flooding to a depth of 300mm.

8.4 Moving Forward

The policies, procedures and guidance that the LLFA is proposing to put in place are included in Part 2 of this strategy and the work programme for the first three years leading up to the first review of this strategy is included in Part 3. These set out the detail of the policies to be followed and the proposals for actions that will be taken to deliver the Local Flood Risk Management Strategy in Hertfordshire. However, in summary the county council is proposing the following:

- To adopt a leadership role in the management of flood risk in Hertfordshire.
- To work in partnership and collaborate with key partners and stakeholders in managing and reducing flood risk in the county.
- To build a robust knowledge base that is available to all in order to support flood risk management in Hertfordshire.
- To continue to build capacity amongst partners for dealing with and managing flood risk.
- To implement fully emerging responsibilities in relation to the management of flood risk structures and features including ordinary watercourses.
- To work with partners to secure the effective implementation of Sustainable Drainage Systems (SuDS) in new development.
- To support the provision of clear guidance to the development industry about its responsibilities in relation to the management of flooding and flood risk associated with new development.

9. Prioritising Risk in Hertfordshire

In order to better understand flood risk within Hertfordshire, further assessments of the areas at risk and the sources and extent of that flood risk will need to be completed. Recognising that some areas will have a greater level of flood risk than others, it will be necessary to prioritise the areas to be assessed.

Whilst Hertfordshire is at risk of flooding from a variety of sources, those associated with main rivers is well documented through the Environment Agency's own flood zone maps and the management of that risk is set out in the Catchment Flood Management Plans (CFMPs). Therefore any further assessment and collection of data undertaken by Hertfordshire County Council will focus on local sources of flood risk, with the opportunity for these two sources of information to be combined as part of future partnership projects. Further assessment will initially take place through the Surface Water Management Plan (SWMP) process.

Under the Flood Risk Regulations 2009, a Preliminary Flood Risk Assessment (PFRA) was required for all Lead Local Flood Authorities (LLFAs) to identify areas at risk of flooding from local sources. The national Flood Map for Surface Water (FMfSW) dataset is considered to be the most suitable dataset for consistent assessment across Hertfordshire, as it closely correlates with other technical studies undertaken.

The PFRA considered that the risk from ordinary watercourses and groundwater will be within the same areas as those recorded as being at risk from surface water, therefore the surface water maps are indicative of areas at risk from all local flood sources, see Map 5, Flood Map for Surface Water in Annex 1.

The FMfSW shows areas at surface water flood risk in most of Hertfordshire's major settlements. As part of the PFRA process kilometre grid squares above the following thresholds were identified on the map as areas at significant risk:

- 200 or more people affected and/or
- 1 or more critical services affected, including electricity and water and/or
- 20 or more non residential properties affected.

The number of people at risk was calculated using a multiplier based on the number of residential properties affected.

Table 4. Estimated Numbers of Properties at Risk of Surface Water Flooding in Hertfordshire by District

District	No. of Properties at Risk
Broxbourne	3,800
Dacorum	8,700
East Hertfordshire	7,000
Hertsmere	4,400
North Hertfordshire	7,400
St Albans	6,800
Stevenage	2,800
Three Rivers	4,400
Watford	4,300
Welwyn Hatfield	3,800
Hertfordshire total	**53,400**

Prioritising the areas to be assessed will be done by using the number of properties overall within each district at risk of surface water flooding, this can be found in Table 4 above. This is based on flooding to a depth of 0.3m in a 1 in 200 chance in any year event. Whilst the map of areas above the threshold is a valuable tool for indicating areas where properties at flood risk are concentrated, there are a number of areas which fall below the threshold which would be missed. This is particularly important in the context of Hertfordshire's mixed urban and rural setting to ensure that settlements that may not hold a significant number of properties but would be entirely flooded are appropriately assessed.

The district authority areas of Watford and St Albans have already been subject to further investigation works as part of the early Defra programme of SWMPs, as they include the settlements shown to be at highest risk within Hertfordshire.

It is intended that further SWMPs will be undertaken in order of the highest number of properties at risk. The SWMPs will focus on the settlements at risk within each district. It is proposed that the remaining district authority areas will be investigated in the following order:-

- Dacorum
- North Hertfordshire
- East Hertfordshire
- Broxbourne
- Hertsmere
- Three Rivers
- Welwyn Hatfield
- Stevenage

The programme for undertaking the SWMPs will be included the implementation plan for the strategy and the work will be funded by Hertfordshire County Council as the LLFA.

10. Understanding and Prioritising Funding for Projects

Funding will need to be sought from a variety of sources in order to deliver projects as government funding will be limited each year and is likely in many cases to be a contribution towards costs rather than full funding. So even where a scheme qualifies for national or regional funding it is likely that additional local funding will be required to facilitate projects going ahead. Many projects are likely to be developed through the flood risk partnership, with partners and organisations with relevant flood risk responsibilities or assets relating to the project engaged in the production of the scheme. Partnership working may also provide opportunities for reduction in costs through shared benefits.

Flood and Coastal Resilience Partnership Funding is part of the Environment Agency's overall capital allocation to provide Flood Defence Grant in Aid (FDGiA) up until the financial year 2014/15. The partnership funding approach is outcome focussed, providing funding in a formula based manner depending on benefits to households, other whole life benefits to businesses, agricultural productivity and infrastructure and environmental outcomes.

Funding is available for a variety of projects from substantial defences to property level protection, and can cover different types of sources of flooding providing the responsibility does not rest with water and sewerage companies who have alternative funding sources.

It is likely that most schemes will receive a percentage of the required funding, with other contributions needed at a regional or local level or cost savings made to ensure the project is fully funded and can proceed.

In addition the Regional Flood and Coastal Committees, of which Hertfordshire falls within the areas covered by the Thames and Anglian Central committees, collects an annual local levy to use for flood and coastal risk management within its area. The local levy is voted for and paid by local authorities covered by the committee area. The levy includes all the projects the committee wishes to fund or contribute to and is considered to be a local contribution. The local levy may be used to top up the funding for schemes which have been partially funded through FDGiA.

Beyond FDGiA and local levy, funding can be sought from a variety of sources. The Halcrow report for Defra on joint funding 'Local Flood Risk Management Schemes Phase 1' June 2011 includes a list of potential partners ranging from local authorities to developers and community groups and potential sources of funding ranging from Regional Growth Funds to private beneficiaries and Community Infrastructure Levy. Hertfordshire's flood risk partnership will need to determine how to prioritise schemes put forward, whether to focus on only developing schemes that will qualify to be fully funded or whether to supplement or seek contributions to partially funded schemes.

Local contributions are not mandatory and a decision can be taken by the partnership on whether to collect contributions. It will need to be decided how to raise the additional money, taking into account partners involved, those likely to benefit and

the ability to pay a contribution. The process for collecting local contributions can also be lengthy. However, the use of local contributions is likely to be considered favourably by other funding sources and allows a local influence on schemes which are taken forward - where there is the will to pay or local backing for a project.

In order to understand how best to prioritise local projects for funding within Hertfordshire, taking into account the formula for national funding and local levy, Hertfordshire County Council commissioned a study to develop a robust and evidence based methodology for local prioritisation. The methodology must aim to provide transparent and clear reasoning for the prioritisation and justification for the feasibility and viability of the project. Prioritisation of local projects is necessary as it must be recognised that taking into account all funding sources, it will still not be possible to fund all flood risk management projects identified.

Once potential projects have been identified in areas at risk of flooding from local sources, either through the Surface Water Management Plan (SWMP) process or through another technical study, the projects will be ranked initially by using the proposed criteria in Table 5 overleaf. The implementation of schemes that have been prioritised will depend on the availability of funding, which is likely to have to be drawn from a number of sources. Some funding may be restricted to a particular area of benefit or a specific community, but where there is discretion the criteria in Table 6 will be used to help determine which projects should benefit from local funding sources.

This prioritisation process will build up a picture over time of the most beneficial flood risk management projects within the highest risk areas, allowing Hertfordshire County Council and its partners to focus efforts on funding local projects. However it must be recognised that it is possible for projects to advance more quickly than the initial prioritisation if local funding becomes available which would ‘unlock’ a project’s potential for moving forward. In this way local communities and organisations could consider investing in raising local contributions as beneficiaries of a proposed scheme in order for it to be realised.

Based on the prioritisation methodology some pilot candidate schemes will be put forward for funding in order to test and verify the prioritisation criteria, and assist in understanding the funding processes.

Table 5. Proposed criteria for initial prioritisation of scheme development

Criteria Description	Low		Moderate		Significant		Maximum Score	Comments
	Count	Score	Count	Score	Count	Score		
No. of buildings in FMfSW (shallow) with 5m buffer	0-25	5	26-84	10	>84	15	15	Using the EA's criteria of identifying iFRAs, any flooding area which has more than 84 properties at risk (200 people / occupancy rate of 2.34) is considered significant.
No. of Critical Infrastructure (only Highly Vulnerable & Essential Infrastructure as per PPS25)	0	0	1	5	>1	10	10	Criteria used to ensure only the most important structures/infrastructure are counted (e.g. Ambulance stations, police stations, electrical substations, etc)
No. of Historic Flooding Incidents (including multiple events at 1 property)	0-10	5	10 to 50	20	>50	35	35	
No. of Partners Agreed as Priority Flooding Location	0	0	1 to 2	15	>2	20	20	
Funding	<50%	0	≥50%	5	100%	10	10	If Funding is already in place, score is significant. If some funding is in place but additional funding is required, score is moderate. If no funding is in place, score is low.
Deprivation	>40%	0	20-40%	5	<20%	10	10	Using National Statistics on deprived areas. If area is in the 20% most deprived areas, score is significant. If area is in the 20-40% most deprived the score is moderate. If the area is in the 60% least deprived the score is low.
						TOTAL	100	

Table 6. Proposed criteria for second stage prioritisation of scheme development

Criteria Description	Low		Moderate		Significant		Maximum Score	Comments
	Count	Score	Count	Score	Count	Score		
Cost/Benefit Ratio	<1	0	1 to 10	Count/10 *65	>10	65	65	Cost/Benefit Ratio is converted to a score between 0 and 65
Environment	Low	5	Moderate	10	Significant	20	20	Environmental Enhancement is assessed as Low, Moderate or Significant
Life Time Performance	Low	5	Moderate	2	Significant	0	5	On-going costs assessed as low, moderate or significant
Resilience	Low	0	Moderate	2	Significant	5	5	Over performance of scheme assessed as low, moderate or significant
Uncertainty	Low	0	Moderate	2	Significant	5	5	Potential to comply with increased standards assessed as low, moderate or significant
						TOTAL	100	

11. Communicating Understanding of Flood Risk

An important part of work to support the strategy will be effective communication to stakeholders and communities so that everyone understands the roles of respective organisations and the practical limitations on capacity to reduce risk. Planning communication requirements will be an integral part of the delivery of initiatives such as Surface Water Management Plans (SWMPs).

Communications will be based on the following principles.

- Ensure communities have enough information to effectively increase their resilience by participating in decision making and making the necessary preparations before floods occur so impacts can be reduced and they are better able to deal with events and subsequent recovery.
- A balance should be maintained between addressing issues of past floods and managing future risks, including adapting to climate change.
- Optimise existing communication activities being delivered by partners and explore opportunities for joint working, thereby securing efficiencies and savings
- Make sure that all audiences have a clear understanding of key messages, and how to access relevant information.

