Suffolk Flood Risk Management Partnership

APRIL 2012

Suffolk Local Flood Risk Management Strategy

> Over 5.5 million properties in England and Wales are at risk of flooding from rivers, the sea or surface water. That's one in six which means there's a high chance one of these properties is your home or business.
>
> *National Flood Forum*

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Related Documents

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Contents

Glossary and abbreviations

of words and phrases commonly used in flood and coastal risk management

AONB	Area of Outstanding Natural Beauty
Aquifer	A layer of porous substrate that contains and transmits groundwater
AW	Anglian Water
Asset Register	Register of structures or features which are considered to have an effect on flood risk.
Catchment	The extent of land which catches and holds rainwater.
CFMP	Catchment Flood Management Plan – strategic plans for flood management
Consenting	Process of obtaining permission to add/amend structures in/near a watercourse or flood defence structure
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
FCERM	Flood and Coastal Erosion Risk Management
FDGiA	Flood Defence Grant in Aid
Fluvial flooding	Flooding from rivers
FMfSW	Environment Agency's Flood Map for Surface Water
Foul flooding	Flooding that is contaminated with sewage
GIS	Geographic Information System. Software that captures, stores, analyses, manages, and presents data that is linked to location.
Groundwater flooding	Flooding when water levels in the ground rise above the surface
IDB	Internal Drainage Board
JEPU	Joint Emergency Planning Unit
LDA	Land Drainage Act
LDF	Local Development Framework – planning framework
LiDAR	Light Detection and Ranging. Method for collecting high-resolution topographic data
LLFA	Lead Local Flood Authority. In England, either the unitary authority for the area, or if there is no unitary authority, the county council for the area.

Main River	A statutory watercourse – usually larger streams and rivers marked as such on the Environment Agency main river map.
Ordinary Watercourse	A statutory type of watercourse including river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) that is not classified as main river.
PFRA	Preliminary Flood Risk Assessment. A high level summary of significant flood risk describing the probability and consequences of past and future flooding, required by the Flood Risk Regulations 2009.
Pluvial flooding	Flooding from rainfall – another name for surface water flooding.
RAMSAR	Wetlands of International Importance
RBMP	River Basin Management Plan – plan for the delivery of the Water Framework Directive
RFCC	Regional Flood and Coastal Committee
Risk	Risk = probability of an occurrence x its potential consequence
SAB	SuDS Approval Body (the county council)
SAC	Special Areas of Conservation - Areas protected under the EU Habitats Directive
SCC	Suffolk County Council
SFRA	Strategic Flood Risk Assessment
SFRMP	Suffolk Flood Risk Management Partnership
SMP	Shoreline Management Plan – strategic plans for the long-term management of the coast
SRF	Suffolk Resilience Forum
SPA	Special Protection Area. Areas protected under the EU Birds Directive which support significant numbers of wild birds and their habitats.
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
Surface water flooding	Flooding caused by high intensity rainfall that generates flows over the ground and collects in low lying areas. Also known as pluvial or flash flooding.
SW	Surface Water
SWMP	Surface Water Management Plan
Water & Sewerage Companies	Companies responsible for provision of both water and drainage of waste water and sewage (e.g. Anglian Water).
WFD	Water Framework Directive

1. Introduction

The Suffolk Local Flood Risk Management Strategy is an important new tool to help everyone understand and manage flood risk within the county. Its primary focus is on 'local flooding' from surface water, groundwater or ordinary water courses such as streams and ditches. This type of 'flash flooding' generally caused by localised heavy rainfall, appears to be increasingly common but until recently there has been little understanding of the risks or actions to address the risks. Historically flood risk management has concentrated on river and tidal flooding.

However, for those who suffer flooding, it matters little what type of flooding is causing the problem and this strategy aims to provide information about all forms of flooding and the organisations involved in all aspects of flood risk management, from flood protection to dealing with a serious flooding event. It will not repeat information that is available elsewhere but will signpost the reader to relevant material. The strategy will not cover coastal erosion.

Press report about one year after the 2007 flooding in Gloucestershire:

Mrs S, 63, had to be rescued after she fled to an upstairs room to escape the rising flood waters. She then spent nine months living in a mobile home after there was £80,000 worth of damage to her house. She said "It's been a nightmare year."

Her son said: "She was a vulnerable pensioner who had to spend the coldest months of the year living in a mobile home."

Mrs S hopes the flooding will never happen again and said she gets" very anxious whenever it rains heavily".

This strategy is the first of its kind covering the whole of Suffolk. With ever improving knowledge, additional legislation and budgetary constraints it will be necessary to update and review the strategy and its associated action plan on a regular basis. This review process will be overseen by the Suffolk Flood Risk Management Partnership and scrutinised by a panel of local Councillors from all corners of the county.

The main aim of the strategy is to reduce the risk of flooding and the misery and economic damage that flooding causes, in a sustainable manner. Also, any flood management activities carried out will aim to enhance the built and natural environment.

The strategy document starts with information on the legislation that underpins flood risk management activities, who is involved and what part each will play in helping reduce the risk of flooding in Suffolk. It then looks at the nature of flood risks in Suffolk and what further information is needed to help build a better picture of local flood risks.

The next section describes the objectives together for managing flood risk and how we might achieve them, leading onto the action plan in Appendix 1. In putting these objectives we considered three options for local flood risk management:

Do nothing – potentially more properties will flood and for those already at risk of flooding they will potentially flood to a greater depth and/or more frequently.

Maintain – keep pace with climate change so that there is no net increase in flood risk; existing flood risk management infrastructure will need to be improved over time and all new development will need to take climate change into account.

Improve – take action to reduce the number of properties that would potentially flood and the potential impacts of that flooding.

After discussions with key stakeholders, we propose to take a pragmatic approach to reduce the

current flood risk and ensure that we do nothing to make this worse in the future, recognising the limited resources available for flood and coastal risk management and other priorities within the county.

In the action plan we outline a range of actions, from small-scale local activities to long-term major plans and where possible we have identified who will be involved, when things might happen and how they might be paid for.

The money available for flood risk management is never going to be adequate to deal with all existing flood risks and the increasing future risk brought about by further development and a changing climate. Traditional approaches to flood risk management will need to be supplemented by everyone working together and by those at risk taking responsibility to help themselves.

1.1 History of flood risk management

The responsibility for flood risk management within Suffolk has changed considerably over the past 50 years. In 1989 the National Rivers Authority was set up, a national body that took over the roles and responsibilities for flood risk management, drainage and water quality. In 1991, a number of pieces of legislation were enacted which consolidated existing water legislation.
Most relevant in terms of flood risk management were the Land Drainage Act, which outlined the duties and powers to manage land drainage for a number of bodies including internal drainage boards and local authorities, and the Water Resources Act, which outlined the roles and responsibilities of the National Rivers Authority. District councils were originally responsible for sewerage and councils continue to manage a number of ordinary watercourses and highway drainage.

In 1995 the Environment Agency took over the roles and responsibilities of the National Rivers Association and responsibility for issuing flood warnings, a role previously held by the police.

The management and operation of the Environment Agency is divided into a number of regions across the country; Suffolk lies within the Anglian Region.

1.2 Legislation

Following the extreme floods of 2007, the Pitt Review stressed the importance of implementing better legislation for the effective management of flooding, particularly from surface water.
Many of the recommendations from the Pitt Review have been implemented through the **Flood and Water Management Act 2010**, which places a greater responsibility on upper tier local authorities (county and unitary councils) for surface water management issues, under their new role as a Lead Local Flood Authorities. The role of the Environment Agency in respect of river and tidal flooding remains in force. The Environment Agency also has a strategic role to oversee all flood and coastal erosion risk management, ensuring it is undertaken in a sustainable manner.

The Flood Risk Regulations (2009)[1] came into force in December 2009 and transpose the EU Floods Directive into law for England and Wales. The Flood Risk Regulations required a **Preliminary Flood Risk Assessment** to be produced which identifies areas where significant numbers of people are at risk of surface, ground and ordinary water course flooding. Where such areas exist the regulations also require the production of hazard and risk maps and flood management plans. Within Suffolk, there are no areas that satisfy the national criteria for defining such areas, not because there is no risk, but because of the largely rural nature of the county and lack of large urban areas. The Preliminary Flood Risk Assessment for Suffolk[2] was completed in June 2011 and will be reviewed in 2016.

The Preliminary Flood Risk Assessment is a high level screening exercise that brings together, from a number of sources, easily available information on past and potential flooding to enable judgments to be made about local flood risk. The assessment of potential flood risk was derived

1. http://www.legislation.gov.uk/uksi/2009/3042/contents/made
2. http://www.suffolk.gov.uk/TransportAndStreets/RoadMaintenance/Flooding.htm

from national datasets produced by Defra but also with the benefit of additional information from Ipswich as a result of the Borough's recording of flood events. The assessment of past flooding was obtained from a number of sources, but the process of analysing past flooding revealed some inadequacies in the collection of data on flooding incidents which will be addressed through this strategy. As a consequence of this current lack of certain information on flooding incidents, only a small number of locations were identified in the Preliminary Assessment Report as having 'significant harmful consequences[3]'. The information generated through it has been used to inform this strategy.

The Flood and Water Management Act 2010[4] gained royal assent in April 2010 and provides legislation for the management of risks associated with flooding and coastal erosion. The Act reinforces the need to manage flooding holistically and in a sustainable manner. It places a number of new roles and responsibilities on Suffolk County Council, which is designated a 'Lead Local Flood Authority'. The preparation of this Local Flood Risk Management Strategy is just one of the duties placed upon the county council.

A national Flood and Coastal Erosion Risk Management strategy has been produced by the Environment Agency which sets out the principles that will guide local strategies and the activity of all flood authorities.

The Act defines various bodies as 'risk management authorities'. These are:

- a Lead Local Flood Authority;
- the Environment Agency;
- a district council for an area where there is no unitary authority;
- an internal drainage board;
- a water company;
- a highway authority.

The powers and duties in the Act are summarised on the next page. More details on how they will be discharged are in Chapter 2.

Planning legislation:

A National Planning Policy Framework has just been published (March 2012) by the Department of Communities and Local Government. It is designed to streamline previous planning policy. In relation to managing flood risk it retains much of the guidance that was contained in the previous Planning Policy Statement 25[5] (PPS25). The aim is to reduce development in flood risk areas and reinforces the requirement for sustainable surface water management in new developments.

Coast Protection Act (1949):

This provides the legal framework for the protection of the coast against erosion and encroachment by the sea within the boundaries set out in Schedule 4 of the Act. It gives Maritime District Authorities (e.g. Suffolk Coastal and Waveney District Councils) powers to undertake coast protection works on their frontage.

Other legislation:

Flood and coastal risk management is affected by a range of other national and local legislation, policies and non-statutory plans, the most significant of which are listed below:

- The Climate Change Act (2008).
- The Conservation of Habitats and Species Regulations (2001).
- The Civil Contingencies Act (2004).
- The Strategy Environmental Assessment (SEA) Directive (2001).

3. The definition of significant harmful consequences used was: within a 1 km square, for a rainfall event with a 1 in 200 annual chance of occurring the flooding affected 200 or more people and/or 1+ critical service (eg a hospital, water treatment works) and/or 20+ non-residential properties

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

5. http://www.communities.gov.uk/publications/planningandbuilding/pps25floodrisk

- The Land Drainage Act (1991).
- The Water Framework Directive.
- Marine and Coastal Access Act.
- The Countryside and Rights of Way Act (2000).
- The Wildlife and Countryside Act (1981).

Regional and local plans:

- **River Basin Management Plan Anglian River Basin District (December 2009)**[6] – the plan for the delivery of the Water Framework Directive in the Region. Its' focus is to improve the ecological qualities of water bodies (sea, rivers, streams, lakes, etc).

Responsibility	Details
Preparation of an Asset Register	Lead Local Flood Authorities (LLFAs) have a duty to maintain a register of structures or features which are considered to have an effect on flood risk, including details on ownership and condition as a minimum. The register must be available for inspection. The content of the register are set by the government.
Power to designate flood risk management structures	LLFAs, as well other flood management authorities have powers to designate structures and features that affect flooding or coastal erosion in order to safeguard assets that are relied upon for flood or coastal erosion risk management. The details of this power have yet to be defined by government.
Investigation of flood incidents	LLFAs have a duty to co-ordinate the investigation and recording of significant flood events within their area. This duty includes identifying which authorities have flood risk management functions and what they have done or intend to do with respect to the incident, notifying risk management authorities where necessary and publishing the results of any investigations carried out. Further information with respect to this duty is provided at Section 2.4.2.
Prepare a Local Strategy for Flood Risk Management	LLFAs are required to develop, maintain, apply and monitor a local strategy for flood risk management in its area. The local strategy will build upon information such as national risk assessments and will use consistent risk based approaches across different local authority areas and catchments.
SuDS Approval Body*	LLFAs are designated the SuDS Approving Body (SAB) for any new drainage system, and therefore must approve, adopt and maintain any new sustainable drainage systems (SuDS) that serve more than one property.
Works powers	LLFAs have powers to undertake works to manage flood risk from surface runoff and groundwater, consistent with the local flood risk management strategy for the area.
Consenting changes to Ordinary Water Courses	If riparian owners wish to culvert an ordinary water course or insert any obstructions, consent is required from the LLFA, except within Internal Drainage Board (IDB) areas. This duty commenced 6 April 2012.

*At the time of writing (April 2012), there are a number of aspects of the FWMA that have not been fully implemented and as such this strategy can only refer to the current or expected situation. The commencement of the role of Sustainable Drainage Systems Approval Body is expected to be by April 2013. The details of this implementation were recently consulted upon and the document refers to the provisions outlined in the consultation, which maybe subject to further change.

6. http://www.environment-agency.gov.uk/research/planning/33106.aspx

- **Catchment Flood Management Plans**[7] are high level strategic plans through which the Environment Agency, working with key decision-makers within a river catchment, identify and agree policies for sustainable flood risk management. There are four plans covering the river catchments across Suffolk:
  - Broadland Rivers.
  - East Suffolk.
  - Great Ouse.
  - North Essex.
- **Shoreline Management Plans**[8] are strategic plans for the long-term management of the coast. There are three plans covering the Suffolk coast:
  - The Kelling to Lowestoft SMP.
  - The Suffolk SMP covering Lowestoft to Felixstowe.
  - The Essex and South Suffolk SMP which covers the Stour and Orwell estuaries.
- **Strategic Flood Risk Assessments** are undertaken by District/Borough Councils as part of the strategic planning process and where available their Local Development Frameworks/Local Plan.
- **Suffolk Community Risk Register**[9] is produced by the Suffolk Resilience Forum and identifies the major risks in Suffolk (including inland and coastal flooding), their likelihood and impacts. There are plans for emergency response and recovery for specific risks.
- **Ipswich Borough Council's Drainage and Flood Defence Policy**[10] – states how the Borough controls development in areas of flooding and is referred to in Local Planning documents. It provides guidance on the roles of drainage bodies and council services, sets standards for sustainable drainage for new developments and explains how the Borough manages local flood risk. The document will be updated following the adoption of the Suffolk Local Flood Risk Management Strategy.
- **Surface Water Management Plan for Ipswich** (currently in draft) is a detailed study of surface water risks in Ipswich leading to a plan to manage the main risks. Other Surface Water Management Plans are planned in areas where we believe there is a high risk of surface water flooding, such as Lowestoft.

1.3 The Local Flood Risk Management Strategy

The production of this local strategy is a statutory requirement under the Flood & Water Management Act. It follows the publication of a National Flood & Coastal Erosion risk Management Strategy which sets out principles that must guide all flood and coastal risk management activities.

These guiding principles, that underpin this local strategy, are:

- **Community focus and partnership working.**
- **A catchment and coastal cell based approach.**
- **Sustainability.**
- **Proportionate, risk-based approaches.**
- **Multiple benefits.**
- **Beneficiaries should be allowed and encouraged to invest in local risk management.**

The requirement to produce a Local Strategy is predominantly concerned with the management of surface, ground and ordinary water course flooding (= local flooding) but will clearly link to flooding from rivers and the seas. The strategy will not cover coastal erosion risks.

7. http://www.environment-agency.gov.uk/research/planning/114303.aspx
8. http://www.environment-agency.gov.uk/research/planning/105014.aspx
9. http://www.suffolkresilience.com/
10. http://www.ipswich.gov.uk/site/scripts/documents_info.php?documentID=80

Caveat re new information

This strategy will need to be updated at the appropriate time to reflect changes in legislation and national policy. At the time of writing there are some aspects of the Flood & Water Management Act 2010 that have yet to come into force, most notably the sustainable drainage powers and duties. This draft strategy has been prepared using current information, which may change before the document is formally adopted.

Who produced it?

The production of the Local Strategy has been overseen by the Suffolk Flood Risk Management Partnership (see Section 2.4).

A working group was set up from the partnership, together with AECOM consultants, to produce a first draft which was shared within each partner organisation and with key stakeholders, local councillors and community groups. As a result of this informal engagement this consultation draft

has been prepared. It has been endorsed by local authorities via their normal political processes, and will now be subject to a formal three-month public consultation.

The final strategy will then be formally adopted/endorsed by all councils and other risk management authorities in the county.

The Local Flood Risk Management Strategy will be a statutory document, which will impact on the activities of all flood risk management authorities – i.e. local authorities, the Environment Agency, highways authorities and Internal Drainage Boards.

These bodies will all have a 'duty to act consistently with the local strategy' when undertaking their flood and coastal erosion risk management functions and have a 'duty to have regard for the strategy' when discharging other duties that may affect flood and coastal risk (for example spatial planning and development).

Water companies will also have a 'duty to have regard for the local strategy' for all relevant functions.

1.4 The Suffolk Flood Risk Management Partnership

The Flood and Water Management Act requires Suffolk County Council to take a leading role in managing local flood risks, working in partnership with other relevant authorities and the public.

The Suffolk Flood Management Partnership, made up of key risk management authorities and the Suffolk Resilience Forum, is fundamental to the delivery of a co-ordinated and consistent approach to flood and coastal risk management and working alongside the public to make a real difference in the county.

The Partners are:

- Suffolk County Council
- Forest Heath District Council
- St Edmundsbury Borough Council
- Babergh District Council
- Mid Suffolk District Council
- Ipswich Borough Council
- Suffolk Coastal District Council
- Waveney District Council
- Environment Agency
- Anglian Water
- Ely Group of Internal Drainage Boards
- East Suffolk Group of IDBs
- Waveney, Lower Yare & Lothingland IDB
- Broads Authority
- Highways Agency
- Suffolk Resilience Forum

This partnership was set up on 2009 following the publication of the Pitt Recommendations to share expertise and local knowledge and work jointly to understand and reduce flood risk across Suffolk. It has links to a number of other relevant groups and key players in managing flood and coastal risks, including:

- **Anglian Regional Flood & Coastal Committees** (Eastern & Central) brings together councillors appointed by Lead Local Flood Authorities (LLFAs) and appointees with relevant experience. Their role is to approve the annual programme of work ensuring there are coherent plans for risk-based investment that optimises value for money and benefits for local communities in flood and coastal erosion risk areas.
- **Developers** have a vital role in delivering sustainable drainage as promoted by the Flood and Water Management Act as well as the wider planning proposals in relation to flood risk outlined in this strategy. It is crucial that future development takes proper regard to all sources of flooding and wherever possible deliver reductions in flood risks both on and off site.
- **East Anglian Coastal Group** and its associated subgroups oversee the production and delivery of Shoreline Management Plans and share coastal expertise.
- **Local Community Emergency groups** set up co-ordinate parish-level emergency actions in the event of major emergencies, including flooding.
- **Local Estuary/Coastal Groups** formed by residents, landowners and other interested parties to represent local interests and assist in the management of flood and coastal risks.
- **Local Government Association Inland Flood Group** and **Coastal Special Interest Group.** These groups provide support to local authorities in exercising their duties as flood and coastal risk management authorities and links to national policy makers.
- **Marine Management Organisation** has a key role in coast protection via licensing of activities

on the shoreline and developing marine plans that overlap with terrestrial spatial plans.