12. Reporting and Review

12.1 European and National Reporting and Review

Coordinating progress and managing flood risk will be reviewed through a number of reporting mechanisms. The European Floods Directive through the Flood Risk Regulations 2009 (FRR), Flood and Water Management Act 2010 (FWMA) and the Department for Communities and Local Government's Single Data List provide opportunities to demonstrate Hertfordshire's progress on Lead Local Flood Authority (LLFA) duties and powers.

12.2 Flood Risk Regulations 2009

As Hertfordshire does not have any Flood Risk Areas, no further reporting is required until the next cycle in 2016. Information gathered through the processes set out in the Strategy will be used to provide historic and future flood risk data in the next cycle.

12.3 Flood Water Management Act 2010

Section 18 of the FWMA requires the Environment Agency to report to the Minister on flood and coastal erosion risk management progress. The National Flood Risk

Management Strategy confirms that annual reporting will be undertaken, with more detailed reporting in line with the six year cycle outlined in the FRR.

Contributions are needed from LLFAs to complete a national picture of progress implementing new legislation, strategic planning such as Catchment Flood Management Plans (CFMPs) and Local Flood Risk Management Strategies and delivery of flood defence schemes. Progress indicators, such as production of a local strategy and development of a register of structures and features, will reflect the developing nature of flood and water management roles and therefore may change in future years so progress can continue to be appropriately reported. The first report is expected to be published in autumn 2012 and yearly thereafter.

The Department for Communities and Local Government produces the single data list which acts as a catalogue of the data that local authorities must provide to central government each year to report progress. The list covers aspects of all local authority responsibilities not just those relating to flood risk, and replaces the former performance related National Indicator sets. Flood risk data required includes progress on implementing the FRR and FWMA e.g. investigations undertaken and Sustainable Drainage Systems (SuDS) approval, numbers of flood risk management staff within local authorities, number of developments in the floodplain against Environment Agency advice, and properties at risk of flooding and those where flooding has been reduced or managed. Data is reported annually in March.

12.4 Local Arrangements for Reporting and Review

Hertfordshire County Council will be regularly reporting on indicators to the Environment Agency and Department for Communities and Local Government. (The indicators are listed in Annex 3). Progress on the Local Flood Risk Management Strategy will be reported annually as part of the process of reviewing and updating the annual work programmes.

The Flood Risk Partnership will need to review whether national indicators will be sufficient to monitor progress locally or whether more specific indicators should be developed.

Glossary

Acronym	Term	Explanation
	Aquifer	Layers of permeable rock which provide water storage - important for supporting water supply and/or river flows.
AStGF	Areas Susceptible to Ground Water	Mapping produced by the Environment Agency to show areas with a potential for groundwater emergence.
AStSW	Areas Susceptible to Surface Water	Mapping produced by the Environment Agency to provide broad areas where surface water flooding was likely to cause problems in three bands ranging from less susceptible to more susceptible to flooding. The methodology assumed that sewer and drainage systems were full and did not account for infiltration or the impacts of the location of buildings.
CFMP	Catchment Flood Management Plan	CFMPs assess flood risk from all sources across a river catchment area and establish flood risk management policies for those areas to assist in understanding flood risk within the catchment and delivering sustainable flood risk management in the long term.
	Climate Change	Long term variations in the climate of the earth including temperature, wind and rainfall patterns.
CLG	Department for Communities and Local Government	Government department responsible for policy and regulations supporting local government, communities and neighbourhoods
Defra	Department for Environment, Food and Rural Affairs	Government department responsible for policy and regulations on the environment, food and rural affairs.
	DG5 register	Records of property flooding from the drainage and sewer network collated and held by water companies.
EA	Environment Agency	A non-departmental public body responsible for protecting and improving the environment and promoting sustainable development.
	European Floods Directive	European Commission legislation which aims to provide a consistent approach to managing flood risk across Europe.
FAS	Flood Alleviation Scheme	A capital scheme to provide defences or storage for flood water to alleviate flooding within a surrounding area.
FCERM	Flood and Coastal Erosion Risk Management	Measures including strategies, policies and schemes designed to manage flood and coastal erosion risk at a national, regional or local scale. Also referred to as FRM - Flood Risk Management.
FDGiA	Flood Defence Grant in Aid	Part of the Environment Agency's overall capital allocation to invest in flood risk management schemes.
FMfSW	Flood Map for Surface Water	Mapping produced by the Environment Agency to provide broad areas where surface water flooding was likely to cause problems based on two different chances of rainfall and displayed in two bands- surface water flooding and deep surface water flooding. The methodology assumed an allowance for infiltration and a national average drainage capacity, and mapped building locations.
	Flood Risk Area	An area where there is a significant risk of flooding from local flood risk sources including surface water, ground water and ordinary watercourses, identified using guidance produced by Defra as areas where a 'cluster' of square kilometres affected by flood risk holds in excess of 30,000 people.

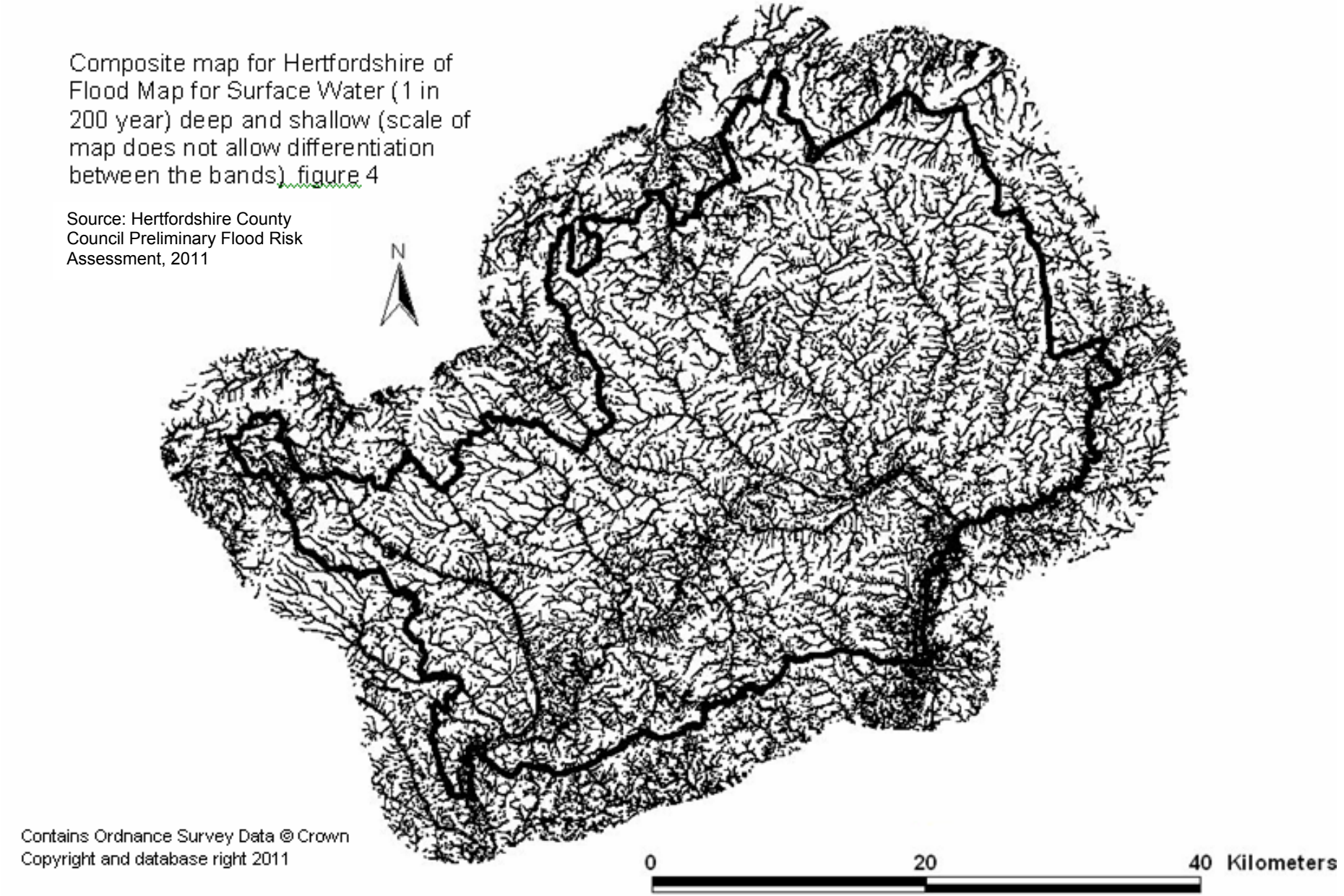
Acronym	Term	Explanation
FRR	Flood Risk Regulations 2009	UK regulations implementing the requirements of the European Floods Directive which aims to provide a consistent approach to managing flood risk across Europe, based on a six year cycle of assessment and planning.
FWMA	Flood and Water Management Act 2010	UK legislation which sets out the roles and responsibilities for flood and coastal erosion risk management in England, in response to the Pitt review of the 2007 floods.
	Flood Zone 3	This zone comprises land assessed as having a 1 in 100 (>1%) or greater chance in any year of fluvial flooding.
	Flood Zone 2	This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 (1% – 0.1%) chance in any year of fluvial flooding.
	Fluvial	Relating to rivers or streams (compare with entry for pluvial below). Generally used to describe flooding from main rivers – fluvial flooding.
	Fluvial Flooding	Flooding where water in a river exceeds the capacity of the river banks and spills into the surrounding area.
	Groundwater Flooding	Flooding where water stored underground rises above the surface of the land level in areas which are not channels or drainage pathways.
iFRAs	Indicative Flood Risk Area	Areas identified by the EA as part of PFRA development where more than 30,000 people are at risk of flooding (built up from clusters of 1km squares where at least 200 are potentially at risk of significant surface water flooding).
HCC	Hertfordshire County Council	The County Council, and Lead Local Flood Authority for Hertfordshire.
HRF	Hertfordshire Resilience Forum	A forum bringing together organisations which have a duty to co-operate under the Civil Contingencies Act, and those who respond to emergencies, to prepare an emergency plan.
LFRMS	Local Flood Risk Management Strategy	The local strategy for a LLFA to identify the various flood risk management functions of different authorities and organisations, assess local flood risk, produce objectives and measures for managing flood risk, the costs and benefits of those measures and how they will be implemented, and contributions to wider environmental objectives.
LLFA	Lead Local Flood Authority	A county or unitary authority responsible for taking the lead on local flood risk management matters
	Local levy	Annual levy collected from local authorities by the Regional Flood and Coastal Committee to fund flood and coastal erosion risk management within its area.
	Main river	
NFRMS	National Flood Risk Management Strategy	The national strategy for England developed by the Environment Agency to identify the various flood risk management functions of different authorities and organisations, objectives and measures for managing flood risk, the costs and benefits of those measures and how they will be implemented, impacts of climate change and contributions to wider environmental objectives.

Acronym	Term	Explanation
NPPF	National Planning Policy Framework	The new national planning regime. See entry on PPS25 below for an explanation of the relevance to this Strategy.
	Ordinary watercourse	A stream, ditch, cut, sluice or non-public sewer which is not classified as a main river.
PFRA	Preliminary Flood Risk Assessment	An assessment under the FRR which assesses significant historic and future flood risks within an area, identifying significant flood risk areas and providing information on flooding for reporting to the European Commission.
	Pluvial	Relating to rain (compare with entry for fluvial above). Generally used to describe surface water flooding – pluvial flooding.
PPS25	Planning Policy Statement 25	Guidance on how flood risk should be covered in planning policy and development control. Although superseded by the National Planning Policy Framework the principles are likely to be carried through in local plans and related guidance.
RFCC	Regional Flood and Coastal Committee	Committees established by the Environment Agency consisting of members representing LLFAs and independent members, who ensure that there are plans for identifying and managing flood risk across catchments, promote investment in flood and coastal erosion risk management and provide a link between risk management authorities and other relevant bodies.
RMA	Risk Management Authority	As defined under the Flood and Water Management Act as LLFAs, the Environment Agency, District councils where there is no unitary authority, internal drainage boards, water companies and highways authorities.
	Single Data List	A list of all the data returns that central government expects from local government - it replaces the previous National Indicator Set and consolidates other requirements.
SFRA	Strategic Flood Risk Assessment (Level 1 and Level 2)	An assessment providing information on areas at risk from all sources of flooding, used to provide an evidence base for flood risk and planning decisions.
	Surface water flooding	Flooding where rainwater collects on the surface of the ground due to soil being saturated or drainage and watercourses in the area are full to capacity or not accessible by the rainwater due to land levels.
SWMP	Surface Water Management Plan	A plan which assesses surface water flooding within a given area and outlines the preferred approach to managing that risk. The plan is undertaken in consultation with key partners who are responsible for flood risk management and drainage in that area. The plan should influence future resources; emergency and land use planning and identify areas where flood alleviation works may be required.
	Sustainable Development	Development undertaken in a sustainable manner to ensure that the needs of the current generation do not adversely impact the lives of future generations, improving and enhancing the area concerned.
SuDS	Sustainable Drainage Systems	Methods for draining and storing surface water in a sustainable way, designed to mimic natural drainage processes as far as possible, providing multiple environmental benefits.

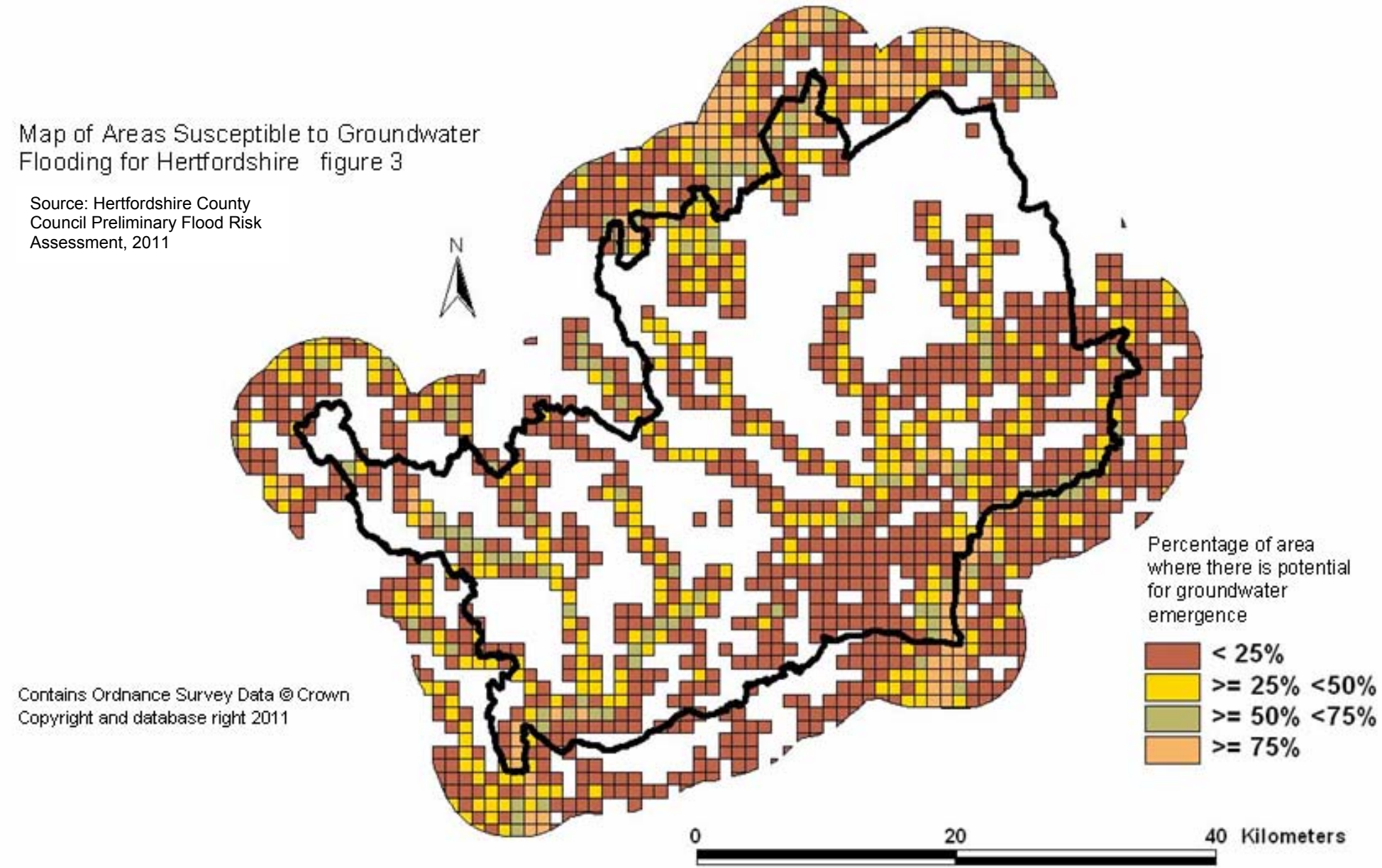
Annex 1 Maps

Map 1. Extent of Flood Map for Surface Water in Hertfordshire
Map 2. Areas Susceptible to Groundwater Flooding for Hertfordshire
Map 3. Extent of Flood Zone 2 in Hertfordshire
Map 4. Extent of Flood Risk Zone 3 in Hertfordshire
Map 5. Flood Map for Surface Water- sq/km where the threshold of people/ properties at risk is exceeded

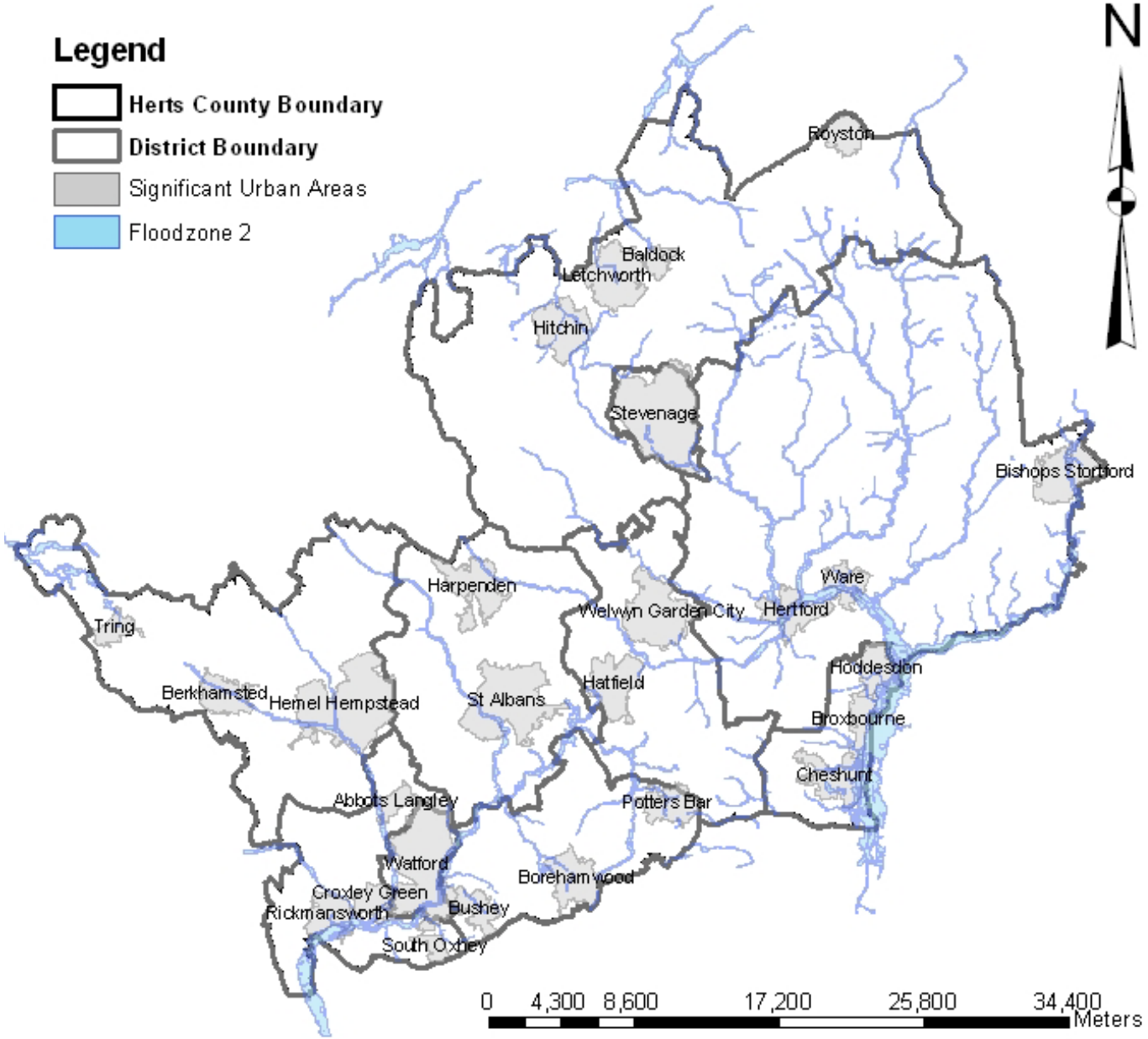
Map 1. Extent of Flood Map for Surface Water in Hertfordshire