- **Natural England** and other national and local environmental and conservation bodies will help deliver flood risk management in a way that also delivers wider environmental benefits.
- **Neighbouring Lead Local Flood Authorities.** An informal grouping of all Lead Local Flood Authorities from across the eastern counties has been created for mutual assistance and to share expertise. It is possible that this type of grouping maybe given more formal status alongside coastal groups in future.
- **Network Rail**
- **Riparian Owners.** The many land and home owners whose land adjoins a watercourse have certain rights and responsibilities in relation to flood risk management. These people are key players in the management of local flood risk, particularly in the many rural areas of Suffolk. The National Farmers Union and the Country Land and Business Association are important bodies representing agricultural and landowning interests and are the main route by which we can influence many riparian owners.
- **Suffolk Coast Forum.** A forum comprising relevant local authorities, estuary groups, Environment Agency, Natural England, the Marine Management Organisation and ports authorities to take a strategic role in coastal management. It will provide an important link with the Suffolk Flood Risk Management Partnership in integrating inland and coastal flood management.
- **Suffolk Joint Flood Scrutiny Panel** comprising elected members from county and all district authorities whose role is to scrutinise the work of the Suffolk Flood Risk Management Partnership and the flood management activities of its partners.
- **Suffolk Planning Officers group** comprises lead planning officers from all planning authorities across the county.
- **Town & Parish Councils** are the key route to the general public and local information. They have a key role in encouraging local self-help groups to prepare for flooding and other emergencies and as a conduit for passing information to and from the public to the county council.
- **Utility providers** have a key role in ensuring their key infrastructure is protected from flood risk.

1.5 What is the nature of flood risk within Suffolk?

Although current projections for future climate change predict an overall decrease in rainfall it is likely to occur in more intense stormier conditions at certain times of the year. Combined with the predicted rise in sea level there will be an increased risk of tidal, river and surface water flooding.

Extract from 'Suffolk County Council's Environmental Action Plan' and supported by the findings of the UK Climate Change Predictions 09[11]

Flooding is a natural phenomenon, the adverse effects of which can be made worse by poor management of the landscape and environment. The problems can be made worse if we fail to do anything about the risk.

Rainfall and the consequential flooding by its very nature is unpredictable in location and severity, and dealing with these uncertainties will be challenging, particularly in the case of surface water flooding. However, flood risk is something that can be understood and its effects are generally more predictable, however blockages in drainage systems may cause unusual and even less predictable flooding.

The nature of flood risk within Suffolk is extremely varied and widespread across the county.

11. http://www.ukcip.org.uk/

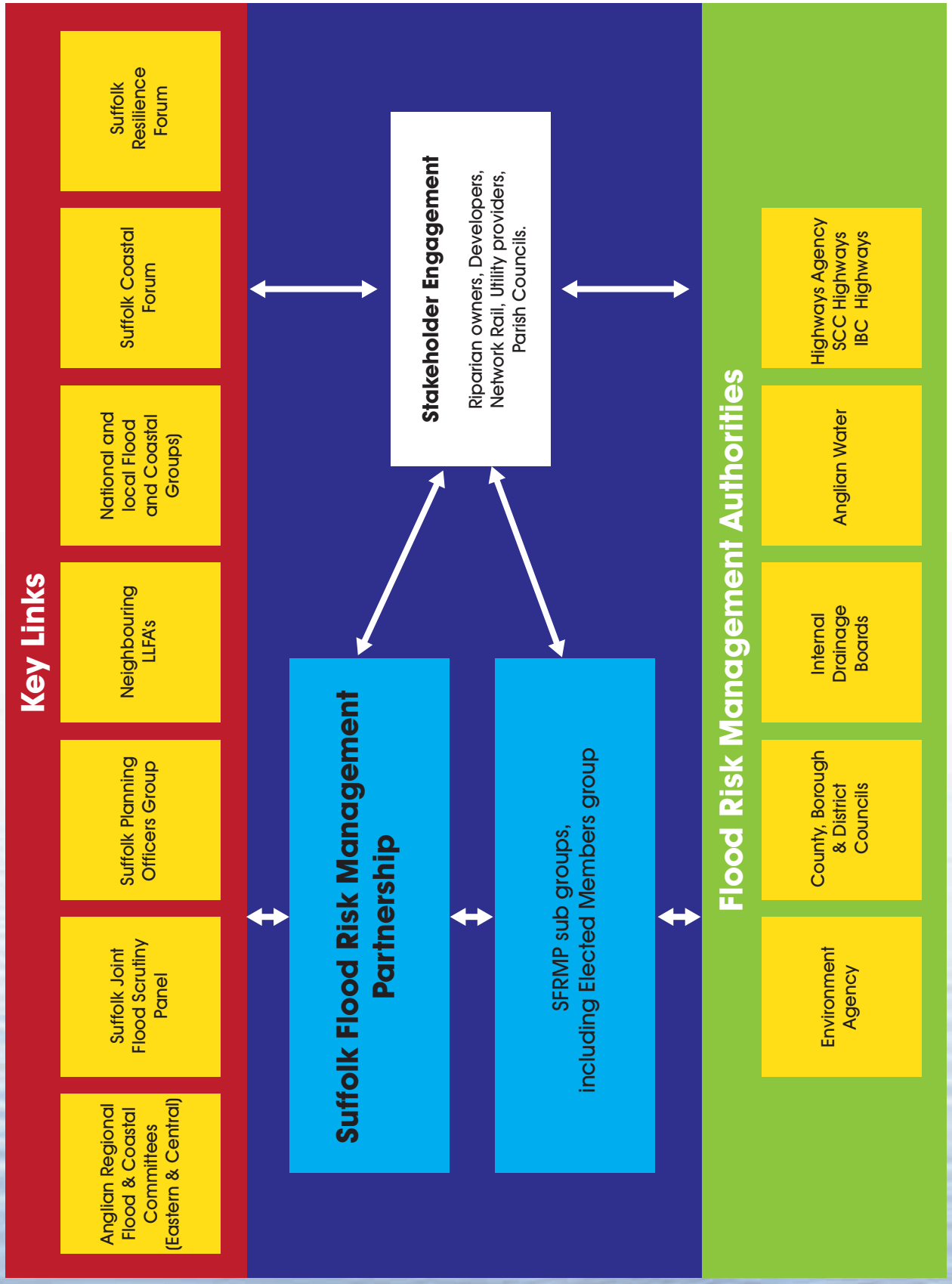


Figure 1.1: Relationships between groups involved in flood and coastal risk management

Suffolk has an extensive coast and estuaries, a network of rivers and low lying land, which combined with a number of urbanised areas, means it is at risk of flooding from a range of different sources.

The main sources of flood risk within Suffolk include:

Surface water flooding, also known as pluvial flooding or flash flooding, occurs when high intensity rainfall generates runoff which flows over the surface of the ground and ponds in low lying areas. It is usually associated with high intensity (typically greater than 30mm/hr) or prolonged rainfall and can be exacerbated when the ground is saturated or when the drainage network has insufficient capacity to cope with the additional flow. Until recently, the risk from surface water was poorly understood, with little information available about the mechanisms of surface water flooding and the associated risks.

Based on current information Suffolk has nearly 120,000 properties predicted to be affected by surface water flooding during an extreme rainfall event with a 0.5 per cent (1 in 200) chance of happening each year and a flooding depth of 0.3 metres. This risk is widespread across the county (see Figure 4.2).

Groundwater flooding occurs when water levels in the ground rise above the ground surface. Flooding of this type tends to occur after long periods of sustained heavy rainfall and can last for weeks or even months. The areas at most risk are often low-lying areas where the water table is more likely to be at a shallow depth and flooding can be experienced through water rising up from the underlying aquifer or from water flowing from springs. The Suffolk Preliminary Flood Risk Assessment has identified areas susceptible to groundwater flooding across the county; this information will be used to assist with the prioritisation of flood risk areas.

River flooding, also known as fluvial flooding, occurs when a watercourse cannot accommodate the volume of water that is flowing into it. Rivers are categorised into **main rivers** and **ordinary watercourses**. Main rivers are usually large watercourses but also include smaller watercourses of strategic drainage importance. The Environment Agency's powers to carry out flood defence works apply to main rivers only. All other smaller watercourses, ditches and streams are classified as ordinary watercourses. Internal Drainage Boards, which cover the lower-lying, drained areas of the county, have powers to carry out works on many ordinary watercourses in the east and northwest of Suffolk.

Suffolk has a number of main rivers (see section 2.7.2) and associated tributaries including, the Waveney, Blyth, Alde, Ore Deben, Orwell, Stour, Gipping, Lark and River Little Ouse which all pose a threat of river flooding, in addition to the vast network of ordinary watercourses.

The north west of the county is part of the Fens – an extensive drained area mainly below sea level, extending into the counties of Cambridgeshire, Lincolnshire and Norfolk. Chapter 3 will deal with this unique area as a whole.

Coastal or tidal flooding usually occurs during storm surges when there is an increased risk of high sea levels causing overtopping or breaching of coastal flood defences leading to flooding inland. The greatest risk of coastal flooding is experienced when there is a combination of high tides and a storm surge, which is when a low pressure system causes a localised rise in sea level and wave height. Many parts of Suffolk's coastline and estuaries are prone to coastal flooding, as illustrated by the severe floods in 1953.

Based on Environment Agency flood maps, there are some 38,000 properties at risk of river/tidal flooding in Suffolk.

Coastal erosion, the wearing away of land and the removal of beach sediments by wave action, tidal currents, wave currents or drainage occurs in a number of locations along Suffolk's coast. However, this risk falls outside the responsibility of the Lead Local Flood Authority and is outside the scope of this strategy. There may, in the longer term, be areas where erosion will lead to increased flood risk.

Reservoir flooding results from the complete or partial failure of a reservoir structure. It may be caused by erosion due to seepage, overtopping

of the dam beyond its design level or through accidental damage to the structure. There is only one large reservoir in Suffolk (Alton Water) that poses a slight risk to a small number of properties. There are a number of smaller, largely agricultural reservoirs, but the likelihood of flooding from these sources is extremely rare and most are located well away from residential areas.

Sewer flooding occurs when the sewer network cannot cope with the volume of water that is entering it or when pipes within the network become blocked. This type of flooding is often experienced during times of heavy rainfall when large amounts of surface water overwhelm the sewer network causing flooding. Water Utility 'DG5'[12] registers show a total of 247 flood events reported by water companies over the last decade. These events occurred in a number of locations, largely within urbanised areas.

Highway flooding can be defined as flooding caused by heavy rainfall or overflowing from blocked or overloaded drains, soakaways and gullies causing water to pond within the highway network or from a lack of formal drainage system. During the Preliminary Flood Risk Assessment process, highway flooding reports were collected from around 250 different locations (with dates up to 15 years ago) and this data is included in the overall evidence base of flood information.

Highway flooding in Beyton in 2009. Work has now taken place to alleviate this problem

It is frequently difficult to establish a single precise cause for flooding and a holistic approach needs to be taken.

1.6 Factors increasing flood risk

Flood risk is a combination of probability and consequence; as there are a number of factors which will lead to higher probability of flooding in the future and more serious potential consequences, this will result in an increase in the risk of flooding across Suffolk.

The factors leading to an increase in flood risk include:

- The prediction that climate change[13] will lead to more frequent and more severe extreme weather and rising sea levels, and therefore to more extreme floods with more serious consequences.
- The deterioration in the condition and performance of existing drainage infrastructure and flood defence structures over time will increase future flood risk.
- New development and changes in land use may lead to an increase in impermeable surfaces and general loss of vegetation cover, therefore causing increased levels of runoff during heavy rainfall events.

1.7 Suffolk's environment

Suffolk has a number of nationally and internationally designated environmental sites in addition to locally important ecological areas. Figure 1.2 (overleaf) highlights the major protected areas[14]. For further information and maps see **www.natureonthemap.naturalengland.org.uk/**

12. A water-company held register of properties which have experienced sewer flooding due to hydraulic overload, or properties which are 'at risk' of sewer flooding more frequently than once in 20 years

13. http://www.ukcip.org.uk/

14. For information, other designations and maps see http://www.natureonthemap.naturalengland.org.uk/

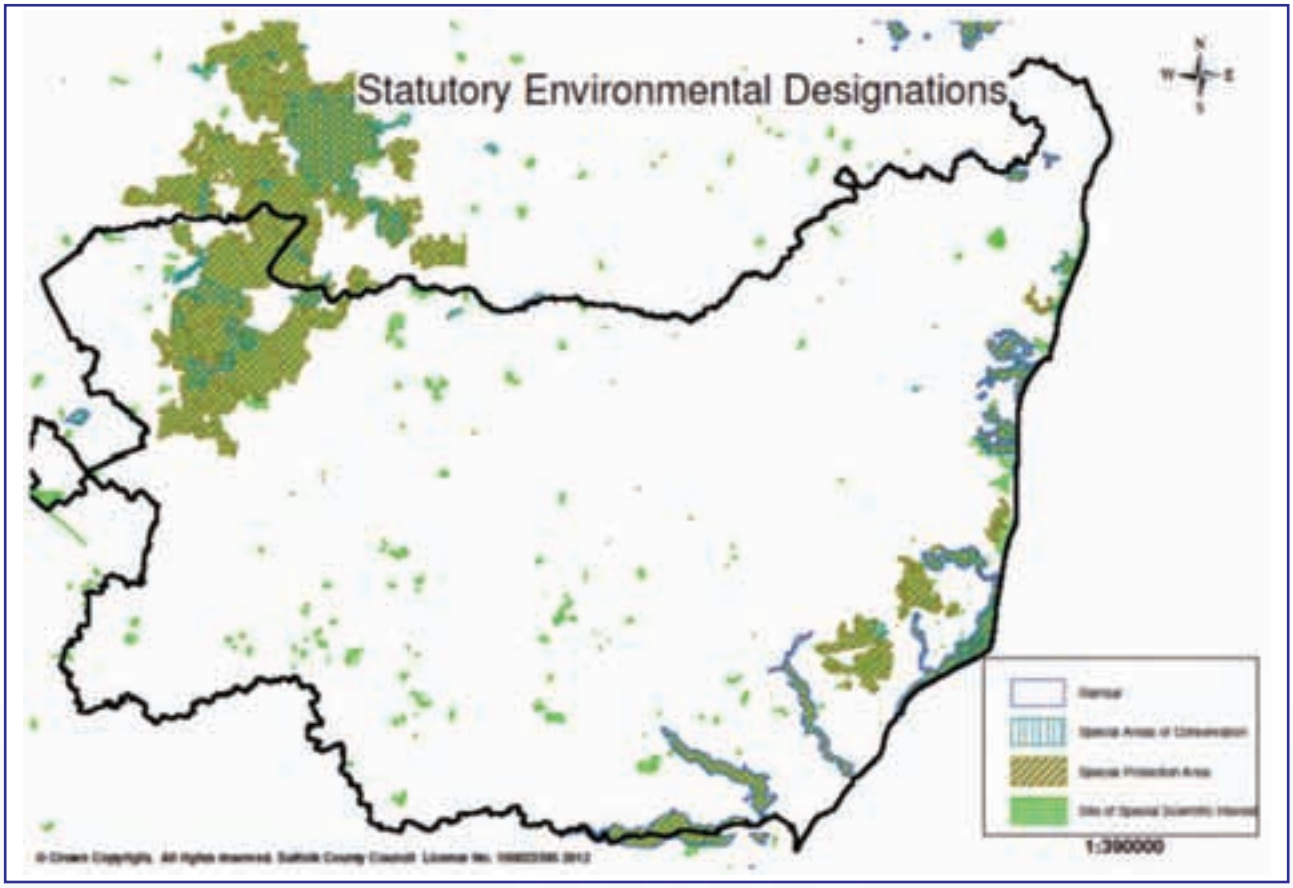


Figure 1.2 Map showing main environmental designations in Suffolk

In addition there are also a large number of locally designated wildlife sites and areas which are important to improving biodiversity in Suffolk[15].

Flood and coastal risk management has the potential to impact on these sites either in a positive or negative way and all activities need to take due consideration of the natural environment, aiming to enhance biodiversity and water.

1.8 What happens next?

This strategy and its associated Action Plan will be a working document that will be amended as new legislation and policy comes into force and as new information guides our activities.

The Suffolk Flood Risk Management Partnership will publish a short review each year reporting progress on delivery of the action plan and agreeing any appropriate amendments to the strategy, detailed in Chapter 8.

The County Council recognises the need to increase success in preventing or mitigating flood risks, not only to reduce occurrences of flooding within Suffolk but also to limit the increasing demands on response and recovery capabilities for any larger scale flood event.
Dealing with these risks will be part of Suffolk's strategy for adaptation to climate change.

Extract from 'Suffolk County Council's Environmental Action Plan'

12. hhttp://www.suffolkwildlifetrust.org/species-and-habitats/county-wildlife-sites/

2. Flood management authorities and their responsibilities

2.1 The key players in flood and coastal management in Suffolk

Suffolk County Council, as the Lead Local Flood Authority, is responsible for taking the lead in managing flood risk from local sources. This includes surface water, groundwater and ordinary watercourses and also where there is an interaction between these sources and main rivers or the sea. The county council also has other related roles in emergency planning and road drainage – detailed in sections below.

There are a number of key organisations who together manage flood and coastal erosion risks in Suffolk. These are:

- The **Environment Agency** is responsible for managing flood risk from main rivers, reservoirs and the sea, and also has a strategic overview role over all flood and coastal erosion risk management. It also has a key role in providing flood warnings to the public and protecting and improving the environment and promoting sustainable development.
- **Anglian Water** is both a water and sewerage company, responsible for the provision of foul and surface water sewerage across the whole of Suffolk and providing water to the majority of Suffolk. **Essex & Suffolk Water** provides water, mainly in the north east of the county.
- **The Highways Agency, Suffolk County Council Highways Department and Ipswich Borough Council** are responsible for managing flood risk on roads and highways within the county. For trunk roads (A11 from Newmarket to Thetford; A12 north of Lowestoft; A12 south from Ipswich to Colchester and the A14) the responsibility lies with the Highways Agency; roads within Ipswich are looked after by Ipswich Borough Council (as agent for Suffolk County Council until March 2013) and for all other roads, responsibility lies with the County Council Highways Department.