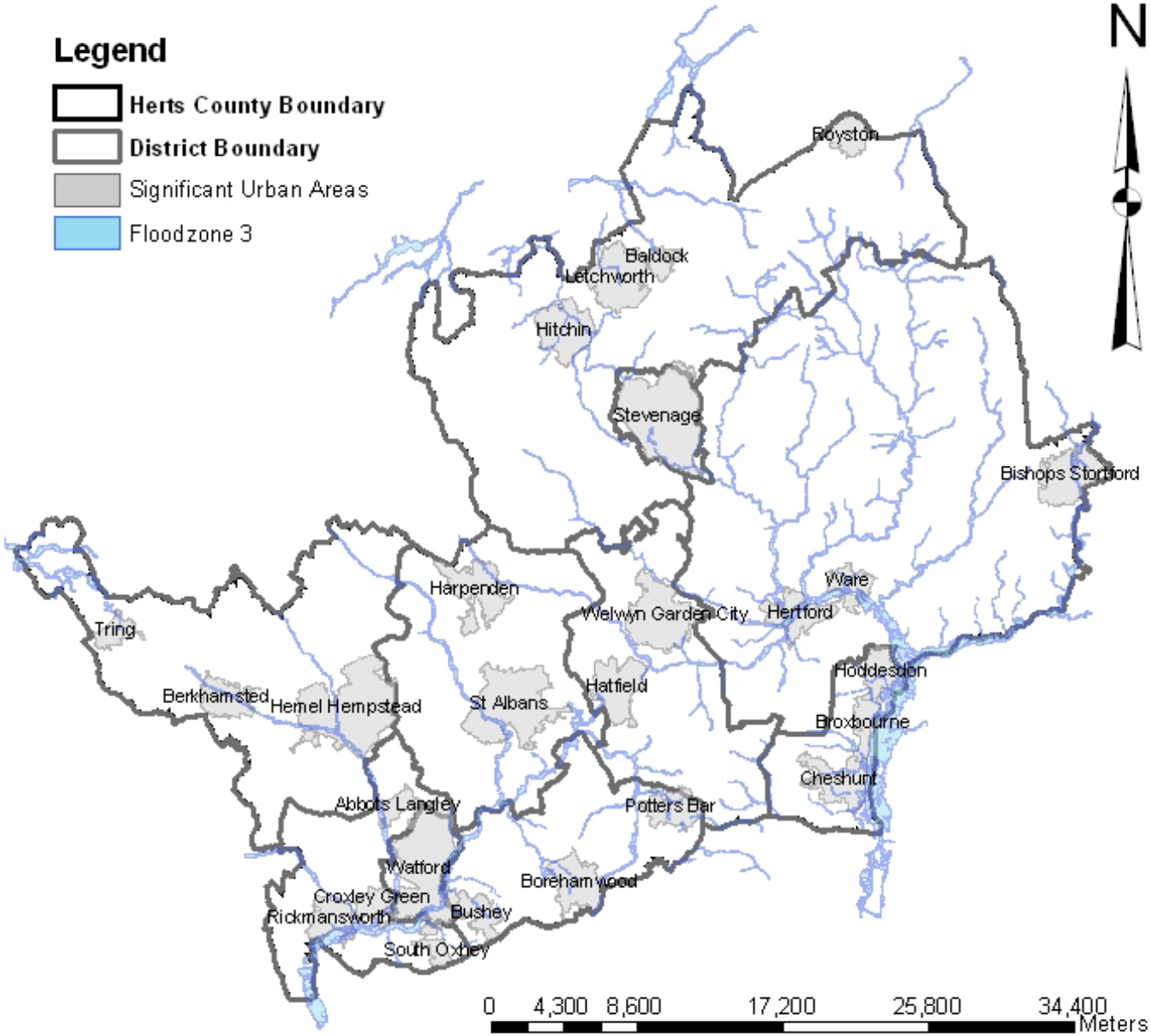
Map 2. Areas Susceptible to Groundwater Flooding for Hertfordshire



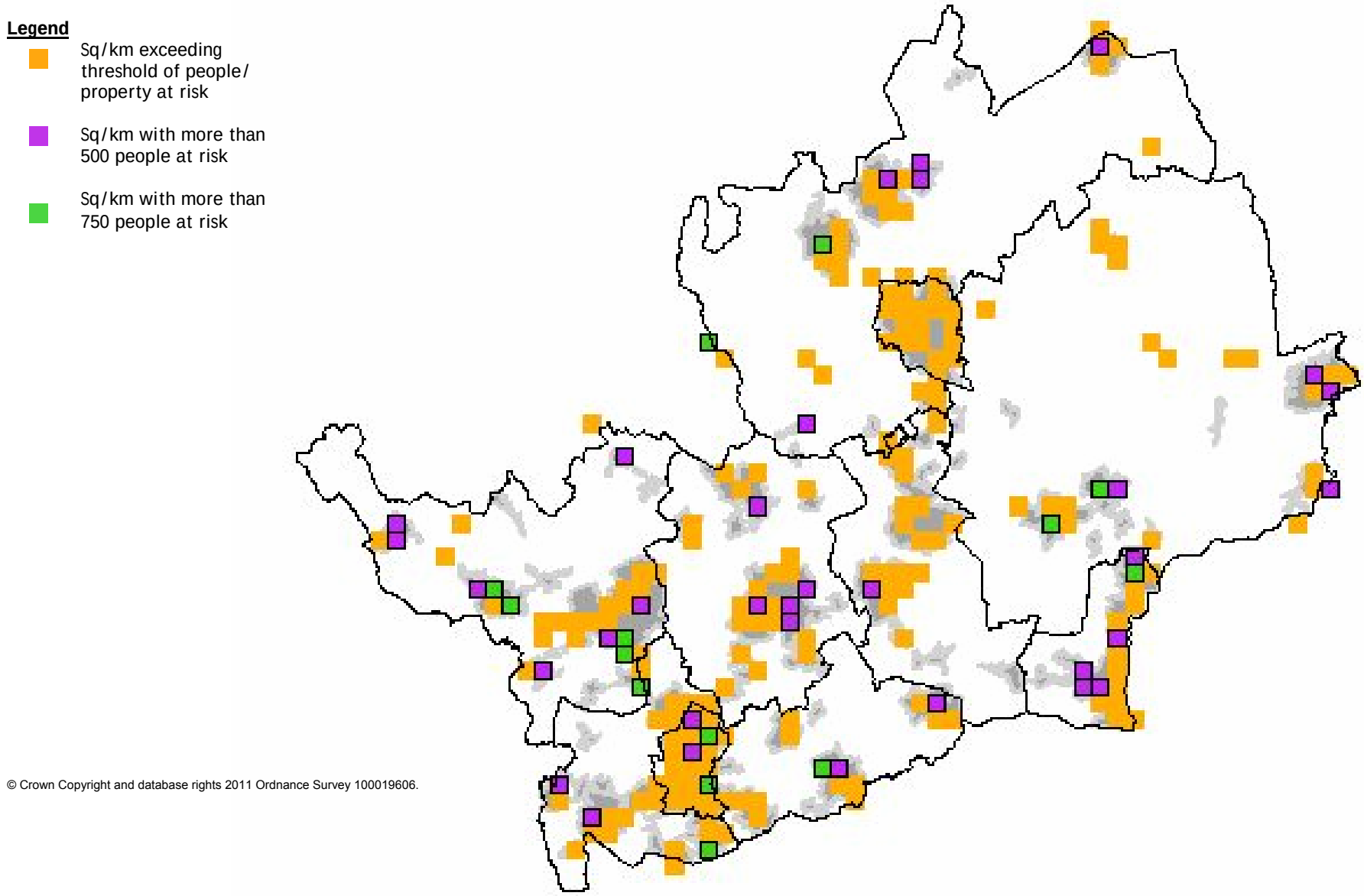
Map 3. Extent of Flood Zone 2 in Hertfordshire



Map 4. Extent of Flood Risk Zone 3 in Hertfordshire



Map 5. Flood Map for Surface Water- sq/km where the Preliminary Flood Risk Assessment "Blue Square" Thresholds of Number of People at Potential Risk from Surface Water Flooding is Exceeded



Annex 2. Responsibilities of Risk Management Authorities

A2.1 Hertfordshire County Council

Hertfordshire County Council as the Lead Local Flood Authority (LLFA) has an important role to play as the strategic leader for local flood risk management in Hertfordshire. This involves developing this Local Flood Risk Management Strategy document, ensuring that all organisations involved in flood risk management are aware of their responsibilities, monitoring progress and activity by all parties involved in flood risk management and co-ordinating communication with the public and between organisations.

As LLFA the county council has a range of duties which includes:

- Preparing reports and plans to meet the requirements of the Flood Risk Regulations 2009 (FRR).
- Carrying out investigations of flooding where appropriate and publishing reports.
- Keeping a public register and associated record of structures and features which have a significant effect on local flood risk.
- Designation of structures and features where appropriate.
- Regulation of ordinary watercourses outside of areas covered by Internal Drainage Boards.
- Establishment of a Sustainable Drainage Systems (SuDS) Approval Body (SAB).

In addition the authority has incidental powers which allow it to carry out practical works to manage flood risk from surface water and groundwater.

Hertfordshire County Council also has a number of other roles that relate to flood risk management; these include:

- Highways Authority – management of the majority of roads in the county and their associated drainage.
- Planning Authority - the county council is the planning authority for minerals and waste development together with its own projects e.g. school sites. The authority produces a Strategic Flood Risk Assessment (SFRA) to support the Minerals and Waste Plan.
- Emergency Planning – the authority is a category one responder under the civil contingencies act and the role is set out in the Multi Agency Flood Plan.
- Historical and Natural Environment - maintenance of databases which are shared with other authorities. The information is relevant to planning of practical works and assessing of potential for environmental impacts.

A2.2 Environment Agency

The Environment Agency has a role in flood risk management both as a national strategic body and also more locally operating as a Risk Management Authority (RMA) at a catchment and area level. Aspects of the strategic role that are relevant to the Local Flood Risk Management Strategy are:

- Using strategic plans like the Catchment Flood Management Plan (CFMP) and the Shoreline Management Plan to set the direction for Flood Risk Management.
- Collation and review of the assessments, plans and maps that LLFAs produce to meet the Flood Risk Regulations 2009.
- Providing the data, information and tools to inform government policy and aid risk management authorities in delivering their responsibilities.
- Supporting collaboration, knowledge-building and sharing of good practice including provision of capacity-building schemes such as trainee schemes and officer training.
- Managing the Regional Flood and Coastal Committees (RFCCs) and supporting their decisions in allocating funding for flood defence and flood resilience schemes.
- Monitoring activity and reporting on flood and coastal erosion risk management.
- Providing grants to RMAs to support the implementation of their incidental flooding or environmental powers.

The Environment Agency's local role as an RMA is relevant in the following areas:

- Managing flooding from main rivers and reservoirs.
- Communication about flood risk warnings to the public, the media and to partner organisations.
- Supporting communities to be flood resilient through sharing best practice and provision of information.
- Advising on the planning process.
- Emergency planning, multi-agency flood plans, which are developed by local resilience forums.
- Bringing forward flood defence schemes through the RFCCs, working with LLFAs and local communities to shape schemes which respond to local priorities.

A2.3 District and Borough Councils

Have a flood risk management function relating to ordinary watercourses and in addition have a range of functions which are relevant to the Local Flood Risk Management Strategy:

- As planning authorities, the district councils prepare a local plan to guide development. Flood risk is taken into account based on a SFRA which must consider flood risk from all forms of flooding.

- Under the Flood and Water Management Act 2010 (FWMA), district councils have the powers to carry out works on ordinary watercourses to reduce flood risk.
- Activity relating to powers under the Land Drainage Act 1991 to make bylaws relating to ordinary watercourses
- District authorities own and manage public spaces which, may already, and could potentially perform a flood risk management function
- District authorities have responsibilities for emergency planning as a responder under the Civil Contingencies Act and this role is outlined in the Multi Agency Flood Plan.

A2.4 Internal Drainage Boards

In addition to the universal responsibilities under the FWMA, Internal Drainage Boards (IDBs) have the following new responsibilities and responsibilities:

- Power to designate structures and features that affect flooding.
- Duty to act consistently with local and national strategies.
- Regulation of ordinary watercourses within the IDB district.
- Statutory consultees to the SuDS approval process where proposed drainage systems will involve discharge of water into an ordinary watercourse in an IDB's district.

A2.5 Water Companies

There are two types of water companies serving Hertfordshire. Affinity Water Central is a water supply company, while Anglian Water and Thames Water are water and sewerage companies providing both water supply and wastewater services.

Water Supply Companies

Water supply companies are not RMAs and do not have the same obligations to co-operate and be subject to scrutiny by LLFA committees. However, like all persons, they will be required to provide information related to flood risk to Hertfordshire County Council and the Environment Agency. They will also be affected by the change to the Reservoirs Act 1975 which has been amended to state the following:

Water and Sewerage Companies

Water and sewerage companies have the following responsibilities around flood risk management:

- Respond to flooding incidents involving their assets.
- Maintenance of a register of properties at risk of flooding due to a hydraulic overload in the sewerage network (DG5 register).
- Undertake capacity improvements to alleviate sewer flooding problems on the DG5 register.