Figure 2.1: district council boundaries

- Within Suffolk there are seven **District or Borough Councils** (see Figure 2.1, previous page) who, in addition to their planning role have powers to undertake flood risk management work on ordinary water courses outside of Internal Drainage Board areas. Suffolk Coastal and Waveney District Councils are maritime authorities responsible for managing risks from coastal erosion in their areas.
- There are three groups of **Internal Drainage Boards** located within the area. Internal Drainage Boards were set up in areas of special drainage need with the primary function to manage water levels in their areas to minimise flood risk and supply water to people, property and agriculture. See Figure 2.2 below for details of the areas for each Internal Drainage Board has responsibility.
- The **Broads Authority** manages the Norfolk and Suffolk Broads, with responsibility for conservation, planning, recreation and navigation. The Broads area has the status of National Park, thus the Broads Authority is responsible for planning for its area.
- **Suffolk Resilience Partnership (SRF)** is the mechanism by which the emergency responding agencies in Suffolk routinely co-operate with each other as a partnership to discharge their duties under the Civil Contingencies Act 2004 (CCA 2004). The SRF is not a statutory body nor does it have powers to direct its members; however, it is the agreed forum that co-ordinates multi-agency emergency preparedness, including risk assessment, contingency planning, training and exercise to enhance Suffolk's preparedness for emergencies.
- The **Joint Emergency Planning Unit (JEPU)** provides an enabling service for all Suffolk local authorities (county, district and borough) to prepare for emergencies and acts as a focal point for local authorities when dealing with other response agencies as part of the Suffolk Resilience Forum.

2.2 Responsibility for flooding

As discussed, flooding can come from a number of different sources and under recent legislation the responsibility for managing the risk from these different sources falls with different Risk Management Authorities; a simplified illustration of this can be seen in Figure 2.3 below. (NB. coastal erosion is not included).

The sections below provide more information about all the powers and responsibilities that these organisations have.

But flood risk management is not something that can be left solely in the hands of certain organisations and forgotten by everyone else. **Households, businesses and landowners** have their part to play too. Even if this strategy was being devised at a time of substantial public sector budgets, the organisations would still not be able to prevent all floods or solve all concerns. That is why the powers and responsibilities of Suffolk's citizens are also recorded in this section.

Typical IDB drainage channel, near Sizewell

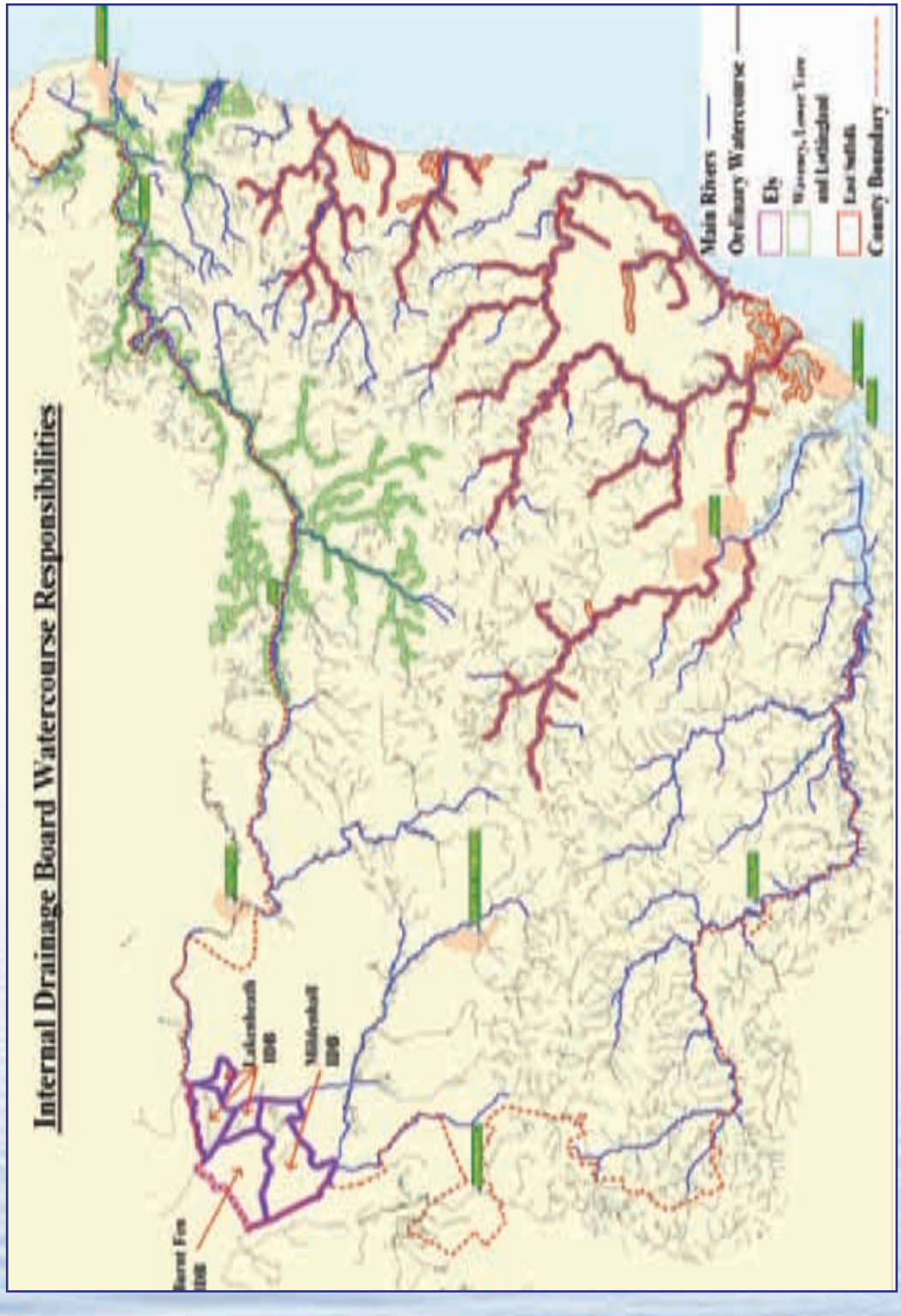


Figure 2.2: Internal Drainage Board Watercourse Responsibilities[16]

16. For details and local maps –

Ely Group: http://www.elydrainageboards.co.uk;

East Suffolk Group: http://www.wlma.org.uk/index.pl?id=144

Waveney, Lothingland & Yare: http://www.nicholsons-uk.com/LinkClick.aspx?fileticket=ccrryiuTPX4%3d&tabid=623&mid=1465

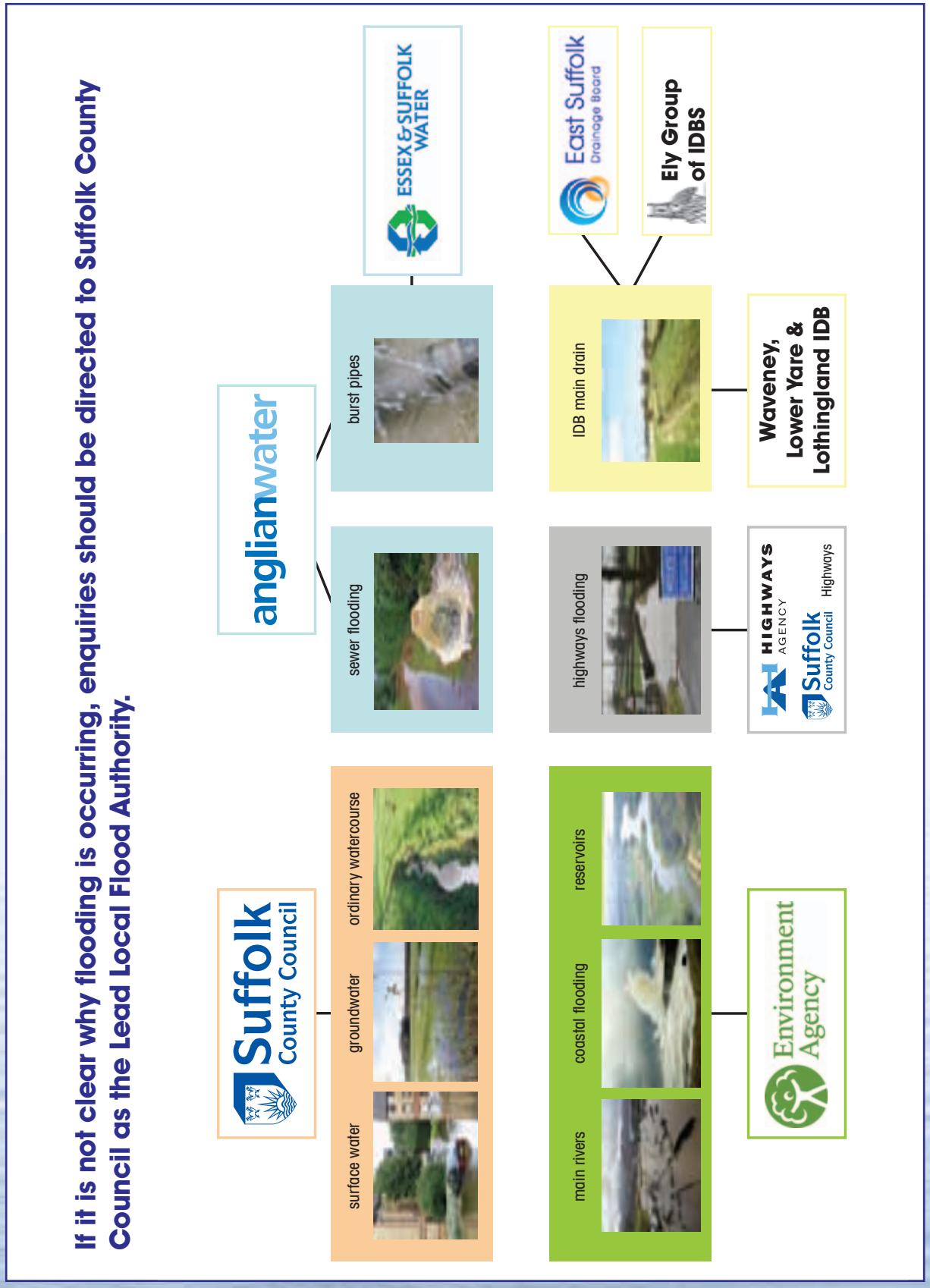


Figure 2.3 Overview of responsibility for flood risk management within Suffolk.

2.3 Powers and responsibilities of Flood Risk Management Authorities

The Flood and Water Management Act identified certain organisations as 'risk management authorities' which have responsibilities around flooding, both new ones from the Flood and Water Management and longstanding ones from previous legislation.

These authorities have all of the following duties and powers:

- Duty to be subject to scrutiny from the lead local flood authority's democratic processes. In Suffolk we have a Joint Flood Scrutiny Panel comprising councillors from the county council and all district/borough councils.
- Duty to co-operate with other risk management authorities in the exercise of their flood and coastal erosion risk management functions, including sharing flood risk management data.
- Power to take on flood and coastal erosion functions from another risk management authority when agreed by both sides.

Co-operation between these risk management authorities will take place through the Suffolk Flood Risk Management Partnership. This will entail collaboration on recording flood assets, assisting with flood Investigations, providing local knowledge to Sustainable Drainage (SuDS) Approval Officers regarding drainage applications in their area relating to new development, sharing information and data and working together to ensure public enquiries are dealt with swiftly by the appropriate organisation.

In addition, all authorities have a universal duty to comply with **environmental legislation**. They have a duty to take reasonable steps, consistent with the proper exercise of the authority's functions, to further the conservation of Sites of Special Scientific Interest. (Wildlife & Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000)

All authorities are required to have regard for the requirements of the Habitats Directive in the exercise of their functions (regulation 9(5)).

2.4 Powers and duties of Suffolk County Council

2.4.1 As Lead Local Flood Authority

The Flood and Water Management Act 2010 identified Suffolk County Council as the Lead Local Flood Authority for the county of Suffolk. This gives the county council a strategic role in overseeing the management of local flood risk.

The main responsibilities of Suffolk County Council are as:

- Lead Local Flood Authority.
- SuDS Approval Body.
- Emergency Planning.
- Highways authority.
- Historical and natural environment.
- Planning Authority.

The Flood and Water Management Act 2010 gives the county council the following duties and powers.

NB. A duty is something the council is legally obliged to do; a power can be used if appropriate but does not have to be used.

The Flood Risk Management Authorities in Suffolk are:

Suffolk County Council

Anglian Water

Internal Drainage Boards

District and Borough Councils

Environment Agency

Highways Authorities

- Strategic leadership of local risk management authorities.
- Development, maintenance, application and monitoring of a strategy for local flood risk management.
- Powers to request information from any person in connection with the authority's flood and coastal erosion risk management functions.
- A duty to investigate and publish reports on flooding incidents as appropriate (see box for details), to identify which authorities have relevant flood risk management functions and what they have done or intend to do.
- A duty to maintain a register of structures or features (asset register) which have a significant effect on flood risk in their area, in the view of the lead local flood authority.
- Responsibilities as a SuDS Approval Body (SAB) with responsibility for approval, adoption and maintenance of most new SuDS.
- Decision making responsibility for whether works on ordinary watercourses that may affect water flow can take place. Internal drainage boards also have this role on ordinary watercourses within their areas.
- A duty to exercise flood or coastal erosion risk management functions in a manner consistent with the national and local strategies.
- A duty to aim to contribute towards the achievement of sustainable development in the exercise of flood or coastal erosion risk management functions and to have regard to the Ministerial guidance on this topic.
- Power to do works to manage flood risk from surface runoff or groundwater.

  This includes powers under s25 Land Drainage Act 1991 to require a person impeding the proper flow of water in an ordinary watercourse to remedy that condition.
- Power to designate structures and features that affect flooding.

Suffolk County Council has an important role to play as the strategic leader for local flood risk management in Suffolk. This involves developing this strategy, 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.

The Suffolk Flood Risk Management Partnership is led and managed by the county council and provides an important forum to discuss all aspects of flood risk management in the county.

2.4.2 In the Recording of Flood Incidents

To assemble an accurate picture of flood risk across Suffolk requires the collection of precise and useful records from actual flood incidents occurring across the County.

The decision whether or not to investigate a flood is at the discretion of the Lead Local Flood Authority and the comprehensiveness of the investigation will be adjusted to reflect the significance of the incident and the resources available. In the event of very widespread, significant flooding affecting large areas of Suffolk, our ability to investigate every incident in detail is likely to be severely limited.

TThe investigations will examine which authorities have an involvement in a flood incident, and a report will outline their responsibility or actions, if any. Investigations will involve consultation with the relevant risk management authorities, landowners and private organisations involved, all of whom we expect to co-operate with us and provide comments.

In order to obtain consistent and accurate records of local flooding in Suffolk we need as much information as possible from individuals and Parish Councils.

If you become aware of a flood in your area, please provide us with the following information via floods@suffolk.gov.uk or complete the online form at www.suffolk.gov.uk/floodrisk

- **Your name and contact details**
- **Date of the flood**
- **Location of the flood (map references or precise address)**
- **How long did the flood last?**
- **How deep was the water at its worst?**
- **Where did the water come from (if known)? e.g. overflowing ditch**
- **Weather preceding the flood – including amount of rainfall if known**
- **Did water get into domestic/commercial properties? If so, which ones?**
- **What damage or problem did the flooding cause? e.g. blocked road into village for 2 hours or flooded all downstairs rooms.**
- **Was any action taken at the time to reduce the flood risk? e.g. use of flood gates at front door.**
- **Any other relevant information.**

Photographs of the flood and its effects are very useful, so please provide these wherever possible

The aim is for Flood Investigation Reports to bring all useful information together in one place, providing an understanding of situations, outlining possible causes of flooding and potential long-term solutions. Further recommendations will also be made to highlight potential flood risk management actions. Reports will provide a clear and thorough understanding of flooding situations, but our duty to investigate does not guarantee that problems will be resolved and cannot force other authorities into action. Decisions about next steps must be made by the parties involved.

Flood Investigation Reports will be available to anyone on request within 3 months of an incident being reported to Suffolk County Council. However, there are cases where this timeframe will be extended (e.g. if widespread flooding occurred across the County).

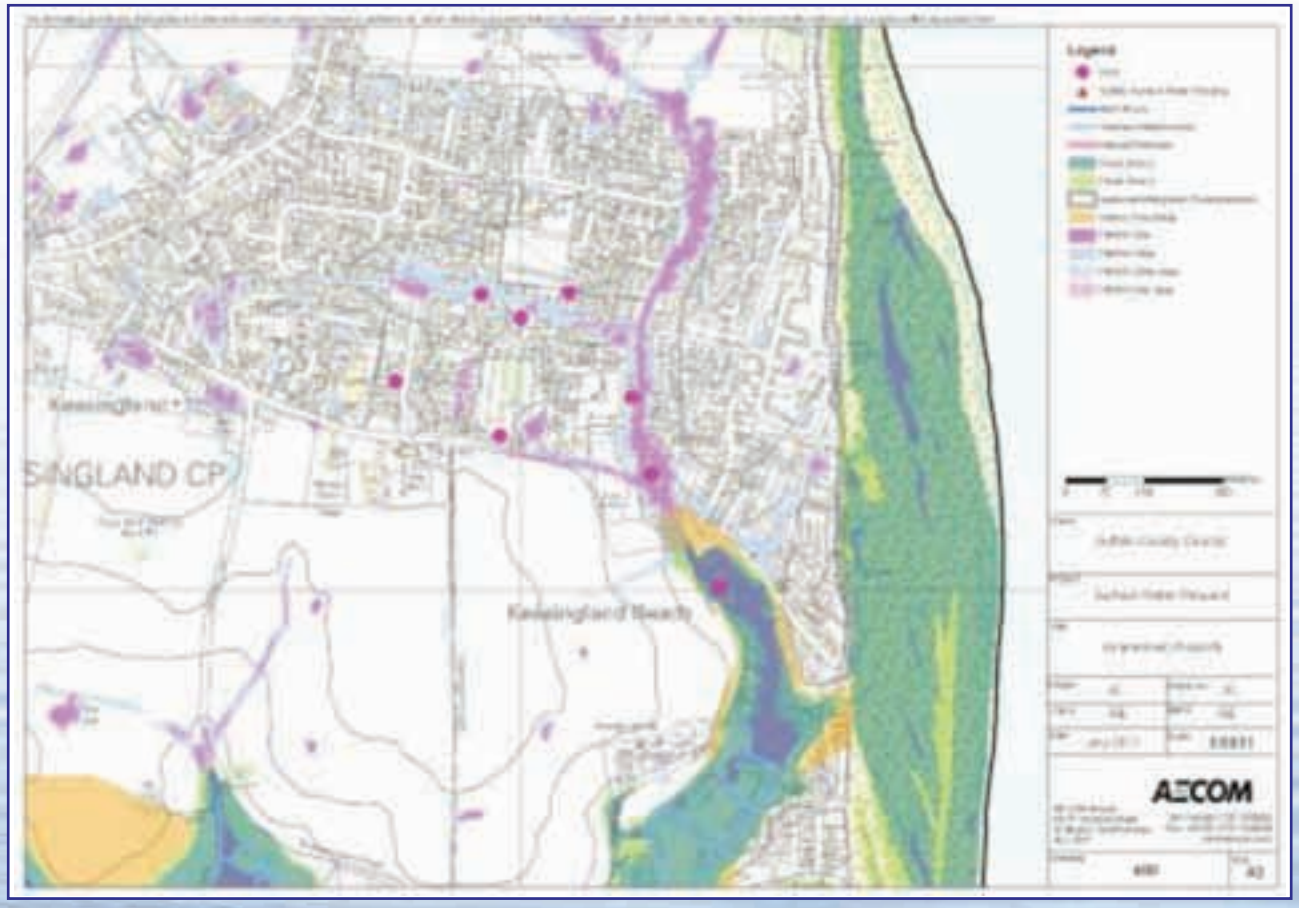


Figure 2.4: Example of map showing flood records

An investigation will normally be carried out where any of the following criteria are met:

- **where there was a risk to life as a result of flooding;**
- **where there is ambiguity surrounding the source or responsibility of a flood incident;**
- **where internal flooding of one property (domestic or business) has been experienced on more than one occasion;**
- **where internal flooding of five properties has been experienced during one single flood incident;**
- **where a major transport route was closed for more than 10 hours as a result of flooding;**
- **where critical infrastructure was affected by flooding.**

2.4.3 In the preparation of an Asset Register

Flood Risk Assets are structures or features which are considered to have an effect on flood risk. An example could be an embankment protecting properties and therefore decreasing flood risk, or an undersized culvert in a residential area, which may actually increase flood risk during high rainfall.

Suffolk County Council is required to ensure there are records of all significant assets available for use by risk management authorities and for inspection by the public at all reasonable times. It will take many years before this register is sufficiently comprehensive to be of real value in flood risk management. Steps are underway to develop a register within the county council and to link up existing registers held by other authorities.

Unlike major assets associated with fluvial or tidal flooding or coastal erosion, there has often been much confusion over the ownership and maintenance responsibility of local flood risk assets. This is likely to be due to local drainage infrastructure commonly being hidden underground or along land boundaries, where landowners either do not realise or acknowledge that they have any responsibility. The Asset Register is a way to address this problem and ensure that residents are aware of assets in their area and have information to enable them to contact the assets' owners when there are problems.

There are no set criteria for what defines an asset as significant but the most important consideration is its location. Future flood risk mapping and the flood history at a site will be used to analyse the 'significance' of each flood risk asset. The vulnerability of the asset's surroundings will also be used to determine the consequences of its failure.

New sustainable drainage assets will be recorded via the SuDS approval process and asset data may also be captured through local studies, such as Surface Water Management Plans and flood investigations.

2.4.4 In the Designation Of Assets

Once the relevant clauses of the Flood and Water Management Act have been commenced, Suffolk County Council, the Environment Agency, Internal Drainage Boards and the District Councils will all be 'designating authorities'. That is, they may 'designate' features or structures where the following four conditions are satisfied:

1. The designating authority thinks the existence or location of the structure or feature affects
   a. a flood risk, or
   b. 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 designating risk management authority. The aim of designating flood risk assets is to safeguard them against unchecked works which could increase flood risk in the area. Designating of features or structures is not something that will be done regularly but only when there are concerns about the asset.

   All proposals for designation will be discussed by the Suffolk Flood Risk Management Partnership in order to ensure consistency across the designating authorities.

Note: designation of an asset does not mean there is a duty on anyone to maintain it in its current condition.

2.4.5 In carrying out a 'Consenting' role in respect to Watercourses

If riparian owners or other bodies wish to culvert an ordinary watercourse or insert any obstruction, consent is required. Except within Internal Drainage Board areas, Suffolk County Council is responsible for this (from 6 April 2012). The clear guiding principle will be to ensure that obstructions in watercourses are kept to a minimum and not increase the risk of flooding.

Information about the need for consents and the consenting process are available on the website **www.suffolk.gov.uk/floodrisk** – click on the section "information about gaining consent for works affecting watercourses". Where obstructions are inserted without consent, or in a manner contrary to a consent, the council has powers to enforce their removal or take remedial action.

2.4.6 In performing the SuDS Approval Body (SAB) role

Sustainable Drainage Systems (SuDS) are a crucial mechanism in ensuring that development can take place without causing drainage problems for existing development. SuDS retain surface water runoff within the development and stop it running off at fast rates, causing flooding downstream. They also provide an opportunity to ensure that water quality and amenity are considered with the same importance as managing volumes of water. In this respect, sustainability and consideration of biodiversity and natural habitat issues can become an integral part of the design and development process.

The Flood and Water Management Act 2010 assigns Suffolk County Council the role of a SuDS Approval Body (SAB) which must:

- Approve all construction work which has drainage implications.
- Adopt all SuDS schemes associated with surface water emanating from more than one property.
- Ensure that all adopted SuDS Schemes are properly maintained.

When this aspect of the Act is enacted (expected by April 2013) full details of how this will be implemented will be agreed with partners and publicised widely.

The SuDS approval process will be integrated with the planning process – with discussions commencing at the earliest possible stage.

In the interim, the guidance on SuDS principles, given in section 5.4.1, should be noted.

2.4.7 In carrying out Emergency Planning

Emergency planning in Suffolk is co-ordinated by the Suffolk Joint Emergency Planning Unit (JEPU), involving both the County and District/Borough Councils. JEPU supports the efficient delivery of civil preparedness and business continuity services within local authorities, working closely with emergency services, the Environment Agency and other relevant bodies in the event of flood

emergencies, assisting as appropriate in evacuation, rescue and recovery after a flood. The unit, with staff based in district and borough councils and centrally in the County Council, provides expertise to enable councils to meet their statutory responsibilities:

- Assess Suffolk risks in accordance with lead responsibility and coordinate local authority input to Community Risk Register.
- Develop Suffolk Emergency Plans in accordance with lead responsibility.
- Develop Suffolk local authorities Business Continuity Management arrangements.
- Develop arrangements for Civil Preparedness information available for public use.
- Maintain system for warning, informing and advising public in event of an emergency.
- Share information with other Suffolk responders.
- Co-operate with other Suffolk responders to enhance co-operation and efficiency.
- Provide advice and assistance to businesses and voluntary organisations about business continuity management.

During and after an emergency, JEPU will coordinate county, district and borough councils in the following roles and responsibilities:

- Coordinate emergency support within their own functions.
- Deal with surface water and groundwater flooding, flooding from 'non main rivers'.
- Work with the other Category 1 and 2 responders as part of the multi-agency response to floods.
- Coordinate emergency support from the voluntary sector.
- Liaise with central and regional government departments.
- Liaise with essential service providers.
- Open rest centres.
- Manage the local transport and traffic networks.
- Mobilise trained emergency social workers.
- Provide emergency assistance.
- Deal with environmental health issues, such as contamination and pollution.
- Coordinate the recovery process.
- Manage public health issues.
- Provide advice and management of public health.
- Provide support and advice to individuals.
- Assist with business continuity.

An increasingly important part of this role, supported by the Environment Agency and voluntary organisations, is to encourage the formation of local emergency groups.

2.4.8 As the Highways Authority

All Highways Authorities are Risk Management Authorities according to the Flood and Water Management Act and must adhere to all the responsibilities of risk management authorities. The County Council is the highways authority for most of the county with the following exceptions:

- The Highways Agency is the highway authority responsible for trunk roads - the A11 from Newmarket to Thetford; A12 north of Lowestoft: A12 south from Ipswich to Colchester and the A14.
- Ipswich Borough Council is currently the Agent to Suffolk County Council as highway authority discharging functions for roads within the borough.

The responsibilities/powers listed in this section are relevant to all these highways authorities.

In addition to their responsibility as a risk management authority, highways authorities also have further responsibilities:

- **Responsibility to maintain the Highways**

  Under the Highways Act, the Highways Authority has a duty to maintain the highway. This includes ensuring that highway drainage systems are clear and that blockages on the highway are cleared, where reasonably practicable.

As part of this duty, roads are regularly inspected and maintained.

- **Powers to deliver works**

  Highways authorities are able to adopt SuDS that serve the highways.

  The highway authority can deliver works that they consider necessary to protect the highway from flooding. These can be on the highway or on land which has been acquired by the highway authority in the exercise of highway land acquisition powers for that purpose.

  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.

- **Response in an Emergency Flooding Event**

  In the event of an emergency or major incident Suffolk highways authority will aim to provide:

  - The means to transport people through its' contacts with local bus, coach and taxi operators and the in house fleet to assist with evacuations and helping uninjured survivors at the scene of a major incident to travel home or to a place of safety.
  - Assistance in management of the transportation network to restore the flow of traffic in the event of an evacuation or away from the area of an incident. This includes providing equipment such as barriers, cones and signs and setting up and marking route diversions (service provided by Works Contractors in conjunction with the Police) and changing traffic signal controls to improve the flow of traffic.
  - Use of the Suffolk Traffic Control Centre facilities and established media contacts to keep staff and the public across the County informed on travel related matters plus detection systems to enable management of traffic on the road network.
  - The means to inspect repair or clear the highway network through the provision of staff, materials and equipment sourced through contractors.

2.4.9 In connection with the Historic Environment

The historic environment comprises historic landscape, built environment and buried archaeological deposits. The County Council's Archaeological section advises planners and other land management decisions such as flood management to avoid or mitigate damage to the historic environment.

It maintains the Historic Environment Record which is the most complete record of all historic environment assets within Suffolk and using this knowledge to advise the on the impact of proposed schemes including, for instance, flood storage areas, swales, and SuDS.

2.4.10 As a Planning Authority

Suffolk County Council is a Planning Authority with responsibilities similar to District and Borough Councils planning functions, albeit restricted to minerals and waste related developments and the determination of county council planning applications, which affect Flood Risk Management in two key ways:

1) Considering flooding concerns in developing local minerals and waste plans
2) Working with the SuDS Approval Body in ensuring that planning applications and drainage applications are complementary – namely the determination of Minerals and Waste planning applications and the county council's own developments (schools, roads etc).

2.5 Powers and responsibilities of district and borough councils

Outlined below are the flood risk management roles and responsibilities of district and borough councils. The key areas where they have responsibilities can be identified as follows:

- Responsibilities under the Flood and Water Management Act 2010.
- Responsibilities as a Planning Authority.
- Responsibilities for maintenance of public spaces.
- Responsibilities as a coastal erosion risk management authority.
- Responsibilities for emergency planning.

2.5.1 Responsibilities under the Flood and Water Management Act

District and Borough Councils have the universal responsibilities under the Flood Water Management Act. They also have the following new responsibilities

- Power to designate structures and features that affect flooding or coastal erosion.
- Duty to act consistently with local and national strategies.

2.5.2 Responsibilities under the Land Drainage Act

District and Borough Councils no longer have responsibilities (except when it is a landowner) under the Land Drainage Act.[17]

Coastal Erosion protection at Shotley

17. 6th commencement of Flood & Water Management Act, 6 April 2012

2.5.3 Responsibilities as a Planning Authority

District and Borough Councils' planning function affects Flood Risk Management in three key ways:

NB. These same functions apply to the Broads Authority as the planning authority for its area.

- Considering flooding concerns in developing local plans.
- Working alongside developers and the SuDS Approval Body in ensuring that planning applications and drainage applications are complementary.
- Considering flood risk assessments submitted in support of applications on which the Environment Agency do not require to be consulted.

When considering flooding concerns in developing local plans the Planning Authority needs to do the following:

- Produce a Strategic Flood Risk Assessment. This should consider not just fluvial and coastal flooding but also local flood risk issues. Where Critical Drainage Areas have been identified these will need to be included.
- Develop a Local Development Framework (LDF) that carefully considers flood and coastal erosion risks. This is a statutory planning document which planners can then use to object to inappropriate development in the floodplain. Consequently the LDF should support the Strategic Flood Risk Assessment (SFRA), the Preliminary Flood Risk Assessment and Surface Water Management Plan (where applicable). This should allow the LDF to assess and record the flood risks for new developments and steer development to areas of lowest flood risk. Equally in maritime districts, there is requirement to assess risks from coastal erosion and permanent tidal inundation and where appropriate designate coastal risk management zones where permanent development will not be permitted.
- Planning authorities should only approve development where it can be demonstrated that the proposal satisfies all the following criteria: (a) it does not increase the overall risk of all forms of flooding in the area through the layout and form of the development and use of appropriate SuDS; (b) it will be adequately protected from flooding; (c) it is and will remain safe for people for the life time of the development and (d) it includes water efficiency measures such as rainwater harvesting or use of local land drainage water where practicable.[18]
- Promote development in areas of lowest probability of flooding through embedding the sequential approach referred to in the National Planning Policy Framework into the LDF.
- Safeguard land for critical infrastructure.
- Develop action plans, where necessary, to support sustainable spatial planning and ensure all plans are integrated and firmly linked to local strategies.
- Ensure that neighbourhood plans fully consider flood risk issues.

Co-operation between the Planning Authority and the SuDS Approval Body requires the planning authority to:

- Alert developers and land owners at the master planning stage of the need to consult with the SuDS Approval Body about drainage issues on the site.
- Ensure that requests for outline planning permission are discussed with the SuDS Approval Body.
- Ensure that when the planning application arrives, the attached drainage application is immediately sent on to the SuDS Approval Body (subject to change depending on DEFRA application system proposals).
- Amend local guidance so that, as with recommendations from highways authorities,

18. See technical guidance associated with the National Planning Policy Framework: http://www.communities.gov.uk/documents/planningandbuilding/pdf/2115548.pdf

local planning authorities are able to reject planning applications on the basis that they have failed their drainage application.

Where appropriate, planning authorities are requested to advise clients of the need discuss with the Lead Local Flood Authority whether a land drainage consent is required for alterations or new structures within an ordinary water course.

2.5.4 Responsibilities for maintenance of public spaces

District and Borough Councils are responsible for maintenance of some parks and public spaces and have responsibility for street cleaning. Good maintenance practices can help to reduce flood risk, for instance by ensuring that drainage channels are kept clear and that rubbish and leaves are not tidied into watercourses. For new public spaces which are under the control of a management company, these activities should be included in the management contract.

District and Borough Councils may also be riparian owners of both ordinary and main watercourses and as such should carry out the duties imposed on riparian owners by the Land Drainage Act. They should maintain all assets in their ownership.

Some councils have adopted SuDS systems as part of their public open spaces and these council will be responsible for their maintenance unless transferred to the SuDS Approval Body.

2.5.5 Responsibilities as a coastal erosion risk management authority

Coastal erosion risk management authorities are identified by the Act as those districts councils that have a coastal erosion risk management function. In Suffolk, Waveney and Suffolk Coastal District Councils are coastal erosion risk management authorities. Responsibilities include:

- Shoreline Management Planning in conjunction with the Environment Agency.
- Delivery of coastal erosion risk management activities.
- Working alongside the Environment Agency to develop and maintain coastal flood and erosion risk information.
- Maintain a register of assets and other features that help to manage coastal risks.
- Implement, manage, maintain and monitor shoreline management plans to understand and manage coastal flood and erosion risks.
- Assist communities in planning for the future and taking appropriate steps to adapt to changing coastal erosion risks.

2.5.6 Responsibilities for emergency planning

District councils are part of the Joint Emergency Planning Unit – see section 2.4.7.

2.6 Powers and Responsibilities of Internal Drainage Boards (IDBs)

An Internal Drainage Board (IDB) is a public sector operating authority, empowered under the Land Drainage Act 1991 in areas of special drainage need in England & Wales to carefully manage water levels within defined drainage districts for land drainage, flood risk management, irrigation and environmental benefit.

IDBs operate in water catchment areas not county or district council boundaries, and undertake routine maintenance of drainage channels, ordinary watercourses, pumping stations, and other critical water control infrastructure under permissive powers, the overall responsibility for maintenance being with the riparian owner. Principle operations include weed cutting, de-silting, tree management, mowing of bank-side vegetation and structural inspection, repair and replacement of fixed water control assets.

IDBs can also bring forward water level management schemes through the Regional Flood and Coastal Committees, and will work with lead local flood authorities and local communities to shape schemes which respond to local flood risk priorities.

2.6.1 Emergency Action Planning

IDBs contribute to the development of multi-agency flood plans, which are developed by local resilience forums to help all organisations

involved in responding to a flood event to work better together.

During periods of high rainfall and tidal surge events resources are deployed to take action checking sensitive locations, removing restrictions and where possible reducing the risk of flooding to people and residential property, vital community infrastructure, commercial properties, agricultural land and ecologically sensitive sites. IDBs liaise with flood risk management partners on the developing situation within their districts in order that Lead Local Flood Authorities can execute an appropriate level of response. IDB resources will assist where possible in any post-flood remedial and clearance operations and co-operate with partners in undertaking assessment of significant flooding incidents to determine if new works can be undertaken to reduce the effect of future flooding events.

2.6.2 Development Control

One of the principle services that IDBs provide is consenting works carried out by others in or adjacent to water courses within their operational district. This is done by reasonable application of the Board's Byelaws and the Land Drainage Act 1991, to ensure that any development has regard to secure the efficient working of the drainage system now and in the future and does not cause unnecessary adverse environmental impact as a consequence.

2.6.3 Planning guidance

Associated with the powers to regulate water level management activities within their operational area, IDBs provide comments to local planning authorities on developments in their district and when asked, make recommendations on measures required to manage flood risk and to provide adequate drainage solutions.

2.6.4 Consenting and enforcement on ordinary water courses

Within their drainage districts, IDBs have powers for consenting on ordinary watercourses.
See section 2.4.5.

2.7 Powers and Responsibilities of the Environment Agency

The Environment Agency has both a national strategic role and local operational roles when it comes to flood and coastal erosion risk management.

2.7.1 National Strategic Role

The Environment Agency is required to publish the National Strategy which provides a national framework for all forms of flood and coastal erosion risk management. It aims to deliver a risk-based approach whilst allowing local responsibility and decision-making where appropriate. Like the local strategy, it looks to define and understand the roles and responsibilities of risk management authorities and to provide information to communities at risk and know what they need to do.

The National Strategy identifies the following strategic actions for the Environment Agency:

- Use strategic plans like the Catchment Flood Management Plan and the Shoreline Management Plan to set the direction for Flood and Coastal Erosion Risk Management.
- Support the creation of Flood Risk Regulations reports by collating and reviewing the assessments, plans and maps that Lead Local Flood Authorities produce.
- Providing the data, information and tools to inform government policy and aid risk management authorities in delivering their responsibilities.
- Support collaboration, knowledge-building and sharing of good practice including provision of capacity-building schemes such as trainee schemes and officer training.
- Manage the Regional Flood and Coastal Committees (RFCCs) and support their decisions in allocating funding for flood defence and flood resilience schemes.
- Report and monitor on flood and coastal erosion risk management.

- Provide grants to risk management authorities to support the implementation of their incidental flooding or environmental powers.

2.7.2 Local Operational Role

TThe Environment Agency's Local Operational Role includes emergency planning and managing flooding from main rivers, reservoirs and the sea.

Main Rivers

Main Rivers are watercourses shown on the Environment Agency's statutory Main River map. The Environment Agency has permissive powers to carry out works of maintenance and improvement on Main Rivers. This can include any structure or appliance for controlling or regulating flow of water into or out of the channel. The overall responsibility for maintenance of Main Rivers, however, lies with the riparian owner.

It can also bring forward flood defence schemes through the Regional Flood and Coastal Committees, and it will work with lead local flood authorities and local communities to shape schemes which respond to local priorities.

Coastal Flooding

The Environment Agency is the lead organisation responsible for all flood and erosion risk management around the coastline of England, including tidal flood risk. The Environment Agency leads in the development of Shoreline Management Plans and works with partner organisations, including local authorities to put them into practical action. The Environment Agency supports this by giving Grant-in-Aid funding for coastal defence schemes and overseeing the work carried out.