- Provide, maintain and operate systems of public sewers and works for the purpose of effectually draining an area.
- Have a duty to co-operate with other relevant authorities in the exercise of their flood and coastal erosion risk management functions.
- Must have a regard to national and local flood and coastal erosion risk management strategies.
- May be subject to scrutiny from LLFAs' democratic processes.
- Have a duty for the adoption of private sewers.
- Statutory consultee to the SAB when the drainage system is proposed to communicate with the public sewer.

A2.6 Highways Agency

The Highways Agency is an Executive Agency of the Department for Transport (DfT), and is responsible for operating, maintaining and improving the strategic road network in England on behalf of the Secretary of State for Transport. It acts as the Highways Authority for a number of major highways in Hertfordshire and is responsible for the maintenance of the following motorways and trunk roads in Hertfordshire:

- M1 - Junction 4 – Junction 10.
- M25 - Junction 16 – Herts /Essex border (managed by Connect Plus).
- A1(M) - Junction 1 – Junction 10.
- A5 - M1 Junction 9 – Bedfordshire Border.
- A414 from the M1 Junction 8 to A405 at St. Albans.

The M25 is in the Highways Agency's Area 5 the other roads are in Area 8.

As a Highways Authority, the Highways Agency has the same obligation to co-operate on flood risk issues as the other RMAs. It also has the following responsibilities under other legislation:

- Responsibility to maintain the highways which includes ensuring that highway drainage systems are clear and that blockages on the highway are cleared, where reasonably practicable.
- Powers to deliver works considered necessary to protect the highway from flooding.
- Highway Authorities may divert parts of a watercourse or carry out any other works on any form of watercourse if it is necessary for the construction, improvement or alteration of the highway or provides a new means of access to any premises from a highway.
- Adoption of SuDS on its property as the SuDS Approval Body (SAB) has no obligation to adopt any part of a drainage system which is a publicly-maintained road. If it is on a Highways Agency road, the Highways Agency is expected to adopt and maintain the part of the drainage system on its property in accordance with the approved proposals and the National Standards for sustainable drainage.

Annex 3. Responsibilities of Other LFRMS Stakeholders

A3.1 Businesses and Local Households

Property Owners and Residents

It is the responsibility of householders and businesses to look after their property, including protecting it from flooding. While in some circumstances other organisations or property owners may be liable due to neglect of their own responsibilities, there will be many occasions when flooding occurs despite all parties meeting their responsibilities. Consequently it is important that householders, whose homes are at risk of flooding, take steps to ensure that their house is protected.

Riparian Owners

Householders or businesses whose property is adjacent to a river or stream or ditch are likely to be riparian owners with responsibilities. If your property backs out onto a river or stream then you are likely to be a riparian owner and own the land up to the centre of the watercourse. Your land registry details should confirm this but you may need to discuss it with the local authority to ensure it matches their details.

Riparian owners have a right to protect their property from flooding and erosion but in most cases will need to discuss the method of doing this with the Environment Agency. They also have responsibility for maintaining the bed and banks of the watercourse and ensuring there is no obstruction, diversion or pollution to the flow of the watercourse. Full details can be found in the EA document ‘Living on the edge’

http://publications.environment-agency.gov.uk/dispay.php?name=GEHO0407BMFL-E-E

A3.2 Utility and Infrastructure Providers

Utility and infrastructure providers such as Network Rail, British Waterways, energy companies and telecommunication companies are not risk management authorities (RMAs). However they have a crucial role to play in flood risk management as their assets can be important consideration in planning for flooding. Moreover they may have assets such as culverts which it is important to share with flood RMAs.

They already maintain plans for the future development and maintenance of the services they provide and it is important that they factor in flood risk management issues into this planning process. This will ensure that their assets and systems are resilient to flood and coastal risks and that the required level of service can be maintained in the event of an incident.

A3.3 Parish Councils and Communities

Communities have vital knowledge about the history of flooding in their areas and can make important contributions to helping manage the levels of flood risk and also by helping residents to be aware of and manage the risk to their household

Parish Councils and community groups in areas which suffer from local flooding should record and report flooding incidents when they occur.

Most flood defence and flood resilience projects, particularly in small communities, will require some local funding to supplement that provided by national government if the project is to go ahead.

Parish Councils can use general power of competency look to raise funds through council tax precept or through other local commitments to raise the funds. They can also look to see in what way local residents can contribute to ensure that the price of work is kept low, and hence residents have to pay less. This may be enlisting residents who have training as surveyors or residents with the equipment to do some of the work, such as clearing ditches.

Annex 4. National Flood Risk Indicators

080-00	**Flood and coastal erosion risk management and sustainable drainage systems**		**DEFRA**	**annual**	**Upper tier & single tier**	**Hertfordshire Report 2011 /12**
080-08	Flood and coastal erosion risk management and sustainable drainage systems	Reporting in relation to implementing the Flood and Water Management Act 2010 (FWMA)	DEFRA	annual	Upper tier & single tier	Strategy in progress Register in progress
080-01	Flood and coastal erosion risk management and sustainable drainage systems	Number of local authority investigations carried out and published under S19	DEFRA	annual	Upper tier & single tier	None
080-03	Flood and coastal erosion risk management and sustainable drainage systems	Number of applications made to the SAB and number of approved applications.	DEFRA	annual	Upper tier & single tier	Not yet required
080-04	Flood and coastal erosion risk management and sustainable drainage systems	The number of properties for each approved SuDS application.	DEFRA	annual	Upper tier & single tier	Not yet required
080-05	Flood and coastal erosion risk management and sustainable drainage systems	The number of SuDS approved by the SAB, which have been designated under Schedule 1 but are not adopted, by property type	DEFRA	annual	Upper tier & single tier	Not yet required

080-06	Flood and coastal erosion risk management and sustainable drainage systems	The number of SuDS adopted by the SAB, which have been designated under Schedule 1, by property type	DEFRA	annual	Upper tier & single tier	Not yet required
080-07	Flood and coastal erosion risk management and sustainable drainage systems	The number of SuDS adopted by the SAB, which are located on public land (and therefore not designated under Schedule 1), for each type	DEFRA	annual	Upper tier & single tier	Not yet required
243-00	**Developments in flood risk areas**		**DEFRA**	**annual**	**Single tier & lower tier**	**Number of developments in flood risk areas**
243-01	Developments in flood risk areas	Number of developments in flood risk areas against Environment Agency advice (number of units)	DEFRA	annual	Single tier & lower tier	Reported by district councils
244-00	**Flood risk management capacity**		**DEFRA/EA**	**annual**	**All local authorities**	**Staff employed on flood risk management**
244-01	Flood risk management capacity	Number of staff employed on FRM activity (by number and role) - e.g. capacity	DEFRA/EA	annual	All local authorities	Not yet required
245-00	**Strategic Overview of Flood and Coastal Erosion risk**		**DEFRA/EA**	**annual**	**Upper tier & single tier**	**Properties at risk of flooding, or where flood risk has been reduced or managed**
245-01	Strategic Overview of Flood and Coastal Erosion risk	Number of properties estimated to be at risk from local flooding sources.	DEFRA/EA	annual	Upper tier & single tier	Not yet required

245-02	Strategic Overview of Flood and Coastal Erosion risk	Number of properties where flood risk has been reduced/managed	DEFRA/EA	annual	Upper tier & single tier	Not yet required
246-00	**Reporting on EU flood risk regulations**		**DEFRA/EA**	**every 6 years**	**Upper tier & single tier**	**Preliminary Flood Risk Assessment**
246-01	Reporting on EU flood risk regulations	Preliminary Flood Risk Assessment	DEFRA/EA	every 6 years	Upper tier & single tier	Completed

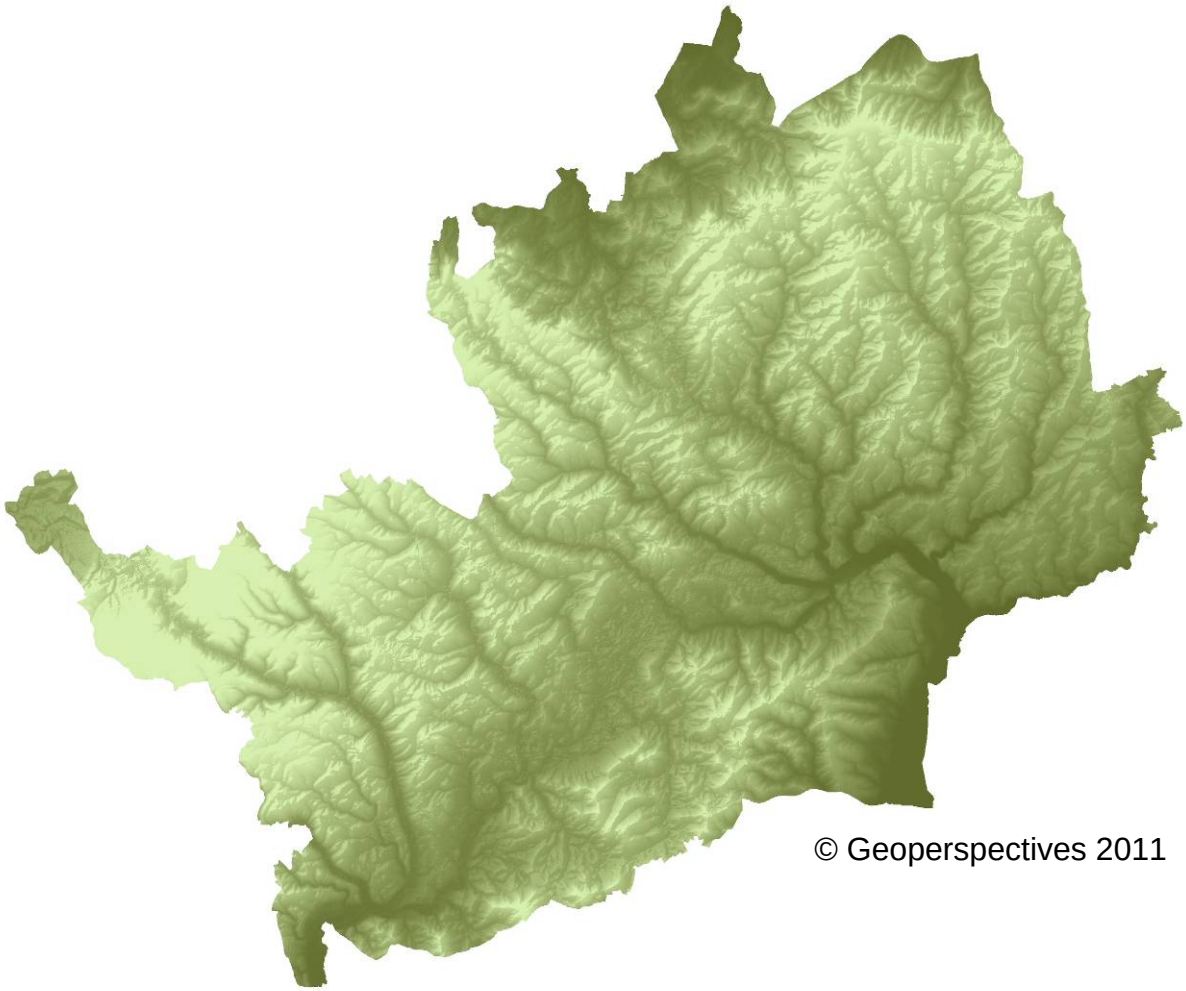
Below N/A in Herts until next Reporting round 2016 onwards

247-00	**Reporting on EU Flood Risk Regulations (2013)**		**DEFRA/EA**	**every 6 years**	**Upper tier & single tier**	**Flood risk and hazard maps**
247-01	Reporting on EU Flood Risk Regulations (2013)	Flood Risk and Hazard Maps for their “Flood Risk Areas”	DEFRA/EA	every 6 years	Upper tier & single tier	Not required
248-00	**Reporting on EU Flood Risk Regulations (2015)**		**DEFRA/EA**	**every 6 years**	**Upper tier & single tier**	**Flood risk management plans**
248-01	Reporting on EU Flood Risk Regulations (2015)	Flood Risk Management Plans for their “Flood Risk Areas”	DEFRA/EA	every 6 years	Upper tier & single tier	Not required

LOCAL FLOOD RISK MANAGEMENT STRATEGY FOR HERTFORDSHIRE 2013 - 2016

POLICIES AND PROCEDURES

Part 2 of 4



Hertfordshire

Contents

1. Introduction

Policies and procedures related to the Lead Local Flood Authority (LLFA) role and Local Flood Risk Management Strategy are set out in this part of the Strategy document. These areas will be revised as required during the life of the Strategy; this will be as a result of anticipated developments in legislation and service development.