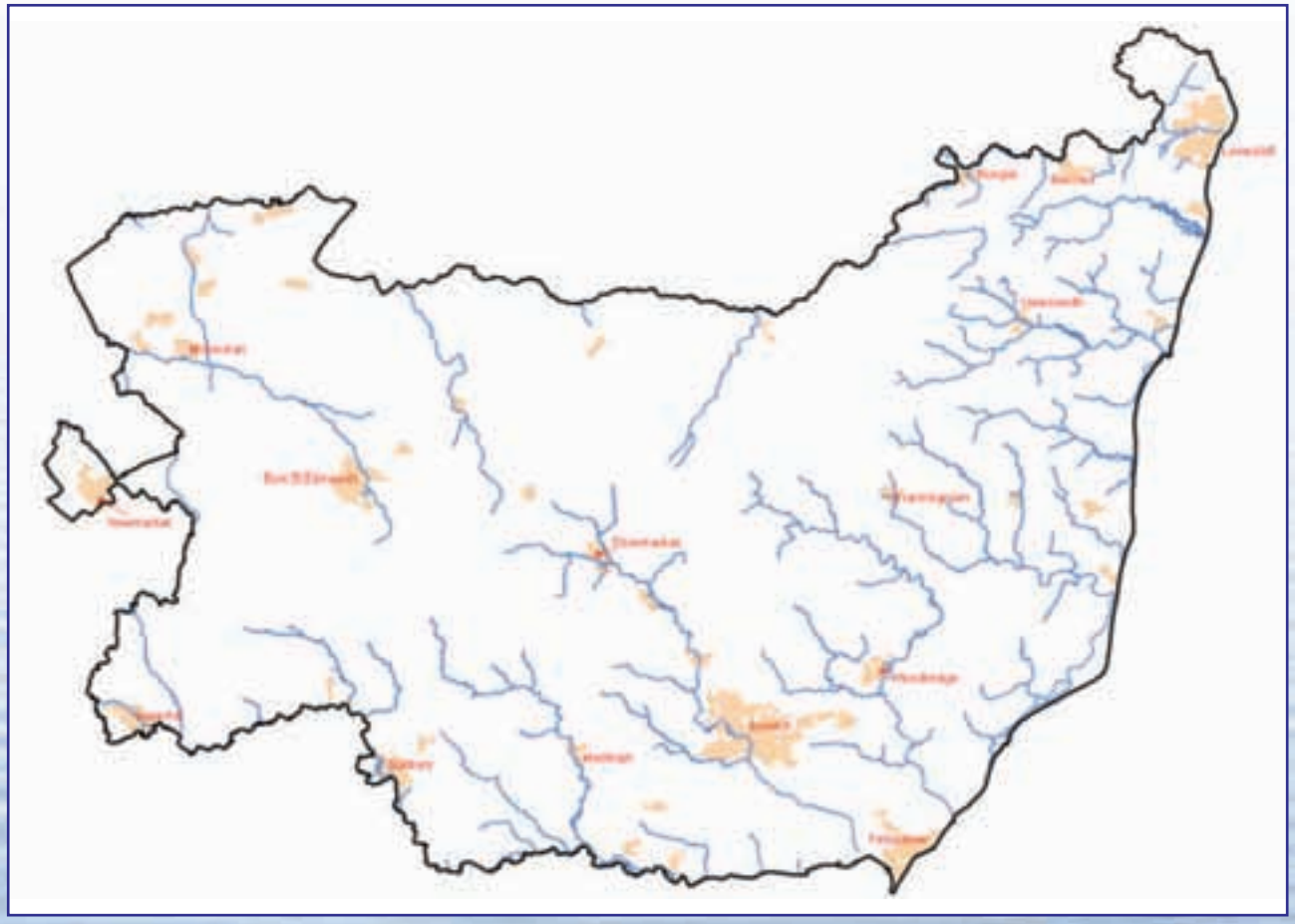


Figure 2.5: Main river map of Suffolk

Reservoirs

The Environment Agency enforces the Reservoirs Act 1975, which is the safety legislation for reservoirs in the United Kingdom. The Environment Agency is responsible as the Enforcement Authority in England and Wales for reservoirs that are greater than 10,000m^3. As Enforcement Authority the Environment Agency must ensure flood plans are produced for specified reservoirs. However responsibility for carrying out work to manage reservoir safety lies with the reservoir owner/operator who should produce the flood plans. The Environment Agency is also responsible for establishing and maintaining a register of reservoirs, and making this information available to the public.

Coastal Erosion Risk Management Authority

The Environment Agency is a coastal erosion risk management authority with the power to protect land against coastal erosion and to control third party activities on the coast. This includes the construction of private defences or the removal of beach material.

2.7.3 Emergency Planning

The Environment Agency contributes to the development of multi-agency flood plans, which are developed by local resilience forums to help the organisations involved in responding to a flood to work better together. It also contributes to the National Flood Emergency Framework for England which includes guidance on developing and assessing these plans. It works with the Met Office to provide forecasts and warnings of flooding from rivers and the sea in England. The Environment Agency and other asset operating authorities also have a role in proactive operational management of their assets and systems to reduce risk during a flood incident.

2.7.4 Planning process

The Environment Agency also has a regulatory role in consenting works carried out by others in or adjacent to water courses and sea/tidal defences to ensure that they have regard to flood risk and do not cause unnecessary environmental damage.

It is also responsible for providing advice to planning authorities in development and flood risk; providing fluvial and coastal flood warnings; monitoring flood and coastal erosion risks and supporting emergency responders when floods occur.

2.8 Responsibilities of Water Companies

There are two types of water companies working in Suffolk. Essex & Suffolk Water, mainly located in the north east of the county is a water supply company, while Anglian Water is a water and sewerage undertaker.

Water Supply Companies

Water supply companies are not Risk Management Authorities and do not have the same obligations to co-operate and be subject to scrutiny by Lead Local Flood Authority committees. However the Reservoirs Act 1975 has been amended to state the following:

- All undertakers with reservoirs over 10,000m^3 must register their reservoirs with the Environment Agency as they are subject to regulation.
- All undertakers must prepare a reservoir flood plan.
- All incidents at reservoirs must be reported.

Water and Sewerage Companies

The water industry is highly regulated and the quality of customer service and the prices they are able to charge their customers are regulated by Ofwat, the Water Services Regulation Authority. The water industry operates on five-yearly cycles called Asset Management Plan (AMP) periods. Prices are set by Ofwat at the beginning of each period, following submissions from each company about what it will cost to deliver their business plans.

2.8.1 Flood Risk Management

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

- Respond to flooding incidents involving their assets.
- Produce reports of the flood incidents.
- 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 lead local flood authorities' 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.

2.8.2 Reducing sewer flooding

Water and Sewerage Companies are responsible for flooding from their foul and surface water sewers, and from burst water mains.

The majority of flooding is reported into 24 hour operational call centre on **0800 771 881**. The call centre agent will check that the flooding incident involves their assets. If it does not they will redirect the call if necessary. If assets are identified a job is raised and dispatched to field teams.

If flooding is present or evidence of flooding present details will be recorded on the 'DG5 Form' and investigated as appropriate which may lead to recording on the DG5 Register.

The DG5 register is a register of properties and areas that have suffered or are likely to suffer flooding from public foul, combined or surface water sewers due to overloading of the sewerage system. Investment in the alleviation of sewer flooding is closely allied to the DG5 register. Priority is given to frequent internal flooding problems where a cost beneficial and sustainable solution is available.

2.8.3 System of public sewers and works

An essential flood risk management duty is defined under Section 94 of the Water Industry Act 1991, which states that Water and Sewerage Companies have a duty to provide, maintain and operate systems of public sewers and works for the purpose of effectually draining our area. They also have a duty under the same Act relating to premises for 'domestic sewerage purposes'. In terms of wastewater this is taken to mean the ordinary contents of lavatories and water which has been used for bathing, washing and cooking purposes and for surface water the removal from yards and roofs. However, there is no legal duty or responsibility relating to highway drainage, land drainage and watercourses, with the exception that Water and Sewerage Companies can accept highway drainage by agreement with a highway authority.

Currently, foul and surface water drainage from new developments can be connected to public sewers[19] and a Water and Sewerage Company has no powers to prevent new connections to its network even if it believes it could cause flooding to customers. This is why Anglian Water comments on planning applications even though they are not a statutory consultee.

However, this will be amended once the relevant section[20] of the Flood and Water Management Act is commenced, when the connection to a public sewer will be permitted only after the drainage strategy associated with a new development is approved by the SuDS Approving Body (to which the Water and Sewerage Company will be a statutory consultee). This will only apply to surface water; the 'right to connect' will still apply to foul water.

19. Section 106 of the Water Industry Act

20. Section 16 of Schedule 3, Flood & Water Management Act 2010

2.9 Responsibilities of Businesses, Landowners and Local Households

2.9.1 Utility and Infrastructure Providers

Utility and infrastructure providers such as Network Rail, energy companies and telecommunication companies are not risk management authorities. 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, information about which needs to be shared with flood risk management authorities. 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. Utility and infrastructure providers may wish to invest time and resources into developing and delivering the local flood risk management strategy, to realise the significant benefits for them and their customers that follow from flood risks being effectively managed.

2.9.2 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.

These steps include to:

- check whether their household is at risk from flooding from the river, coast or local flood sources.
- ensure that preparations have been made in the event of a flood.
- take measures to ensure that their house is protected from flooding, either through permanent measures such as sealants in the wall or temporary measures such as floodsax or flood guards.
- take measures to make sure the house is resilient to flooding so that if it does occur it does not cause too much damage.
- where possible, take out flood insurance.

Flooded garden in Ipswich

Information on whether households are at risk can be provided by the Environment Agency and Suffolk County Council.

All households in Flood Zones 2 and 3 (areas at risk from coastal or main river flooding) should have been contacted notifying them of this and, unless they have chosen to opt-out, will receive flood warnings from the Environment Agency when the risk of river or coastal flooding is high. Information can also be found on the Environment Agency website: **www.environment-agency.gov.uk/homeandleisure/floods/31650.aspx**.

Generalised information about surface water flood risk is not yet publically available and is much harder to map but some rough information can be found in the Suffolk Preliminary Flood Risk Assessment[21]. If there are concerns, residents can contact the Flood Risk Management team **floods@suffolk.gov.uk** who can advise on what information there is.

The Environment Agency provides information on what to do to prepare a household for emergencies. This includes how to make a flood plan which will help you decide what practical actions to take before and after a flood.

See **www.environment-agency.gov.uk/homeandleisure/floods/38329.aspx**.

The Environment Agency has also developed a pamphlet which provides advice on how to make your house more resilient.

See **http://publications.environment-agency.gov.uk/PDF/GEHO1009BRDL-E-E.pdf**.

Another valuable document for householders to refer to is The National Flood Forum's Blue Pages Directory[22] which provides information and advice on what products are available to help protect homes or businesses against flooding.

2.9.3 Riparian Ownership

Landowners, householders and businesses whose property is adjacent to a river or stream or ditch are likely to be **riparian owners** with responsibilities.

If a property backs out onto a river, stream or ditch then the property owner is likely to be a riparian owner, owning the land up to the centre of the watercourse. The Land Registry[23] may be able confirm this.

Riparian owners have a right to protect their property from flooding and erosion but in most case 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 Environment Agency's document 'Living on the Edge'

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

2.10 Responsibilities of Parish Councils and Communities

Flooding events can affect whole communities with households which do not suffer from internal flooding still potentially being trapped as roads are blocked or having to help support and provide shelter to neighbours who have suffered from flooding.

Communities know better than anyone the level of flood risk that they face and can make important contributions to helping manage the levels of flood risk.

District and County Councillors have a key role in helping the Parish Councils and communities understand their role and ensuring affected communities are properly represented in discussions about local activities.

2.10.1 Reporting flood incidents

Officers from risk management authorities are not in a position to know about every flooding incident that occurs, particularly those which do not lead to flooding within properties. However, records of

21. http://www.suffolk.gov.uk/TransportAndStreets/RoadMaintenance/Flooding.htm
22. http://www.bluepages.org.uk/BluePages/tabid/1664/Default.aspx
23. http://www.land-reg.co.uk/landregistry.aspx

flooding incidents which affected roads or entered the curtilage of people's properties are important to record. They can indicate that there has been extensive flooding in relatively regular rainfall events which would warn that the properties are at risk in more extreme rainfall events. This information is crucial in building up cases for flood defence and flood resilience schemes which will require strong evidence of the flood risk to properties.

Parish Councils and community groups in areas which suffer from local flooding should contact the County Council to discuss how best they should record and report flooding incidents when they occur – see also Section 2.4.2. Incidents can be reported via **floods@suffolk.gov.uk** on using the form on **www.suffolk.gov.uk/floodrisk**.

Flooding incidents known to be caused by main rivers or the coast should be reported to the Environment Agency through their emergency floodline **0800 807060**.

Flooding from sewers or leaking water pipes should be reported to Anglian Water on **0800 771 881**.

2.10.2 Parish Council Emergency Self-Help Plans

If a parish is at risk from flooding it is advisable to create an Emergency Plan which details who can be contacted to lead and assist in an emergency, what equipment is available and the location of premises that can be used as emergency accommodation. Assistance is available from the Environment Agency or Joint Emergency Planning Unit. The formation of a local plan describing what will happen in the event of a flood warning being issued is particularly important in an isolated community.

2.10.3 Raising funding and skills for flood resilience and flood defence measures

As is explained in greater detail in Chapter 6 on funding, most flood defence and flood resilience projects, particularly in small communities, will require some local funding to supplement that provided by national government and the Lead Local Flood Authority if the project is to go ahead.

Parish Councils can 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 could be done by enlisting residents who have specialist skills or landowners/residents with the equipment to do some of the work, such as regular clearing of ditches and drainage grilles. Parish Councils will be invited to become involved in any local flood risk management activity as appropriate.

Emergency planning workshop

3. The Fens Policy

TThe area of The Fens located within Suffolk is relatively small but this belies its importance. Water management in this area is critical to maintain flood risk at an acceptable level and, as a consequence, to ensure the continued accessibility to the area for a wide range of human activities including agriculture. The identification of Lead Local Flood Authorities as having a key role in surface water management has given rise to a review of how the management of surface water in Suffolk can be integrated with that for the Fens. There will be continuing dialogue between practitioners to ensure that plans are developed jointly to maintain progress in furthering key aspirations for the Fens and Suffolk generally. To this end an objective and associated action has been identified in Section 5 to cover this. It will be important to ensure that lessons learned from surface water management in the Fens are incorporated into any flood risk proposals in Suffolk.

Figure 3.1 Map of Fens area

The sections below provide information on the Fens area, management plans and aspirations.

3.1 The Fens Area

The Fens cover a large area of eastern England, stretching from the Wash out to Lincoln, Peterborough and Cambridge, with a small area stretching into the northwest corner of Suffolk.

Four different rivers – the Witham, Welland, Nene and Ouse, carry water from surrounding uplands through the Fens and into the Wash.

3.2 Management Plans for the Fens

The Environment Agency has developed Catchment Flood Management Plans for the Anglian Region with the aim of taking a broad view of flood risk at catchment level over the next 100 years. Factors such as climate change, future development and changes in land use and land management were taken into account in developing sustainable policies for managing flood risk in the future.

The Fens area is covered by four different Catchment Flood Management Plans (CFMPs); one for each of the fenland catchments of the Nene, Welland and Glen, Witham and Great Ouse and also by the Wash Shoreline Management Plan (SMP). All five plans recommended that an integrated plan is produced specifically for the Fens in order to develop a sustainable, integrated and long term flood risk management approach for this landscape area. There was also a need for any future plan to bring together organisations and other plans and projects from across the Fens.

Since the development and approval of the CFMPs, the legislative framework for flood risk management landscape has changed considerably, providing opportunities to develop a more integrated approach to upland and lowland flood risk and drainage management from all sources.

The introduction of the duty for LLFAs to produce Local Flood Risk Management Strategies (local strategies) provides an opportunity for integrating and delivering the aims for the Fens. Local strategies are considered an appropriate vehicle due to their key role in setting objectives and identifying priorities and funding needs for local flood risk management. Local strategies will also be driven by LLFAs in partnership, will undergo public consultation and will be informed by CFMPS, SMPs, SFRAs and other relevant strategic and local documents. It is therefore considered a more practical approach to ensure that flood risk and drainage management of fenland areas is co-ordinated across the relevant local strategies. This is in preference to creating an additional, overlapping single strategy for the Fens, managed within a national, rather than local governance framework.

Local strategies will integrate the needs and opportunities of the local Fens and fenland communities with those of the rest of the local LLFA area, and promote a consistent approach across the Fens as a whole. This consistency is crucial, for example, to IDBs, who often span more than one local authority and whose practices will be similar throughout their area. The LLFAs of Lincolnshire, Peterborough, Cambridgeshire, Norfolk and Suffolk have therefore agreed to work together closely to achieve this aim. Forest Heath District Council has been involved on behalf of Suffolk County Council since Suffolk's fenland is principally located in this area.

3.3 Background to the Fens

Localised drainage took place in the fenland landscape from as early as the medieval period. However, large scale drainage of the Fens first began in the 17th Century, when the 'Fens' as we now know it began to take shape. Today this artificially drained landscape is home to approximately half a million people. The Fens cover an area of almost 1,500 square miles, divided between eleven District and five County Councils. For comparison, figure 3.2 depicts how the Fens landscape might look now had the area not been drained from the medieval period onwards.

The Internal Drainage Boards within the Fens have been established over many years because of the special water level and drainage management needs existing within this area, and the particular need for lowland and inland local flood risk management activities. These local works are funded in the main from funds levied locally by IDBs, and present an effective example of the Government's 'localism' agenda.

Well maintained coastal and fluvial flood defences, supporting an extensive drainage infrastructure are essential in promoting sustainable growth in the Fens. Housing, jobs and services that meet the needs of the market towns and the rural communities can only happen if drainage and flood risk is well managed. Growth in the Fens will need to be embraced in a sustainable way; balancing development needs with the need to promote and protect open spaces, natural habitats, landscapes, the built environment and the unique qualities of the Fens. It is therefore essential that 'Flood Risk Management Authorities', utilities and local communities continue to work closely with local planning authorities, so that consideration of sustainable drainage in particular and flood and water management in general are an integral part of the planning and development control process.

Farming contributes significantly to the success of the local economy, supporting a large number of businesses involved in the production of food and rural tourism. The important role that farming plays in the Fens is emphasized by the steady decline in self-sufficiency in the UK, and the Government's renewal of the food security agenda. The Fens account for 50% of all Grade 1 agricultural land in England, producing 37% of all vegetables and 24% of all potatoes grown in the country, as well as enough wheat to make 250

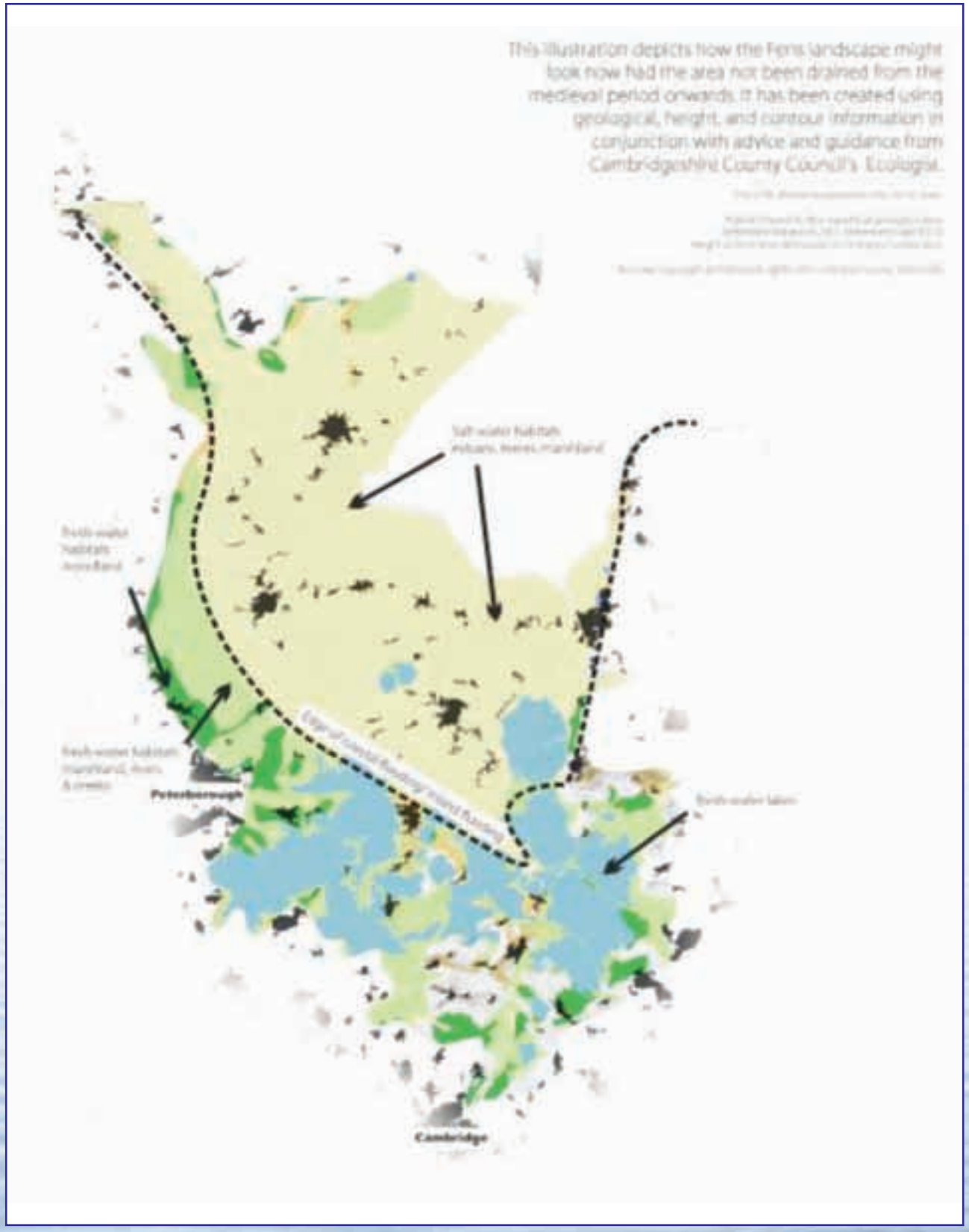


Figure 3.2: An illustration of the Fens before drainage

million loaves of bread every year. The area also supports significant livestock, dairying and outdoor pig production. This supports a large well-established food processing industry. It is critical, therefore, that appropriate flood risk and drainage management measures are taken to protect this nationally important food production area.

In addition to food production, the Fens is popular for tourism, attracting more than 15 million visitors a year. The Fens provide a unique and rich habitat for wildlife and include the Ouse and Nene Washes which while providing flood storage capacity, also retain important wetland for birds. There are also major transport networks, road and rail, as well as houses, critical infrastructure, water, gas and electricity that would be affected if fenland areas were to flood. The Fens also contain heritage sites and form three sides of the Wash, which is internationally designated for animal and plant biodiversity. There are also numerous local sites, ranging from SSSIs to Local Nature Reserves which need to be protected.

3.4 Aspirations

To reflect the importance of the Fens as a highly productive and precious resource, the following aspirations have been identified for the wider area in respect of flood risk and drainage management:

- **Continue to ensure that appropriate flood risk and drainage management measures are taken to protect the nationally important food production areas in the Fens.**
- **Ensure that where appropriate, current levels of protection are maintained in the Fens taking into account climate change.**
- **Manage flood risk and drainage in accordance with principles of sustainable development.**
- **Ensure that development is undertaken appropriately, so that adverse consequences of flood risk are not increased.**
- **Contribute towards the protection and enhancement of the environmental heritage and the unique landscape character of the Fens including biodiversity.**
- **Support promotion and use of the waterways and other areas in the Fens for tourism and recreation.**
- **Develop effective dialogue with local communities to facilitate their involvement in flood risk management in the Fens.**
- **Work with local planning authorities to help them grow the economy in the Fens, through the early consideration of flood and water management needs.**

4. Assessment of local flood risk

4.1 Historic flooding

Historically, the 1953 tidal flood (see photo right), which resulted from high tides combined with a severe storm in the North Sea, is the most notorious flood in recent memory. It resulted in over 307 lives being lost in the eastern counties and widespread damage to properties, agricultural land and the natural environment in Suffolk. Whilst flood defences along our coast and estuaries have been improved since this event, this scale of flooding could easily occur again. The main difference is that we should get much better warning of such a storm, allowing for evacuation from the areas most at risk of flooding. This was tested in November 2007 when a similar tidal surge was forecasted. A number of areas, particularly around Lowestoft, were evacuated, but the storm proved to be less damaging than predicted and resulted in limited localised damage.

Unlike areas of the country such as Gloucestershire, Hull and Cumbria, in Suffolk there have been few recent newsworthy flooding events caused by fluvial or surface water flooding. This does not mean severe incidents will never occur. Localised floods have and will continue to occur in many areas of the county under severe weather conditions and climate change is likely to make them more frequent and more severe. Our aim is to try to predict and reduce the risks where possible and have emergency plans in place to deal with the exceptionally severe event. Unlike a tidal surge, flooding caused by localised rainfall is much harder to predict and as yet there are no adequate warnings available to allow evacuation of an area at risk from this sort of event.

Whilst there is good data on past river and sea floods, our information on historic surface water flooding is limited. Available information was collected as part of the Suffolk Preliminary Flood Risk Assessment (PFRA)[24] process. The data

available for Ipswich was of good quality and was used to identify areas of the town most at risk. For other locations across the county it was inconsistent, but will be used to provide an initial indication of where flooding has been recorded in the past.

It will be important to be able to consider the relative significance of incidents of flooding on a county-wide basis and alongside this strategy we are setting-up a flood incident reporting process. This should permit a better understanding of where the main problems are and where the focus of future help should be placed. The data collected through the flood incident recording process will be used to supplement the current information on historic flooding. This information together with that derived from any flood investigations undertaken will be reviewed on a regular basis to guide future work, in particular where we need to undertake more detailed investigations to understand flooding mechanisms and possible solutions in particular locations.

An early task will be to review the historic flooding information held to see whether it might be

24. www.suffolk.gov.uk/floodrisk

Above: Example of a flood gate installed at an individual property

Above: Example of a flood gate installed to a communal car parking area

possible to identify locations where flood mitigation measures could be implemented. Property flood protection such as flood doors and air brick covers can, in appropriate situations, provide very effective resistance to flooding at minimal cost.

Groundwater flooding is viewed as being a problem in the northwest corner of Suffolk near Brandon. This area comes within the Fens area which is managed by the Ely Group of Internal Drainage Boards who will be consulted on all matters relating to flood risk management in the area.

4.2 Potential risk of flooding

The Preliminary Flood Risk Assessment (PFRA) was undertaken by the County Council to satisfy obligations under the Flood Risk Regulations 2009. This work identified key areas in Suffolk where the potential risk of surface water flooding is thought to be greatest.

Extract from the Suffolk PFRA[25]:

'Potential flood risk has been identified primarily from national sources. The national sources include a number of different datasets which have been used in the past but the most up to date information to hand is contained in the Flood Map for Surface Water, the second generation in national surface water flood mapping. The Flood Map for Surface Water gives an indication of the areas where surface water would be expected to flow or pond during two different rainfall events (with a 1 in 30 and a 1 in 200 annual chance of occurring) and includes a national allowance for drainage capacity in urban areas. The urban underground drainage system would be expected to be removing a proportion of rain falling thus reducing flood volumes apparent on the ground surface. This dataset has been used as the 'locally agreed surface water information' defined in the PFRA guidance document.

The data from the Flood Map for Surface Water (Figure 4.2) has been used to develop maps for use in GIS systems. For each of the rainfall events two maps have been produced; one identifying areas where flooding is greater than 0.1m (surface water shallow) and one identifying where flooding is greater than 0.3m (surface water deep).

25. www.suffolk.gov.uk/floodrisk

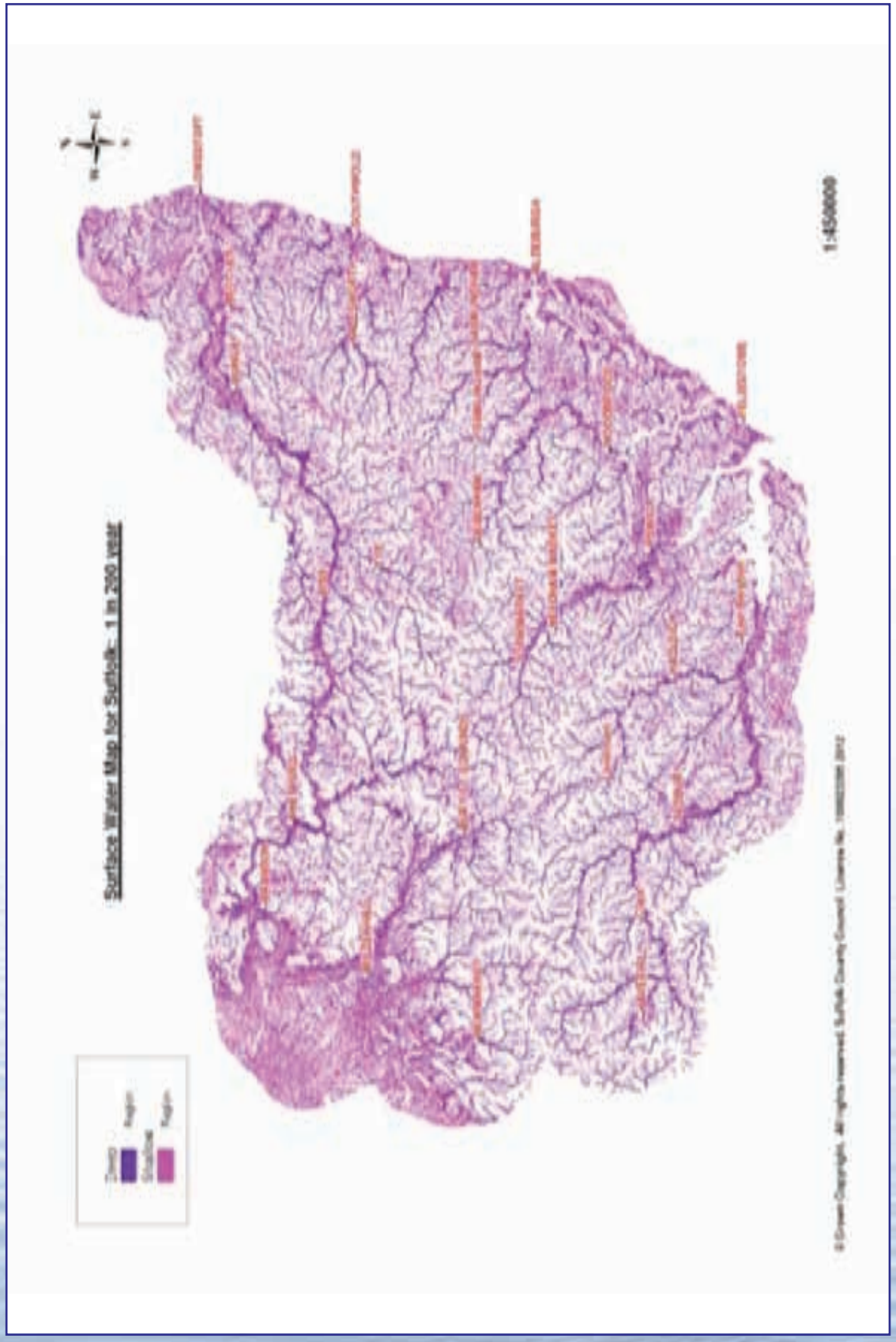


Figure 4.1 Surface Water Flood map for Suffolk

Using this information the Environment Agency has estimated the number of properties at risk of surface water flooding in Suffolk to be 32,500 (flooding to a depth of 0.3m from an event with a 1 in 200 annual chance of occurring). This compares to 54,000 in Essex and 35,800 in Norfolk.

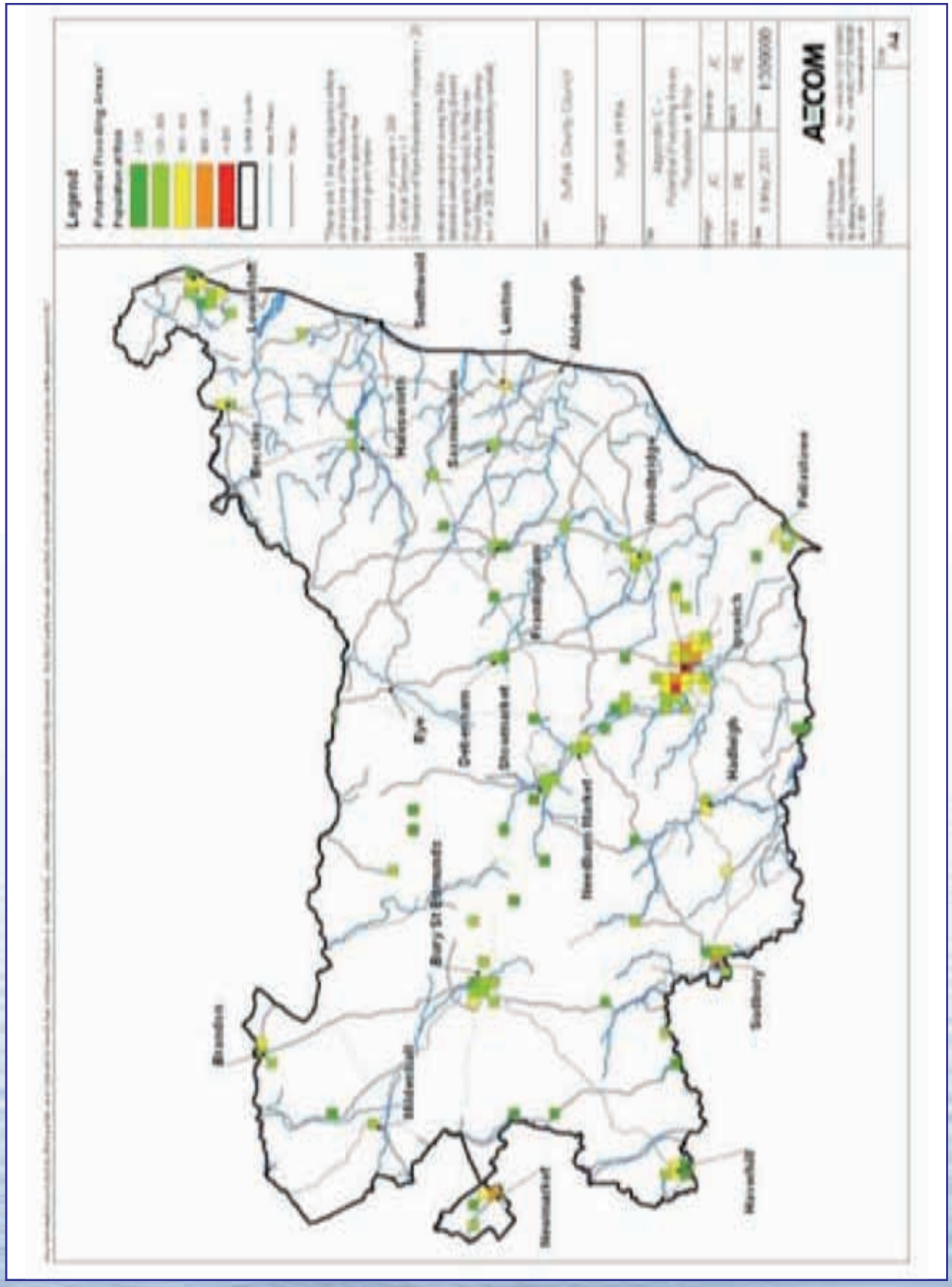


Figure 4.2: Suffolk Surface Water Risk Priority Areas map

In order to help prioritise areas where the consequences of flooding are greatest, the information from the Flood Map for Surface Water was used to identify individual 1km squares where the following criteria were satisfied in respect to potential flooding:

Number of people affected	**>200**
Critical services affected	**>1**
Non-residential properties affected	**>20**

The 1km squares that satisfied the above criteria are often referred to as 'blue squares'.

By looking where a number of these squares are clustered together it is possible to start to rank the main towns/villages at risk in the county. Figure 4.2 illustrates this data showing the total population at risk. The identification of the location of these clusters provides a very useful starting point as to where particular effort should be focused in respect of further investigations and flood risk reduction.

NB. It does not, however, mean that these are the only areas with the potential to flood and cause damage.

Details of existing historic flooding records and predicted risks of surface, ground and ordinary water course flooding can be found in the PFRA, but see Figure 4.4 for summary information on the potential flooding locations and the likely population that would be affected.

4.3 Interactions between the different sources of flooding

Whilst the primary focus of this strategy is local flooding (surface, ground and small water courses such as ditches and streams), flooding in Suffolk can arise from a number of different sources. To members of the public suffering from flooding, the source of the water may seem irrelevant, but for each source there will be a different responsible organisation – see Chapter 2 for details.

Where the source can be clearly identified, the responsible organisation will be the main point of contact. However, as is often the case, where it is not easy to ascertain the source or where multiple sources are involved, the Lead Local Flood Authority will take the lead and work with partners to investigate and deal with the issue in a manner appropriate to the level of risk.

The flood incident reporting process will have provision within it for the collection of information to enable, where at all possible, the responsible organisation for flooding to be identified. Where the flooding satisfies the criteria for carrying out a full investigation (see section 2.4.2) and it has not been possible, based on information obtained through a flood incident report, to establish the source, this would need to be done as part of the full investigation.

The full investigation will take account of all elements of information such as stakeholders' historic records, hydraulic model output and, critically, information obtained from members of the public at the time of the flooding incident. Parish Councils, landowners and the public will be crucial to helping us increase our knowledge and understanding of localised flooding.

It is important to note that tidal flooding represents a significant problem in Suffolk where the consequences are likely to be very serious, albeit infrequent. Suffolk is ranked number 3 in the national list of critical tidal flooding locations. In addition to current focus on tidal flooding, there will be full co-operation between partners where there is an interaction between the sea and surface water. In some areas, the ability of surface water to drain into the sea is limited during very high tides, thus increasing the risk of flooding from two sources at once.