The Strategy is required to define what "locally significant flood risk" is in Hertfordshire, however there can be no simple single definition of what constitutes significant flooding. Measures such as magnitude, impact, frequency, duration or exceeding of a threshold could all be used individually or in combination to describe the significance of a flood event.

Evaluation of significance depends on context and may vary between organisations and individual perceptions. A householder who has been flooded would certainly see the event as significant however in terms of allocating limited resources, a single domestic property will need to be assessed in the context of the 53,000 properties, approximately 10% of Hertfordshire's housing stock, in areas with a potential risk of significant flooding due to surface water runoff.

Significance can be described using a variety of measures which could include value or potential value of damage due to flooding, number of people directly affected, number of people indirectly affected through infrastructure failure or disruption of transport networks and factors such as pollution or other environmental impacts.

Linked to significance is the need to develop thresholds to define events such as flooding incidents or the inclusion of structures and features on the local register. These thresholds will be used to trigger actions as well as providing a methodology for the prioritisation of areas where flood risk management work will be carried out. The determination of appropriate thresholds will take account of two main considerations; firstly the degree of judgement and discretion that the LLFA has to apply its powers in relation to the activity being considered and secondly, the practical limitations of capacity and resources to undertake the required actions.

Hertfordshire County Council's LLFA role and flood risk management functions will operate under the general governance, standards and policies of the authority. This will cover generic areas of activity such as procurement and principles of enforcement. Such principles will be adopted as part of normal operations so will not be duplicated in this document.

The broad principles of how the LLFA role generally and specific requirements of legislation will be carried out are covered in the first section "Policies". They are not anticipated to change during the life of the Strategy and will be reviewed when developing the next Strategy.

Set out in the second section are more detailed guidelines, collectively described as "Procedures", for the way in which services will be delivered.

This will cover a range of service standards, systems for prioritisation, protocols and other criteria on which operational decisions will be made. Changes are anticipated within the life of the Strategy and updates will be added as the remaining legislation is commenced and in the light of experience.

2. Policies of the Lead Local Flood Authority

POLICY 1 Role of the Lead Local Flood Authority

The county council will seek to develop an inclusive and collaborative approach to the sustainable management of local flood risk in Hertfordshire through:

- providing leadership and local coordination;
- a proportionate and risk based approach;
- community focus;
- working in partnership locally and more widely as appropriate;
- publication of criteria on which decisions are based;
- where possible making information freely available;
- promoting opportunities for additional benefits linked to flood risk management;
- actively seeking resources and funding for management of flood risk;
- developing prioritised programmes.

POLICY 2 Investigation and Reporting of Flood Events

Flood events reported to the county council will be recorded and where necessary appropriately investigated in line with the criteria set out in the procedure “Recording and Investigation of Flood Events”.

The content of and requirement to publish formal investigations is set out under section 19 of the Flood and Water Management 2010 (FWMA). Such investigations provide a basic overview of a flooding incident and the need to carry it out is not required in all circumstances. The decision to carry out more detailed investigations will need to be proportionate to the incident and further prioritised as the capacity to carry out non statutory investigations will be limited by the availability of resources.

POLICY 3 Register of Structures and Features

Any structure or feature that has a significant effect on local flood risk will be placed on the public register. The determination of structures and features to be placed on the register will be made by the LLFA in consultation with the relevant Risk Management Authorities (RMAs) and the structure or feature’s owner.

POLICY 4 Designation of Structures and Features

Hertfordshire County Council will work with the RMAs to develop and keep under review criteria and a protocol for the designation of third party structures and features which are deemed to have a significant effect on local flood risk.

Powers are held by Hertfordshire County Council, the Environment Agency, district authorities and the Internal Drainage Board to designate structures and features which have a significant impact on the aspect of flood risk that they manage. Structures and features that might be designated would already be on the register and the decision to designate them would be a precautionary measure to guard against inadvertent removal or alteration that might have a negative effect on flood risk. There are a range of conditions which must be met before designation and it is anticipated that the powers will only be used very rarely. There may be other legislation such as sections 23 and 24 of the Land Drainage Act 1991 which will help prevent unconsidered alterations to structures and features (in this specific example on ordinary watercourses).

POLICY 5 Consenting and Enforcement Activities Relating to Ordinary Watercourses

The county council will operate a risk based approach to the consenting and enforcement activities relating to ordinary watercourses. Where required activity will be coordinated with:

- district councils as they have statutory functions relating to development control and management of ordinary watercourses;
- the Environment Agency as they have statutory functions relating to pollution and water resources and they must be consulted on any proposals for work on ordinary watercourses that would otherwise require consent and is undertaken directly by the county council;
- Natural England as they have statutory functions relating to species, habitats and protected sites;
- other relevant bodies where there are consequences for regulated functions such as highways and the historic environment.

POLICY 6 Sustainable Drainage Systems Approval Body

On commencement of Schedule 3 of the FWMA Hertfordshire County Council as LLFA will be required to determine the arrangements for surface water drainage schemes linked to new development. When setting up the guidelines under which the Sustainable Drainage Systems (SuDS) Approval Body (SAB) will operate, Hertfordshire County Council will work with the district planning authorities to ensure that any relevant SuDS will, in addition to meeting the requirements under the National Standards, as far as it practically possible, make a contribution to local amenity and environment appropriate to the locality in Hertfordshire.

3. Procedures of the Lead Local Flood Authority

PROCEDURE 1 The Role of the County Council as Lead Local Flood Authority

This procedure is linked to all aspects of the strategy document, but particularly to Policy 1, in terms of context and overall approach.

Clarification on the LLFA role and new development:

The county council is the planning authority for its own development and that relating to waste and minerals permissions. Other development is determined by the district authorities and the overall framework is set through the local plans that they are required to produce.

The local plans and the areas of planning which the county council is responsible for must be consistent with the National Planning Policy Framework which requires that:

> *"Local Plans must be supported by strategic flood risk assessment and develop policies to manage flood risk, taking account of advice from the Environment Agency."*

And also outlines when flood risk assessments must be carried out:

> *"A site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1 and all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3 and Critical Drainage Areas, and also where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding."*

The strategy has the aim that there should be no increase in flood risk arising from new development (as development should be appropriately located and take account of climate change). To promote this the county council will complement the requirements above by improving the information base on local flood risk to support the production of strategic flood risk assessments and ensuring local flood risk is appropriately considered in local plans.

The support for this function will be improved once the SAB is established and there is greater understanding of the surface water drainage implications of new development.

PROCEDURE 2 Recording and Investigation of Flooding Events

This procedure is linked to Policy 2.

All significant flooding events notified to the LLFA will be recorded. Significant in this context means an event that would potentially require an investigation applying the criteria below. The initial details may be taken by another organisation that should pass on sufficient information to allow the notification to be followed up if necessary.

The LLFA will notify the appropriate RMA which should then gather relevant information about the flooding event. If the LLFA is the relevant RMA to assess the source of flooding or there is no obvious RMA the LLFA will consider carrying out an appropriate investigation into the causes and reasons for the flooding. The results of the investigation will be published and added to the flood risk database which will be publicly accessible via the web. This will be the LLFA's preferred approach to making this information available to the wider public.

Investigation of flooding events will be carried out:

- In situations where there is uncertainty as to the source of flooding and the organisation with primary responsibility for resolving it. (To satisfy the requirement of Clause 19 (1) (a) of the FWMA to identify which RMAs have relevant flood risk management functions and identify whether each of those RMAs has exercised, or is proposing to exercise, those functions in response to the flood.)
- All cases of internal domestic flooding will be recorded and a basic investigation carried out.

It is proposed that the criteria to be considered in assessing whether a detailed investigation is required should be as follows:

- In the case where internal flooding has occurred at a property on more than one occasion in a ten year period. (Repeat flooding can cause residents extreme hardship and if flooding has occurred on more than one occasion efforts will need to be made to see whether assistance with provision of flood resistance measures, for instance, might be beneficial.)
- Where internal flooding of five or more properties has occurred during one flooding incident. (The flooding of five or more properties is generally regarded as indicating a level of significance of a flooding event and this should give rise to an investigation.)
- Where internal flooding of a business property has occurred during one flooding incident. (The flooding of two or more business properties is generally regarded as indicating flooding significance but also the repetition of un-investigated flooding of business property generally could give rise to possible challenge from insurers. Also, flooding of business property is likely to give rise to greater financial implications and increased disruption if continuity of business operations is affected by the flooding. It was therefore thought prudent for investigations to be carried out in every situation where internal flooding of business property has taken place.)

- Where external flooding of land adjacent to a property has occurred more than five times in a 10 year period. (While external flooding is not as disruptive as internal flooding, the continued vulnerability of property to external flooding would give rise to a reduction in property value and increased hardship for residents/business owners.)
- Where a critical service has been affected by flooding. (If a critical service such as a hospital or sewage treatment works has been affected by flooding then there would be an urgent need to carry out an investigation to minimise the risk of, and to mitigate against, further flooding.)
- Where roads (excluding fords) and railways have been impassable for in excess of 10 hours.
- Where flooding potentially posed immediate, direct and real risk to life. (An investigation will need to be undertaken in any circumstances where there has been a risk to life.)

PROCEDURE 3 Significance of Structures and Features

This procedure is linked to Policy 3.

A definition of significant is needed specifically in relation to the LLFA duty to establish and maintain a register of structures, or features, which may significantly affect flood risk in the county.

The evaluation of significance will be based on risk which is usually calculated from the likelihood of something happening in combination with the severity of the consequences. So the risk of a smaller number of properties potentially flooding relatively frequently may be comparable with a greater number of properties which have the potential to be flooded only rarely. In simple terms if the probability of an area flooding and affecting 10 houses was 10% in any one year and the probability of another area flooding and affecting 100 houses was 1% in any one year the two areas would have broadly the same level of risk. In terms of the significance of structures, where failure of a structure might happen relatively often, e.g. blockage of a small culvert leading to a small area of flooding, this is broadly comparable to a larger structure with a much lower probability of failure leading to a larger flood affecting more properties. This is an illustration of the need to evaluate the impact of events that occur at a range of potential frequencies and a variety of scales. It is a simplistic example and in most cases other factors would need to be considered as well but it demonstrates the general principle. (As examples frequent flooding will blight an area, very large events will place higher demands on services during response and recovery.)