Bungay Sluice, River Waveney

Flooding type	Description	Responsible organisation
Coastal flooding	Tidal flooding represents a significant problem in Suffolk where the consequences are likely to be very serious, albeit infrequent	Environment Agency
Ordinary watercourses e.g. streams and ditches	Local, generally smaller watercourses	Riparian owners. Internal Drainage Boards in their areas
Main rivers	Principal watercourses and strategic smaller watercourses (see map Section 2.7.2)	Environment Agency
Reservoirs	Large water pounds which have embankments represent a potential flood risk	Environment Agency
Surface water flooding	High intensity rainfall gives rise to overland flow of surface water which can pond in low lying areas giving rise to flooding. This is also known as pluvial flooding	Suffolk County Council
Sewer flooding	The public sewer system has a finite capacity and at times of heavy rainfall surface water entering designated surface water sewers, combined sewers (ones which receive foul and surface water flows) and designated foul sewers which are subject to penetration of surface water through misconnections etc can become overloaded giving rise to surface flooding	Anglian Water
Groundwater flooding	Geological conditions can cause surface water which has infiltrated into the ground to emerge at certain locations in the form of wells etc. Also high water tables can be present in locations where there are particular ground conditions. This type of flooding generally occurs after long periods of rainfall as water builds up in underground aquifers ultimately causing an increase in flow in features such as leets (groundwater-fed watercourses)	Suffolk County Council
Highway flooding	Highways have extensive drainage systems and at times of heavy rainfall either hydraulic overload or perhaps inadequate maintenance can give rise to ponding of water which can in turn have an impact on property. The presence of deep water on roads can also give rise to problems for road users causing flooded roads to be closed at certain times	Suffolk County Council Highways Agency Ipswich B C
Railway flooding	A rare occurrence, but at times of heavy rainfall there is the potential for hydraulic incapacity or poor maintenance to give rise to flooding which can effect railway operations	Network Rail

Figure 4.3: Potential flooding sources and responsible organisations

4.4 Prioritisation of areas across the county where resources will be focused

It is not feasible to look in detail at every potential flooding location straight away. The resources to manage flood risk are finite and it is therefore necessary to identify locations where the focus of effort will derive the maximum benefit in terms of overall flood risk reduction in Suffolk.

The identification of the flooding clusters shown in Figure 4.2 offers an initial level of priority in relation to surface water flooding but there are other key factors which will have a bearing on where resources should be concentrated:

- Population concentration. The main aim of the strategy is to reduce flood risk for the greatest number of Suffolk residents.
- Proposed development activity. This will give rise to the consideration of drainage arrangements/ opportunities in particular areas which might offer a way of reducing existing flood risks.
- Locations for capital investment. Any capital project might offer opportunities for flood risk reduction through modification of construction proposals. Conversely, where specific flood defence investment is being made there maybe opportunities to modify the project to provide wider benefits to other stakeholders, thus encouraging additional investment.
- The location of static and touring caravan sites because of their particular vulnerability.
- Historic surface water flooding. Whilst the current information is limited and doesn't provide much insight into significance this aspect will become increasingly relevant following the implementation of the flood incident reporting process.
- Groundwater flooding.
- Main river flooding. Information on main river flooding is derived from the Environment Agency 'Flood Map' and is considered in detail in the Catchment Flood Management Plans covering Suffolk.
- Tidal flooding. Information on tidal flooding is derived from the Environment Agency 'Flood Map' and is considered in detail in the Shoreline Management Plans.
- Ordinary watercourse flooding. There is currently limited data available on this and, like surface water flooding, will benefit from future records of local flooding incidents.
- Anglian Water records of sewer flooding. Water Companies provide information to Ofwat on flooding experienced on the public sewerage network, referred to as DG 5 information. Anglian Water's investment in reducing flooding from the public sewerage network is focussed on historic flooding locations.
- Environmentally protected sites, historic buildings and monuments. National datasets are available which provide the location of structures and sites which are vulnerable to flood damage. It is worth noting that flooding is not always detrimental to environmental sites.

Based on information currently available, a priority banding has been identified for surface water flooding using currently available information.

The next stage is to undertake more detailed surface water management plans for these towns and villages. These will provide the means of investigating, in more detail, the locations at risk within these towns and villages, the reasons why they are at risk and whether there is a sustainable, cost-effective means of reducing the risk – either in the short or longer term. The level of investigation will be appropriate to the perceived risk and will follow the national guidelines for undertaking surface water management plans[26].

26. www.defra.gov.uk/publications/2011/06/10/pb13546-surface-water-guidance/

Priority	Priority group	Location	Population at risk
1	A	Ipswich	13501
2	B	Lowestoft	2590
3	B	Sudbury	1769
4	B	Bury St Edmunds	1989
5	B	Newmarket	2195
6	B	Haverhill	1661
7	C	Felixstowe	744
8	C	Woodbridge	920
9	C	Stowmarket	644
10	C	Brandon	803
11	C	Hadleigh	634
12	C	Needham Market	786

Figure 4.4: Initial identification of surface water priority areas

As can be seen from this table Ipswich has been identified in Band A of priorities as the population potentially at risk from flooding is significantly higher than the other main locations and has already been the subject of a detailed Surface Water Management Plan, the first iteration of which will be published soon. This investigatory work will give rise to the implementation of actions to reduce flood risk in the Ipswich area.

Having carried out further surface water management plans all related data will be compiled in a GIS database to enable practitioners to develop a visual impression of problems and opportunities on a spatial basis. Large amounts of relevant information have already been loaded into the Suffolk Surface Water GIS which will be available to other partners as needed.

As well as the locations listed in Figure 4.4, we will continue to monitor all other areas at risk and where affordable solutions are available will do all we can to reduce risks. This will require the co-operation of local communities and all partners.

4.5 Catchment Flood Management Plans[27]

The paragraphs above largely concentrate on the risks from surface, ground and ordinary water course flooding (the Lead Local Flood Authority responsibilities). However, as noted above, the management of these risks will need to be aligned with wider flood risk priorities – as detailed within the Catchment Flood Management Plans (CFMPs). These plans primarily focus on river and tidal flooding, but also include mention of surface/ground water risk. However, they were produced before the latest surface water risk information was made available.

27. www.environment-agency.gov.uk/research/planning/33586.aspx

Catchment Flood Management Plans

give an overview of the flood risk across each river catchment. They recommend ways of managing those risks now and over the next 50-100 years. They consider all types of inland flooding, from rivers, ground water, surface water and tidal flooding, but not flooding directly from the sea, which is covered in Shoreline Management Plans. They also take into account the likely impacts of climate change, the effects of how we use and manage the land, and how areas could be developed to meet our present day needs without compromising the ability of future generations to meet their own needs.

Definition of CFMPs from Environment Agency website

There are CFMPs covering the river catchments across Suffolk:

- Broadland Rivers.
- East Suffolk.
- Great Ouse.
- North Essex.

The area covered by the East Suffolk CFMP is entirely within the county of Suffolk. The other CFMPs cover some parts of Suffolk as well as neighbouring counties. Figure 4.5 below illustrates the plan borders.

Figure 4.5: Map showing area covered by the East Suffolk CFMP and outline of neighbouring plans

Figure 4.6 below shows the collated data from across the plans covering Suffolk, illustrating the level of risks to properties identified in the plans. Full details of these risks, plus risks to agricultural land and critical infrastructure, together with proposed actions to deal with them, are contained within the individual plans.

Area at Risk	People currently at risk	Predicted Risk in 2110
Lowestoft *	2258	5964
The Broads **	1644	1814
Ipswich *	1577	3677
Mid Colne & Stour	1181	1442
East Anglian Plains (area covering Rattlesden, Laxfield, Coddenham, Saxmundham, Kesale and Carlton)	701	838
Gipping Corridor (Needham Market, Great Blakenham and Claydon)	605	751
Bury St Edmunds	360	468
Debenham	317	353
The Fens **	259	1219
Framlingham	194	216
Newmarket	142	293
Suffolk Coasts & Heaths area	118	154
Halesworth	108	139
Haverhill	14	19

Figure 4.6: Collated data from the 4 Catchment Flood Management Plans covering Suffolk showing 1% annual probability of flooding (0.5% for tidal flooding)

Notes:

** Figure quoted is for 0.5% annual probability of a tidal flooding risk.

* The Fens and The Broads are quoted in their entirety making it difficult to quote a Suffolk specific figure. Similarly the Mid Colne and Stour rivers, covering parts of north Essex and South Suffolk (including Stratford St Mary, Nayland, Bures and Hadleigh) are also quoted together.

5. Objectives for managing flood and coastal risk and options to achieve them

This Chapter sets out the primary objectives and actions which will be taken forward to make progress in the reduction of risk associated with flooding.

In putting these objectives we considered three options for flood risk management:-

Do nothing – potentially more properties will flood and for those already at risk of flooding they will potentially flood to a greater depth and/or more frequently.

Maintain – keep pace with climate change so that there is no net increase in flood risk; existing flood infrastructure will need to be improved over time and all new development will need to take climate change into account.

Improve – take action to reduce the number of properties that would potentially flood and the potential impacts of that flooding.

After discussions with key stakeholders, we propose to take a pragmatic approach to reduce the current flood risk and ensure that we do nothing to make this worse in the future.

Where possible we will work with the population of Suffolk to reduce the risks, recognising the limited resources available for flood and coastal risk management and other priorities within the county.

The ways in which we hope to achieve this are summarised in the following table and developed in the following sections.

Sustainable drainage system in Ipswich

	Objective	Actions to achieve the objective
1	To improve the understanding of flood and coastal risks and ensure everyone understands their roles and responsibilities in reducing the risks.	This strategy will provide a clear explanation of the roles of flood risk management authorities as well as the important roles that residents, businesses and land managers can play. Property owners will be involved in decisions about flood risk management in their areas. Develop clear and consistent guidance for the public to understand the risk of flooding, explaining the actions that residents and businesses can take to manage the residual flood risk and become more resilient to flooding. Develop greater understanding of surface water flood risks by building up a better record of where flooding occurs and through targeted detailed investigations (surface water management plans). Produce and publicise a simple process for recording all flooding incidents so residents and Parish Councils can help us understand existing problems. Develop a consistent approach to recording of flood assets and make this readily available to all interested parties. Develop a consistent approach to designation of structures. Ensure any risks that are recognised but cannot be reduced in the short-term are registered with the Joint Emergency Planning Unit and affected residents are helped to prepare for flooding.
2	To work together (both statutory organisations and the public) to reduce flood and coastal risks, using all available resources and funds to the greatest benefit.	Continue to work in partnership through the Suffolk Flood Risk Management Partnership and the Suffolk Coast Forum. Develop investment plans to make use of opportunities for sharing financial burdens and resources associated with the provision of flood and coastal risk management through the new national partnership funding and local initiatives. Collectively we will work with local communities who wish to contribute to short term improvements. At the same time will with plan ahead to anticipate and reduce future flood risks Property and business owners will be encouraged to protect their properties if they are at risk from flooding. We will provide information and advice on this and promote and support the formation of local emergency groups to prepare for flooding. Carry out a review of resources and tasks that are required by the different organisations to identify the most efficient model for delivery of the new flooding responsibilities.

	Objective	Actions to achieve the objective
3	To prevent an increase in flood risk as a result of development by preventing additional water entering existing drainage systems wherever possible.	Building on government guidelines on sustainable drainage we will prepare local SuDS guidance which will emphasise that there should be no increase in surface water flow from future development wherever possible. It will provide guidance on site layout and levels in new development, a robust inspection process for new SuDS and advice on impacts on natural environments. Ensure that planning decisions are based on up-to-date information about all flood risks and that there is a consistent approach to surface water management in new development. Prepare and maintain a database of historic and predicted local surface water flood risk to provide data for use by planning authorities (to supplement the current flood data provided by the Environment Agency).
4	Take a sustainable and holistic approach to flood and coastal management, seeking to deliver wider environmental and social benefits, climate change mitigation and improvements under the Water Framework Directive.	Promote the concept of water cycle management and multi-functional spaces that will hold flood water, provide space for wildlife and local green space as part of the master planning process. Work with partners to ensure that all planning and other relevant guidance documents include reference to relevant advice on these issues. When undertaking any flood risk management schemes, ensure consideration is given to all relevant plans and policies, e.g. CFMPs, SMPs, RBMPs, SFRA and the impact on protected environments. Link all flood and coastal erosion risk management with the River Basin Management Plan and thus deliver improvements in water body status (water quality, qanitnty and acquatic ecology) wherever possible.
5.	Encourage maintenance of privately owned flood defences and ordinary watercourses, and minimise unnecessary constrictions in watercourses.	Provide guidance and administer a process for consenting of new structures and maintenance of existing structures on water courses. This process will discourage further blocking of watercourses wherever possible. Ensure riparian owners are aware of their duties to keep watercourses flowing freely. Provide support and guidance to people who wish to maintain or improve flood defences on private land. Record all appropriate structures/assets on watercourses so that ownership and responsibility can be identified in the event of a problem with flooding.
6.	To share information on the latest best and best ideas for flood and coastal management.	The Suffolk Flood Risk Management Partnership and the Suffolk Coast Forum will share and where relevant publicise exemplars of successful flood and coastal management to aid local decision making.
7.	To ensure that proposals and policies in this strategy are properly integrated with the rest of the Fens area	Develop effective communication between Suffolk County Council and all organisations with responsibility for flood risk management in the Fens area where water management is particularly critical.

Some further background information about these objectives and their delivery is given in the following sections.

5.1 To provide a clear explanation of everyone's responsibilities

In the past, the way that flooding has been managed has been fragmented and not co-ordinated. In his report on the flooding of 2007, Sir Michael Pitt identified issues which he believed had contributed to the problems encountered. A primary issue was the absence of a single organisation having overall responsibility for surface water management and the upshot of this was the identification of Lead Local Flood Authorities as having that responsibility. This responsibility is now enshrined in the Flood and Water Management Act 2010. However, other responsibilities remain with existing organisations and to the layman the issue of flood management is still somewhat confusing.

Chapter 2 outlines the roles and responsibilities of the various flood risk management authorities and other stakeholders, as well defining what riparian owners, the public and businesses should do to contribute. Stakeholders can be defined as anyone who may be affected by the problem or solution or will be interested in the problem or solution. They can be individuals or organisations and include the public, businesses and communities.

The requirement for the Lead Local Flood Authority to work with all interested parties is enshrined in Pitt Recommendation 15: "Local authorities should positively tackle local problems of flooding by working with all relevant parties, establishing ownership and legal responsibility." The County Council will take the lead role.

The Suffolk Flood Risk Management Partnership and the Suffolk Coast Forum will be the main vehicles for co-ordination and collaborative working. In the event of any uncertainty the County Council will investigate flooding to identify who is responsible for action. Where necessary the County Council will co-ordinate discussions about a resolution to the problem in discussion with responsible authorities and local residents/businesses/landowners. All parties have contributed to the development of this strategy - see Stakeholder and Communication Plan in Appendix 2 for details.

There are a number of local examples of effective engagement and communications and communities working with risk management authorities to deliver real benefits on the ground, particularly in relation to coastal risk management. The experience from these will be used to inform future collaborative working and will be widely shared with others.

5.2 Involving residents and landowners in flood risk management

There is a lack of understanding on the part of the public on issues associated with drainage and the management of flood risk generally. The administration of surface water has been simplified by recently implemented legislation but most people still to find it difficult to understand the complex issues of water management. There is a need to provide concise and clear guidance to address this and clarify the roles and responsibilities of riparian owners and land managers.

Residents, businesses and property developers also need a better understanding of the issues associated with funding and installation of resistance/resilience facilities to premises where flooding is likely to occur. No matter how much money is spent on flood defences and drainage, there will always be a residual risk of flooding in extreme rainfall events. Everyone needs to understand their own risk and decide whether to take individual measures to protect their property or prepare in other ways for possible flooding.

The information that will be provided to residents and businesses will make clear that significant progress can be made in flood risk reduction if people in Suffolk are willing to make their own contribution, both in terms of practical help and

Resilience measures

can be described as those which make it easier and quicker to undertake a clear-up following a flooding inundation.
Such measures could include for instance internal house walls which are constructed in such a way as to enable them to be flushed down after a flooding event.
A cement, rather than plaster, based surface material to a wall with a waterproof paint application could be considered as a resilience measure.

Resistance measures

can be described as those which prevent water getting into property. These could include dams located at individual property doorways/air brick flaps and also more regionalised measures such as the installation of temporary dams to provide flooding protection to perhaps a number of properties.

funding. The statutory flood risk authorities will make progress in a wide range of aspects but individuals doing what they can to help will be a very powerful additional source of improvement.

Residents must ensure that any development of their personal property does not give rise to increased flows into surface water systems will be very beneficial. Some of these issues are subject to planning law but residents are in a position to assist in the avoidance of increase, and maybe generate a decrease, in flow rates through use of permeable driveways, swales, rain gardens etc.

There are a number of relevant guidance notes/pamphlets available which provide clear information to non-professionals on all aspects of water management. Arrangements will be made for this information to be more widely distributed, particularly via partners' websites.

Some of the identified topics which require better communication are:

- Riparian owner responsibilities.
- Installing and operating flood protection and resilience measures to individual properties.
- Opportunities for individual property owners to assist in reducing flood risk, such as reducing impermeable surfaces in gardens and use of green roofs.
- Individuals acting as 'eyes and ears' to notice screens blocking-up and culverts overflowing and reporting flooding incidents.
- Preparing for flooding – the production of emergency plans, etc.

5.3 Working together to use resources and funding in an integrated way and in so doing derive enhanced overall benefit

Chapter 6 outlines the main funding mechanisms for flood and coastal erosion risk management. The Suffolk Flood Risk Management Partnership working together with relevant stakeholders and community groups will identify schemes and collectively seek appropriate funding.
The challenge will be to use existing funding streams in a more co-ordinated way so as to derive additional benefit in terms of overall flood risk reduction.

An example of this might relate to a significant development site in a location where there is experience of public sewer flooding for which Anglian Water has identified a funding requirement. The developer will be required to submit drainage proposals to Suffolk County Council in its capacity as SuDS Approval Body, and this offers the Council an opportunity to see whether a co-ordinated effort could derive an additional overall benefit.

Integrated Coastal Zone Management is already being taken forward through the Suffolk Coast Forum and work is underway to streamline the way the various authorities utilise their human and financial resources for coastal management and integrate relevant strategies and plans. This extends to working closely with local community groups to deliver and/or maintain smaller scale projects on

the coast and estuaries. The Suffolk Flood Risk Management Partnership needs to take a similar approach in the inland situation, starting with an audit of existing resources and plans.

Surface water management is a newer discipline for many and thus there is a need to provide appropriate tools and training to all professionals involved in surface water management (particularly related to SuDS) to enable them to develop an understanding of issues such as the nature of problems and to assist them in formulating plans for reducing flood risks.

5.4 Ensuring a balance between the identification of high level plans and the resolution of local flooding

There is a danger that focussing on high level plans and strategies will delay actually making progress 'on the ground' with flood risk reduction. The success of the overall flood risk reduction strategy will require the demonstration to all residents who have knowledge/experience of problems that progress is actually being made on flood risk reduction at their local level.

There of course will be a need to establish long term actions for ensuring that flood risk does not increase. The development of SuDS guidance is obviously an important requirement which will have a major impact on flood risk for the medium and long term but work on this will need to be done in tandem with the consideration of solutions to more immediate problems.

A primary objective for our work will be an overall reduction in flood and coastal risk in the whole of Suffolk. From a practical point of view it makes sense for resources to be focused not just on the priority areas in terms of the number of properties at risk but also based on the likelihood of being able to implement flood risk reduction.
Data collected both on risks, actual flooding and investment plans will be incorporated into GIS so as to facilitate improved spatial understanding of all relevant information and focus future investigations in areas where the most activity is planned.

The Suffolk Flood Risk Management Partnership, led by the County Council, will work with any community who wishes to contribute to short term solutions to existing flood risks.

5.5 Commitment, on a catchment-wide basis, to preventing an increase in flood risk as a result of new development

Urban creep (the increase of paved areas and extensions which results in increased flows being discharged to surface water systems) and climate change will give rise to an increase in the quantity of rainwater which will have to be dealt with in sewers and watercourses. One calculation suggests that these factors, even without new development generating additional impermeable areas, are likely to give rise to an average 1% year on year increase in flows being received which raises the prospect, in the medium/long term, of significant overloading of existing drainage systems. To avoid this increasing flow causing a worsening flood risk would require significant investment in conventional system upgrading.