What is less obvious is how to rate the impact of flooding on a road or some other infrastructure compared to properties. The most practical means of comparison would be to grade potential flood risk against a standardised scale of impacts. To enable this to be undertaken a technical annex setting out how risk will be calculated will be issued by the LLFA within six months of this strategy being approved.

The register will initially be populated with known structures which may have a potential positive or negative effect on local flood risk. It is then anticipated that the register will develop as Surface Water Management Plans (SWMPs) are researched or flooding investigations are carried out.

Significance of a structure or feature will be determined using a risk matrix correlating the probability of failure against the impact and consequences. Assessment of impact and consequences will be multi-dimensional and consider domestic, commercial, infrastructure and environmental impacts as well as consequences for vulnerable groups and individuals and where a large proportion of a community or settlement is affected.

It is required that as well as ownership, the condition on a structure or feature is also recorded in the register. This infers the need for periodic inspections which will be determined using the risk based matrix, also taking account of the condition at inspection and potential for failure.

PROCEDURE 4 Designation of Structures and Features

This procedure is linked to Policy 4.

The aim of designating flood risk assets (structures and features that would already be on the register) is a precautionary measure to guard against removal or alterations which could potentially increase flood risk in the area. This is so that works are not carried out without prior consultation with the relevant RMA and the implications of proposals can be investigated and considered. Designation of structures and features is not something that should be done routinely but only when there are concerns about the asset.

Hertfordshire County Council, the Environment Agency and the district councils are all ‘designating authorities’. That is, they may ‘designate’ features or structures that have a significant impact on flood risk where the following four conditions are satisfied:

1. The existence or location of the structure or feature affects flood risk (or a coastal erosion risk).
2. The designating authority has flood or coastal erosion risk management functions in respect of the risk which is affected.
3. The structure or feature is not designated by another authority.
4. The owner of the structure or feature is not a designating authority.

If an asset becomes ‘designated’ its owner cannot alter or remove it without first consulting the RMA.

Defra have published an information note and there is a set procedure that must be followed in order to designate assets which includes notice and a right of appeal. This can be found at:

http://www.defra.gov.uk/publications/files/pb13804-fcerm-infonote.pdf

The specific criteria for designating assets will need to be developed locally. This will certainly include the requirement for the asset to meet the criteria to be included on the register of structures and features and there may be a need for significance to be considered further so that only assets of the highest levels of significance have the potential to be designated.

Designation may not be appropriate where a structure or feature is already covered by protective legislation, for example a culvert on an ordinary watercourse.

The advantage of designation is that it is a land charge and will be brought to the attention of new owners when land is transferred. Practically this may mean that the responsibilities associated with a designated structure or feature may be more obvious when compared to the implications of riparian ownership where land transfer involves a section of watercourse.

Any decision to designate a significant structure or feature will rest on the potential for adverse change. Lack of maintenance or other neglect is not covered by the scope of designation, only removal or modification. Factors that will need to be considered to assess risk are likely to include; relatively frequent changes in ownership, the likelihood of an area changing, or sensitivity to change.

It is a new area of activity for all the designating authorities. The Environment Agency is piloting an approach for designating assets relating to main rivers and the coast during 2012 / 13, reporting after March 2013. The county council will work together with the Environment Agency, district councils and the Internal Drainage Board during 2013 to develop a designation procedure that is consistent with the Local Flood Risk Management Strategy.

PROCEDURE 5 Regulation of Ordinary Watercourses

This procedure is linked to Policy 5.

This function will be initially managed based on the advice note provided by the Environment Agency. However in recognition that the service will be operating in a different context under the direction of the county council the process will be reviewed in April 2013 once a risk assessment of all known ordinary watercourses is undertaken. The Environment Agency advice note and its appendices that were provided to the LLFA can be found at the following web locations:

http://publications.environment-agency.gov.uk/PDF/GEHO0112BVYF-E-E.pdf
http://publications.environment-agency.gov.uk/PDF/GEHO0112BVYG-E-E.pdf

PROCEDURE 6 Sustainable Drainage Systems Approval Body

This procedure is linked to Policy 6.

The legislation relating to this area has not yet been commenced but it is anticipated that it will come into force during the life of this strategy (Defra have indicated that this will be April 2014).

In the meantime any requirement for SuDS will continue to be determined by district authorities through the development control process.

Interim guidance for Hertfordshire has been developed based on the material provided for the Government's consultation which closed on 13 March 2012.

In the case of site proposals that will be being developed in the period before the establishment of the SAB, but where the formal planning application will be made after the SAB comes into being, the interim guidance will be available for developers and district authorities to inform discussions prior to a planning application and SAB application being submitted.

Once the SAB comes into being it is proposed that the interim guidance will be adopted to set out the SAB requirements for drainage approval applications (subject to it being consistent with any legislative requirements announced at commencement).

The Interim SuDS Guidance for Hertfordshire can be found at:

http://www.hertsdirect.org/docs/pdf/s/sabguide.pdf

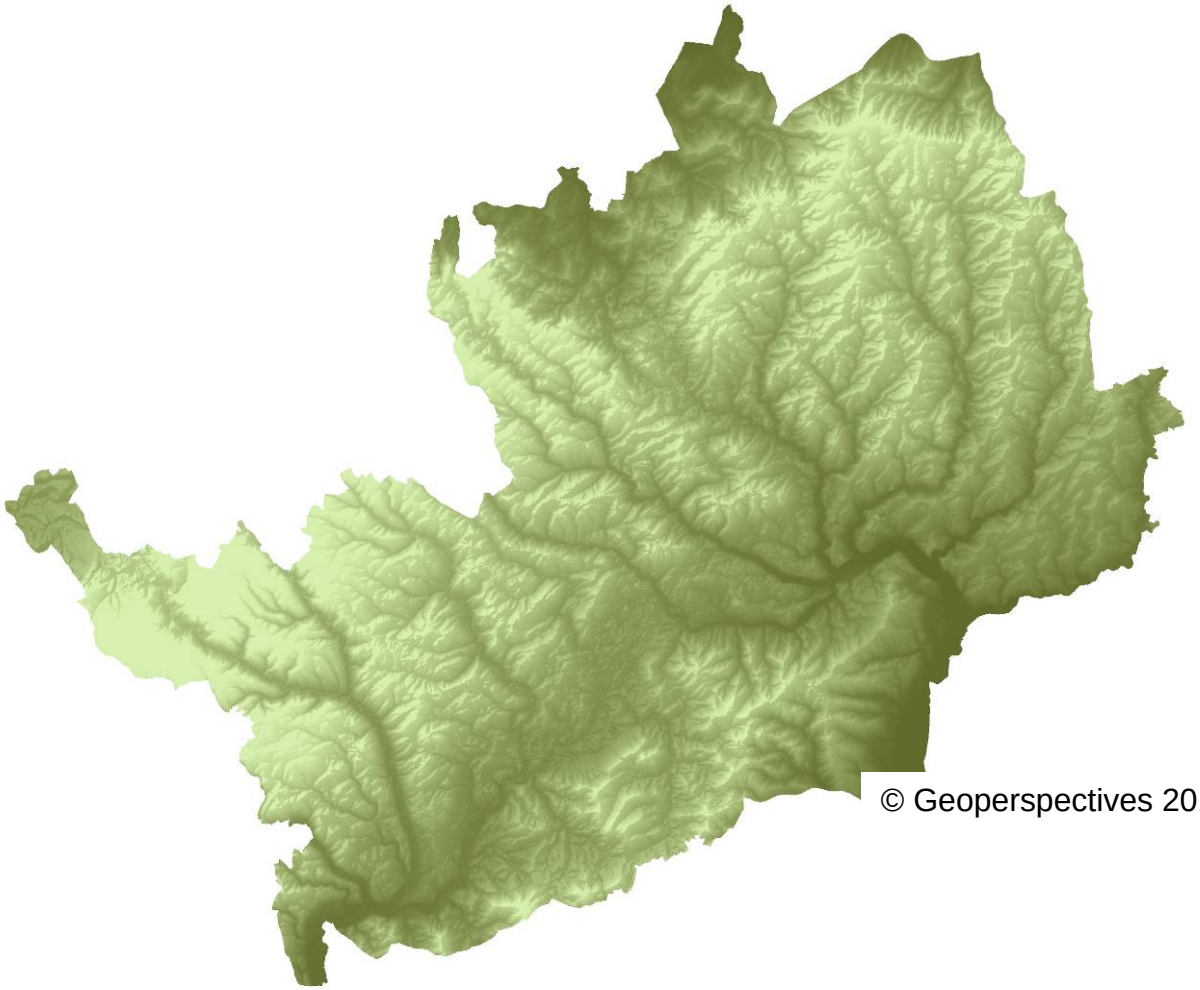
Retrofitting of SuDS to existing development is not a requirement of the SAB and will not form part of the Interim SAB Guidance however examples of best practice will be available through the material on "Building Futures" supporting the SAB document.

SuDS are one option to manage an existing surface water flood risk and will naturally be considered as an approach when the local assessments are carried out when developing the SWMPs and linked action plans.

LOCAL FLOOD RISK MANAGEMENT STRATEGY FOR HERTFORDSHIRE 2013 - 2016

IMPLEMENTATION (Work Programme)

Part 3 of 4



Hertfordshire

Work programme (2012 – 2017)

Action	Key points	Partners	Wider Stakeholders	Resources	Timetable
Register of Structures and Features					
Establish online register of Structure and Features which have a significant effect on local flood risk.	• To be held on 'hertsdirect' • To be updated at least quarterly	• Risk Management Authorities	• General Public • Owners of structures and features • Riparian owners	• LLFA (via consultants)	Set-up By March 2013 and then ongoing development
Maintain online register of Structure and Features which have a significant effect on local flood risk.	• Add information from SWMPs • Refine and quality check entries • Update record at least quarterly			• LLFA	Ongoing
Development of Information on Flood Risk and Flood Risk Management in Hertfordshire					
Develop data sharing protocol for all flood risk information relating to Hertfordshire	• To be agreed with all main contributors	• Risk Management Authorities	• Key infrastructure owners • General Public	• LLFA (via consultants)	By March 2013
Develop web portal for partners and the public to access local flood risk data.	• To be a map based interactive database accessed via 'hertsdirect' • To be updated at least quarterly				By March 2014

Action	Key points	Partners	Wider Stakeholders	Resources	Timetable
Review SFRAs to assess how the improving evidence base for flooding from all sources can be used in spatial planning / development control.	• County based work to be led by the LLFA • District based work to be undertaken by the relevant district authority • As per review timetable for local SFRAs	• District Planning Authorities • Environment Agency	• Developers	• LLFA for coordination • Districts for any detailed studies	County review by March 2013 then ongoing
Consenting and Enforcement Activities on Ordinary Watercourses					
Develop risk based categorisation of ordinary water courses to inform inspection and enforcement.	• Will require the development of risk categories and a review of all mapped ordinary water courses (approx 1,200 km) in Hertfordshire	• District Authorities	• Risk Management Authorities • Riparian Owners	• LLFA and district authorities where appropriate	By March 2013
Inspection, consenting and enforcement activity on ordinary watercourses.	• Inspection regime and enforcement approach as per the outcome of the risk review of ordinary watercourses				ongoing
Surface Water Management Plans					
Develop Surface Water Management Plans based on the 10 district authority boundaries.	• Complete SWMP for Watford and St Albans	• Watford BC • City and District of St Albans	• General Public • Business interests	• LLFA • District authorities	By June 2013

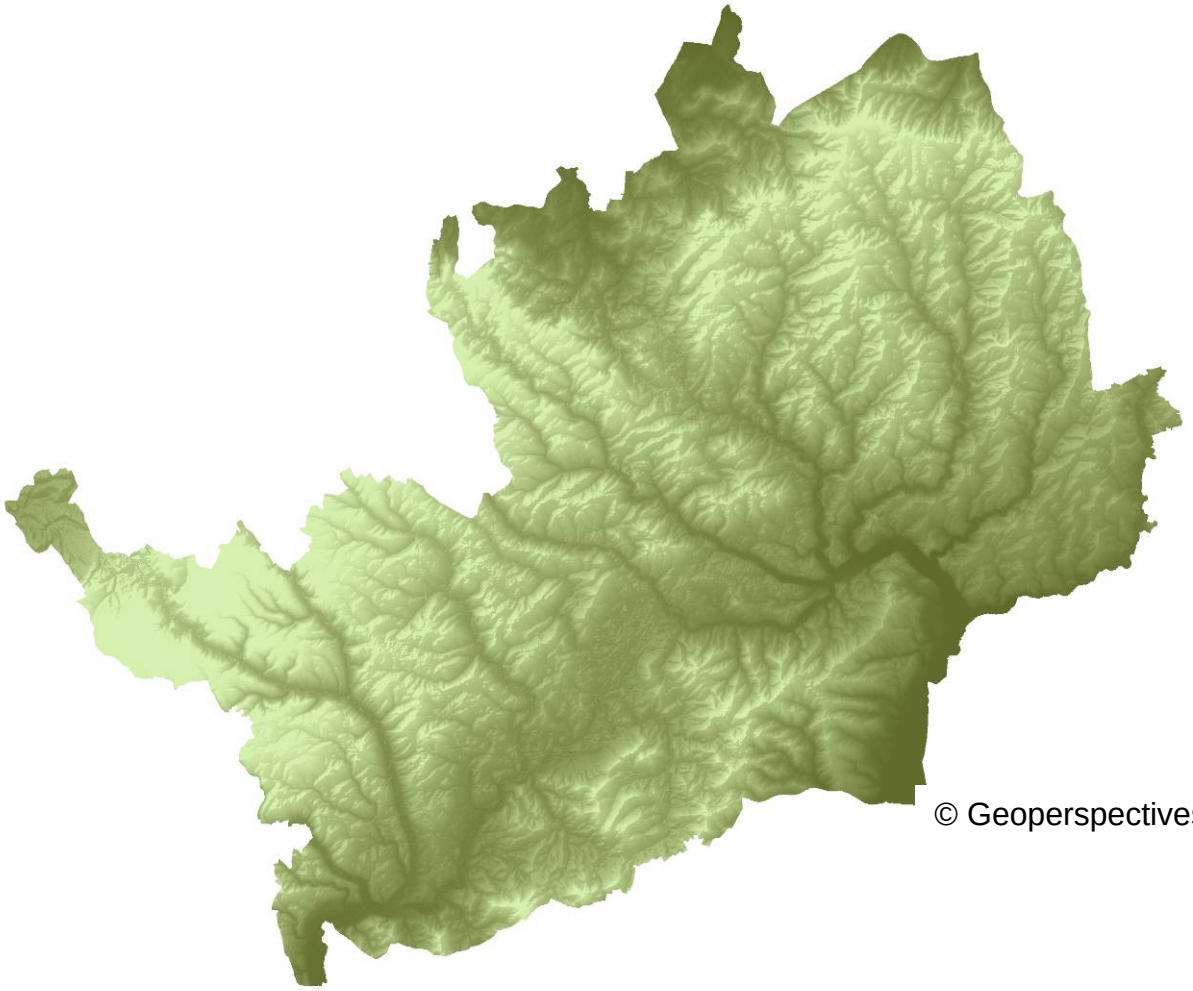
Action	Key points	Partners	Wider Stakeholders	Resources	Timetable
	• Initiate and complete SWMP for Dacorum and North Hertfordshire	• Dacorum BC • North Hertfordshire DC	• Other RMAs	• Other RMAs as appropriate	Start from March 2013 aim for completion in 18 months
	• Initiate and complete SWMP for East Hertfordshire and Broxbourne	• East Hertfordshire DC • Broxbourne BC			Start from March 2014 aim for completion in 18 months
	• Initiate and complete SWMP for Three Rivers and Hertsmere	• Three Rivers DC • Hertsmere BC			Start from March 2015 aim for completion in 18 months
	• Initiate and complete SWMP for Welwyn Hatfield and Stevenage	• Welwyn Hatfield BC • Stevenage BC			Start from March 2016 aim for completion in 18 months
Flood Risk Management Partnerships					
Where necessary establish appropriate Partnership arrangements for flood risk management.	• To include a core strategic level partnership structure and where appropriate local partnership arrangements	• RMAs • Affinity • British Waterways • Lee Valley Regional Park	• Community Groups • Other interested bodies	• LLFA (for initial administrative support)	Set-up and hold initial meetings of strategic group by March 2013. Local groups as and when necessary.
Maintain appropriate Partnership arrangement.				• LLFA fund secretariat	Ongoing

Action	Key points	Partners	Wider Stakeholders	Resources	Timetable
SuDS					
Establish SuDS Approval Body (SAB) to operate in Hertfordshire.	• Initially resource to deal with 200 major applications per year across Hertfordshire	• District planning authorities • Environment Agency • Water and Sewerage Companies	• General Public • Developers	• LLFA to provide pump-priming funds to set-up then to be self-financed via fees charged for drainage approval	By October 2012 (subject to legislation being commenced)

LOCAL FLOOD RISK MANAGEMENT STRATEGY FOR HERTFORDSHIRE 2013 - 2016

RELATED DOCUMENTS AND REFERENCES

Part 4 of 4



Hertfordshire

RELATED DOCUMENTS

NATIONAL

National Flood and Coastal Erosion Risk Management Strategy for England
(Environment Agency / Defra), May 2011
http://www.environment-agency.gov.uk/research/policy/130073.aspx

REGIONAL / CATCHMENT

Thames Catchment Flood Management Plan
Summary Report, Environment Agency, December 2009

http://www.walthamforest.gov.uk/documents/ke81-thames-catchment-flood-management-plan-summary-report.pdf

Great Ouse Catchment Flood Management Plan
Summary Report, Environment Agency, January 2011

http://publications.environment-agency.gov.uk/PDF/GEAN0111BTJL-E-E.pdf

COUNTY

Preliminary Flood Risk Assessment for Hertfordshire (PFRA) June 2011
Hertfordshire County Council

http://www.hertsdirect.org/docs/pdf/f/hccpfra.pdf

Hertfordshire County Council Corporate Climate Risk Assessment
Final report to Hertfordshire County Council
Unrestricted ED49922 Issue Number 1 March 2009

http://www.hertsdirect.org/docs/pdf/s/HCCCCRAMar10

Hertfordshire Interim SAB Guidance

http://www.hertsdirect.org/docs/pdf/s/sabguide.pdf

DISTRICT / LOCAL

Surface Water Management Plans (SWMPs)

(To be added as developed)

Watford (by mid 2013)
St Albans (by mid 2013)

Strategic Flood Risk Assessments (SFRAs)

Broxbourne Borough Council

Report: http://www.broxbourne.gov.uk/PDF/PP%20-%20SFRA_REPORT.pdf

Maps http://www.broxbourne.gov.uk/PDF/PP%20-%20SFRA_Maps.pdf

Dacorum Borough Council, City and District of St Albans, Three Rivers District Council and Watford Borough Council – completed a joint SFRA. References for each authority given below as there are some local differences.

Dacorum Borough SFRA Main Report

http://web.dacorum.gov.uk/home/planning-development/planning-strategic-planning/evidence-base/strategic-flood-risk-assessment-(stage-i)

Dacorum Borough SFRA Level II (a more detailed area of study in the SFRA)

http://web.dacorum.gov.uk/home/planning-development/planning-strategic-planning/evidence-base/strategic-flood-risk-assessment-stage-ii

St Albans City and District

http://www.stalbans.gov.uk/Images/Strategic%20Flood%20Risk%20Assessment%20(SFRA)%202007_tcm15-9473.pdf

Three Rivers District SFRA

http://www.threerivers.gov.uk/Default.aspx/Web/StrategicFloodRiskAssessment

East Hertfordshire District Council

http://www.eastherts.gov.uk/index.jsp?articleid=15661

Hertsmere Borough Council

http://www.hertsmere.gov.uk/Planning--Building-Control/Planning-Policy/Local-Plan/Local-Plan-Evidence-Base.aspx

(Scroll down web page to find SFRA documents)

North Hertfordshire District Council

http://www.north-herts.gov.uk/index/environment_and_planning/planning/planning_policy_and_projects-2/evidence_base/strategic_flood_risk_assessment-2.htm

Stevenage Borough Council

Main Report

http://www.stevenage.gov.uk/content/15953/26379/43876/Flood-Risk-Assessment-Final-Report.pdf

Appendix B

http://www.stevenage.gov.uk/content/15953/26379/43876/Flood-Risk-Assessment-Appendix-B.pdf

Welwyn Hatfield Council

http://www.welhat.gov.uk/CHttpHandler.ashx?id=1263&p=0

Hertfordshire Resilience Multi-Agency Flood Plan, Version: 1.7 Publication Date: March 2010

http://www.hertsdirect.org/docs/pdf/f/maflplv17.pdf

Strategic Environmental Assessment of Local Flood Risk Management Strategy (LFRMS)

LFRMS Environmental Report
Hertfordshire County Council June 2012

Full report
http://www.hertsdirect.org/docs/pdf/f/lfrmsseareport.pdf

Summary
http://www.hertsdirect.org/docs/pdf/f/lfrfsseasummary.pdf

Annexes
http://www.hertsdirect.org/services/envplan/water/floods/floodrisk/lfrmsherts/lfrmsdocs/sea/

REFERENCES

NATIONAL

Flood and Water Management Act 2010

http://www.legislation.gov.uk/ukpga/2010/29/contents

Flood Risk Regulations 2009

http://www.legislation.gov.uk/uksi/2009/3042/contents/made

Guidance for risk management authorities on sustainable development in relation to their flood and coastal erosion risk management functions DEFRA October 2011

http://www.defra.gov.uk/publications/files/pb13640-sdg-guidance.pdf

Selecting and reviewing Flood Risk Areas for local sources of flooding – Guidance to Lead Local Flood Authorities Flood Risk Regulations 2009 (Environment Agency)

Environment Agency Using Surface Water Flood Risk Information: Guidance for LRF, RRT, LPA and LLFA. V1 November 2010 (Environment Agency)

Environment Agency Flood Map for Surface Water – Property Count Method - V1 November 2010 (Environment Agency)

The Development of the Water Industry in England and Wales Ofwat/Defra 2006

http://www.ofwat.gov.uk/publications/commissioned/rpt_com_devwatindust270106.pdf

REGIONAL

Thames River Basin Management Plan
Full report and annexes, December 2009 (Environment Agency)

http://www.environment-agency.gov.uk/research/planning/125035.aspx

Anglian River Basin Management Plan
Full report and annexes, December 2009 (Environment Agency)

http://www.environment-agency.gov.uk/research/planning/124725.aspx