Water companies will need to be more innovative in their approach to surface water management and are moving away from conventional underground drainage solutions to investment in sustainable drainage (SuDS). This is just one example of the increasing focus on the use of SuDS and in support of this Suffolk will be aiming for a zero overall increase in flows being received by sewers. It is, however, recognised that this may not be feasible in all situations.

The achievement of this aim will have to be considered in relation to the entirety of the public sewerage system, watercourses and rivers within Suffolk as there may be incidences where the zero increase cannot be achieved but where a reduction in current flows would be possible.

This aim is in line with other stakeholders' objectives notably:

Anglian Water's Strategic Direction Statement:

"Over the next ten years we aim to make sure that none of the properties in our region are at risk of sewer flooding, due to sewer overloading."

Greenfield Flow

can be described as the natural overland flow generated prior to urbanisation *(Amount varies with location but is commonly of the order of 5 litres per second of flow per hectare.)*

Brownfield Flow

can be described as the flow of surface water to receiving systems that is generated within an urban environment *(Commonly significantly greater the Greenfield Flow.)*

The move to achieving the 'greenfield' pre-development flow rates would represent a step change in surface water management, reversing the trend which has given rise to ever increasing flood risk, habitat loss, biodiversity reduction and reduced recharge of underground aquifers.

Figure 5.1 illustrates the water cycle from natural water balance, through urbanisation and back to water sensitive urban design water balance. Our aim will be to achieve the latter situation wherever possible

5.5.1 The preparation of SuDS guidance to establish requirements/opportunities associated with new development.

There will be specific requirements for managing surface water in respect to any new development carried out in Suffolk and it will be necessary to clearly define what those requirements are for the benefit of planners and developers alike.

Suffolk County Council, in its capacity as the Lead Local Flood Authority, will ultimately have responsibility for the approval of drainage designs submitted for new development in its role as the SuDS Approval Body (SAB), defined in the Flood and Water Management Act. However the responsibility for planning remains with the planning authorities.

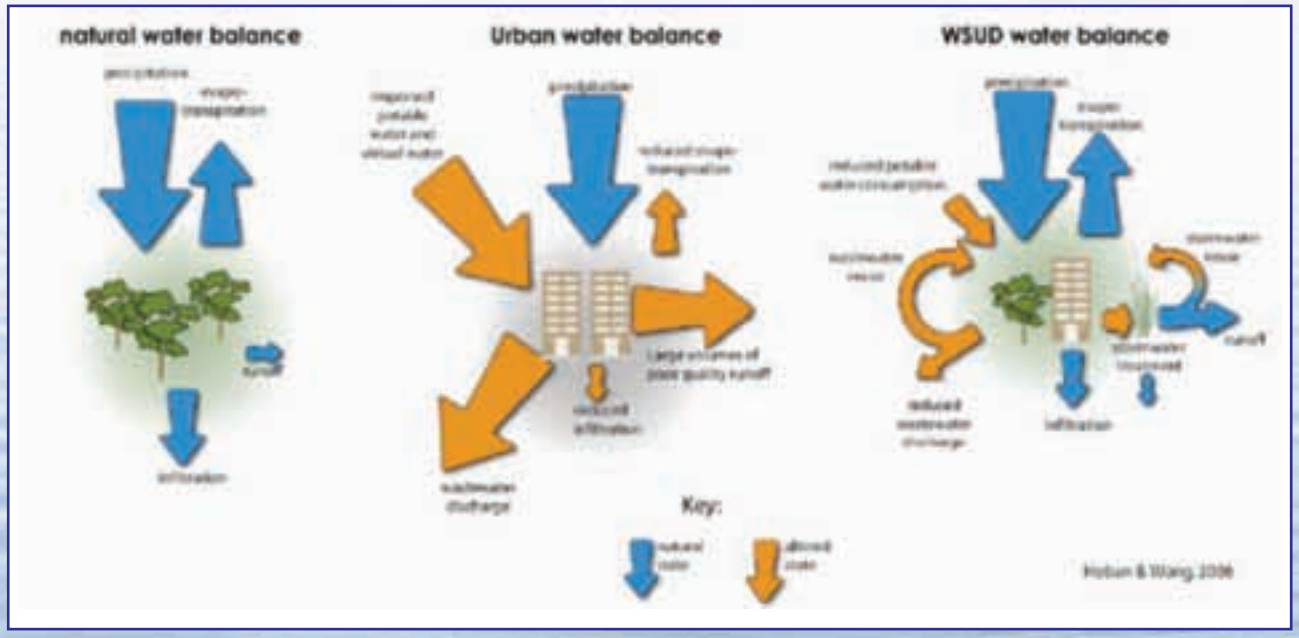


Figure 5.1: Returning to a natural water balance

The guiding principles for SuDS in Suffolk will be:

- **Early consideration of sustainable flood and coastal risk management in production of Local Plans and master planning – promoting and protecting 'blue and green corridors'.**
- **Wherever possible, the use of multifunctional, above ground SuDS that deliver drainage, enhancement of biodiversity, improvements in water quality and amenity benefits.**
- **Ensuring that land owners realise both the importance of reducing flood risk and how properly designed sustainable drainage systems can be an asset to their development.**
- **Ensuring no increase in flood risk from new development wherever possible and contributing to reducing existing risk if feasible.**

"Water is an essential part of our natural and built environment. The way we live, work and play to varying degrees are influenced by the availability and quality of water. Increasingly we need to embrace water management as an opportunity rather than a challenge. Successfully delivered sustainable drainage provides communities and wider society with benefits set within the context of adapting to climate change, development and improving our natural environment."

Extracted from 'Planning for SuDS – Making it happen' (CIRIA report C687, 2010)

Coreys Mill Water Meadow, Stevenage
Dry state

Coreys Mill Water Meadow, Stevenage
Flooded state

Figure 5.2: Example of SuDS system in dry and flooded state Mill Water Meadow Stevenage

Working within the government guidelines (yet to be published) the County Council will, in collaboration with partners, produce detailed SuDS guidance for planners and developers. This will include advice on environmental and public health considerations.

5.5.2 Blue Corridors – Green Infrastructure

"Blue corridors" encompass the idea that both new and existing development, particularly within the urban environment, is planned around watercourses, overland flow paths and surface water areas to create a network of corridors designed to facilitate natural hydrological processes that minimise flooding, enhancing biodiversity, improving access to recreation and helping to adapt to climate change. One of the key aims and benefits of developing Blue Corridors is to provide a network of multifunctional 'blue/green' spaces and corridors within the environment. They offer the potential to allow land to perform a range of functions and provide a far greater range of social, environmental and economic benefits than might otherwise be delivered. Planners are already familiar with the provision of 'green infrastructure' and the two should be complementary[28].

The blue corridors concept is an important one. Essentially it is about protecting natural overland paths for water flow in flood conditions. Where urbanisation has occurred over those paths, to be aware of this, and make provision designing areas where flood water can accumulate when rainfall exceeds that which the drainage system was designed for. These paths need to be created away from buildings so that excessive rainfall does not give rise to property flooding.

Drainage systems can only be designed economically to cater for rainfall events of a realistic magnitude but inevitably there will be 'freak' storms when the design capacity is exceeded. Previous practice took little account of this but with the improved understanding it is possible to designate flow routes around properties to cater for this situation. Roads - perhaps with raised kerbs and alternative vehicle cross-over details - are an obvious way of providing for this with often minimal inconvenience being caused.

Figures 5.3 and 5.4: Illustrations of blue corridors in practise

28. See Natural England's Green Infrastructure Guidance for practical advice and useful case studies: http://www.naturalengland.org.uk/ourwork/planningtransportlocalgov/greeninfrastructure/default.aspx

Design parameters for calculation of the capacity of the surface water system and flood exceedance paths will be provided in the SuDS Guidance.

5.5.3 The integration of surface water system design into all stages of the development process.

To ensure that the maximum benefit can be gained in respect to issues such as availability and quality of water, enhancement of human and natural environments and flood risk reduction, it will be necessary to think about all water related issues at the earliest stage of master planning and at all subsequent stages. The SuDS/Drainage guidelines will establish principles and processes to ensure complete integration of all water related design issues into the overall project design process.

5.6 Ensure planning decisions are properly informed by flood risk and that there is a consistent approach to flood risk management in new development

As well as the provision of advisory guidelines, there is a need to ensure that the evidence base used to determine planning decisions is consistent and up-to-date. The Lead Local Flood Authority will take responsibility for the development of a system for reporting and recording local flooding incidents and the local flood asset register (see sections 2.4.2 and 2.4.3) making this readily available to all who need to see it.

The Environment Agency continues to develop and publish flood[29] and coastal erosion maps.[30]

Surface water risk mapping and the results of detailed surface water management plans will be made available to all who need it. A methodology for data sharing between partners and thus ensuring all decisions are made using the best available information is being developed.

5.7 The adoption of a holistic approach to flood and coastal risk management

The advantages to be gained from thinking holistically about all aspects relating to water generally have long been recognised. We live at a time of climate change where on occasion we have less water than we need for human consumption, food production and to maintain flows in rivers and then, paradoxically, at other times too much water in the form of flooding. Water is also a key component of many natural environments.

Various Government publications in respect to flood risk management establish the need for this holistic approach:

Aim

The manage the risks from flooding and coastal erosion by employing an integrated portfolio of approaches which reflect both national and local priorities, so as:

- to reduce the threat to people and their property; and
- to deliver the greatest environmental, social and economic benefit, consistent with the Government's sustainable development principles.

Taken from 'Making Space for Water – taking forward a new Government strategy for flood and coastal erosion risk.'

The Partnership will be looking to consider issues associated with water supply, land irrigation and

29. http://www.environment-agency.gov.uk/homeandleisure/37837.aspx

30. http://www.environment-agency.gov.uk/homeandleisure/134808.aspx

flooding 'in the round'. An example of this would be a situation where flooding was being caused to property as a consequence of overland flow from farmland. A possible solution might be the provision of a water storage area to accommodate the flood water which could then be used at some later stage for irrigation or for environmental enhancement. This approach might encourage funding from a landowner or environmental body as beneficiaries from the scheme.

The holistic approach will also be used in the context of new development and investment leading to multiple benefits and thus multiple funding sources.

An example of this might be a situation where a public sewer is overloaded to the extent that property flooding is occurring. A possible solution might be to prevent rainwater from house roofs entering the public sewer locally by disconnecting downpipes and diverting surface water to rain gardens and/or perhaps a permeable pavement.

Possible benefits to be gained from such an approach:

- Resolution of a public sewer related flooding problem without having to resort to costly underground system upgrade (Benefit to Anglian Water in terms of capital cost).
- The introduction of interesting features such as rain gardens to enhance the local environment (benefit to local residents).
- Incorporating, into the surface water system design, features such as surface attenuation located within the highway which could have a dual role to support perhaps traffic calming arrangements. (Benefit to highway authority in sharing costs associated with providing traffic calming facilities).
- Incorporating source control/attenuation features such as permeable pavements which can additionally be used for highway drainage. (Benefit to the highway authority if perhaps flooding from the highway has been a problem in the past).
- Funding of ongoing maintenance by a number of organisations. (Benefit to Anglian Water through reduced maintenance costs associated with new assets).

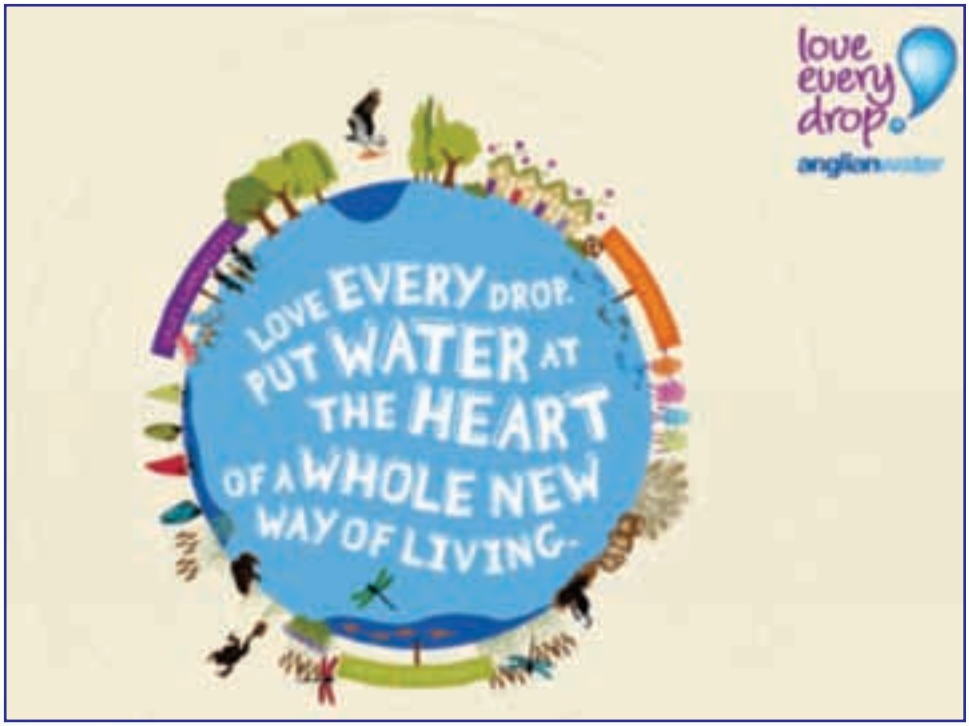
At the heart of the holistic approach will be an increase in value of all aspects associated with water through things like the Anglian Water 'Towards Sustainable Water Stewardship' and 'Love every drop' initiatives. (See figure on next page)

In the South East of England, the lack of availability of water for human consumption is becoming an increasing problem. This together with the continuing focus on the expansion of urban development in the area will create a situation where eventually there will not be enough water. Putting increasing value on water as a primary resource will be essential and the holistic approach will support this.

Another aspect of a holistic approach is in the delivery of wider environmental objectives alongside flood and coastal risk management activities. This is explored in more detail in Chapter 7.

It will be necessary to have discussions with the stakeholders about their aims and objectives and identify the national level objectives. All these aims and objectives, and associated investment plans, will need to be collated and assimilated into the action plan for Suffolk. It is here that Suffolk County Council will need to show strong leadership.

River Stour running through the Area of Outstanding Natural Beauty



Anglian Water has declared initiatives to increase the understanding of the public in the 'value' of water.

Any partner working on one aspect of flood and coastal management will need to consider appropriate plans from other partners. Equally, every effort will have to be made to identify external stakeholders' investment plans that could provide opportunities for flood and coastal management.

5.8 Encouraging the maintenance of privately owned flood defences

In the coastal situation many landowners are realising the importance of contributing to the maintenance and improvement of private defences. They have recognised that public funding for this is likely to be limited unless large numbers of properties benefit from the defences. In order to facilitate this activity the Environment Agency, district councils, Natural England, the Marine Management Organisation, Suffolk County Council Rights of Way and other relevant partners have been working together to co-ordinate advice and guidance to landowners and simplify the necessary consenting processes for landowners to be able to take action. This approach needs to be replicated in the inland situation.

5.9 Encourage ordinary watercourse maintenance and minimise unnecessary constrictions

The maintenance of ordinary watercourses is variable across Suffolk. Before embarking on plans for capital spending on watercourse assets it may be necessary to initiate a review of how maintenance is being carried out presently, by whom, and what actions need to be taken to ensure that assets are being used to their full capacity. There may be a particular issue with regards to the maintenance of culverts and

associated trash screens which if not done in a timely manner can give rise to localised flooding. There are opportunities for local communities to identify such issues and help resolve them by regular local activities.

Improved maintenance of all surface water assets offers the opportunity to generate a reduction in flood risk without the need for capital expenditure

There is a clear role for riparian owners to ensure watercourses are kept flowing. But in many situations, especially where ditches remain dry for some of the time, residents do not recognise the importance of the watercourse and their riparian responsibilities until the extreme rainfall event gives rise to flooding. There are numerous cases of ditches near properties becoming blocked by the tipping of garden rubbish (see Figure 5.5) and flow restricted by the addition of un-consented culverts, etc.

Figure 5.5 Example of partially blocked watercourse behind houses in Ipswich

In Section 2.4.5 we outline the clear guiding principle to reduce unnecessary constrictions in watercourses and prevent additional constrictions wherever possible. But to achieve this, riparian owners must understand the need to seek advice from the consenting authorities before undertaking any works that may constrict flow.

5.10 To obtain as much information as possible on the latest best practice initiatives within the 'industry' as a whole

The Pitt Recommendations, and related initiatives such as the implementation of the Flood and Water Management Act, have given rise to a profound change in the way that surface water management is carried out in England and Wales. The extent to which the individual County and Unitary Councils are making progress with taking up their new responsibilities, developing processes will inevitably be variable as a function of things like the level of relevant expertise of staff, perceived level of risk from flooding in a particular administrative area and political will. For instance in Gloucestershire the high profile which the 2007 flooding gave rise to and the identification of early funding for carrying out detailed surface water management plans has meant that much progress has been made whereas in other areas, where flooding has not been such a problem, limited progress has been made.

Through links with neighbouring Lead Local Flood Authorities, the Local Government Association Flood Group and relevant professional bodies, the Council and partners will share experiences and learn from others. A particular focus for key staff will be understanding best practice in the industry as a whole through continued participation in conferences, attendance at training courses and the obtaining of information from government sources .

In order to inform community decisions, we will share examples of successful local flood management projects between the flood risk management partners and other interested groups.

5.11 Preparing for flood emergencies

There will be an ongoing requirement to ensure that flooding emergency response procedures are comprehensive and up to date. Work on the Preliminary Flood Risk Assessment and the Ipswich Surface Water Management Plan have identified key areas at risk of surface water flooding and this information will need to be incorporated in current emergency response plans which are focussed on tidal and river flooding. When more comprehensive information becomes available this will be incorporated into the Suffolk Resilience Forum plans.

A key aspect of emergency planning is the promotion of local emergency groups and provision of information to enable the public and businesses at risk of flooding to help themselves.

5.12 To ensure that the Strategy proposals/policies integrate with those for the Fens

As detailed in Section 3, the Fens area of Suffolk will require a particular focus when considering policies and practices which can be utilised county-wide. Effective communication processes are already in place to ensure that proper dialogue takes place on aspects of common interest but there will be a need to develop these to ensure that, particularly, the specialist expertise that the practitioners involved in water level management within this special area is properly integrated into overall flood risk strategies.

5.13 Prioritisation of key actions identified

The key objectives and related actions identified above will not all progress concurrently and it is therefore necessary to establish priority in carrying them out – based on the costs of delivering them in relation to benefits achieved, practical and funding considerations.

The Action Plan (Appendix 1) lists key actions, a crude assessment of costs/benefits and likely timescales for delivery.

Below: Putting in new drainage pipe in Long Melford

6. Funding & delivery of plan

It is important that the local strategy sets out how the proposed actions and measures will be funded and resourced within Suffolk. It is also important to identify what funding mechanisms are available to Suffolk County Council and its partners to pay for the flood risk management measures that are set out in the strategy. Effective practical implementation of flood policy objectives requires adequate resources both for the management and response activities of lead local flood authorities as well as for capital projects.

The following chapter provides a summary of available forms of funding that are being considered and will also help to identify any further actions that will be needed to ensure that particular funding alternatives are feasible.

6.1 Current funding mechanisms

Figure 6.1 below identifies the various streams of funding open to risk management authorities. These are discussed further below.

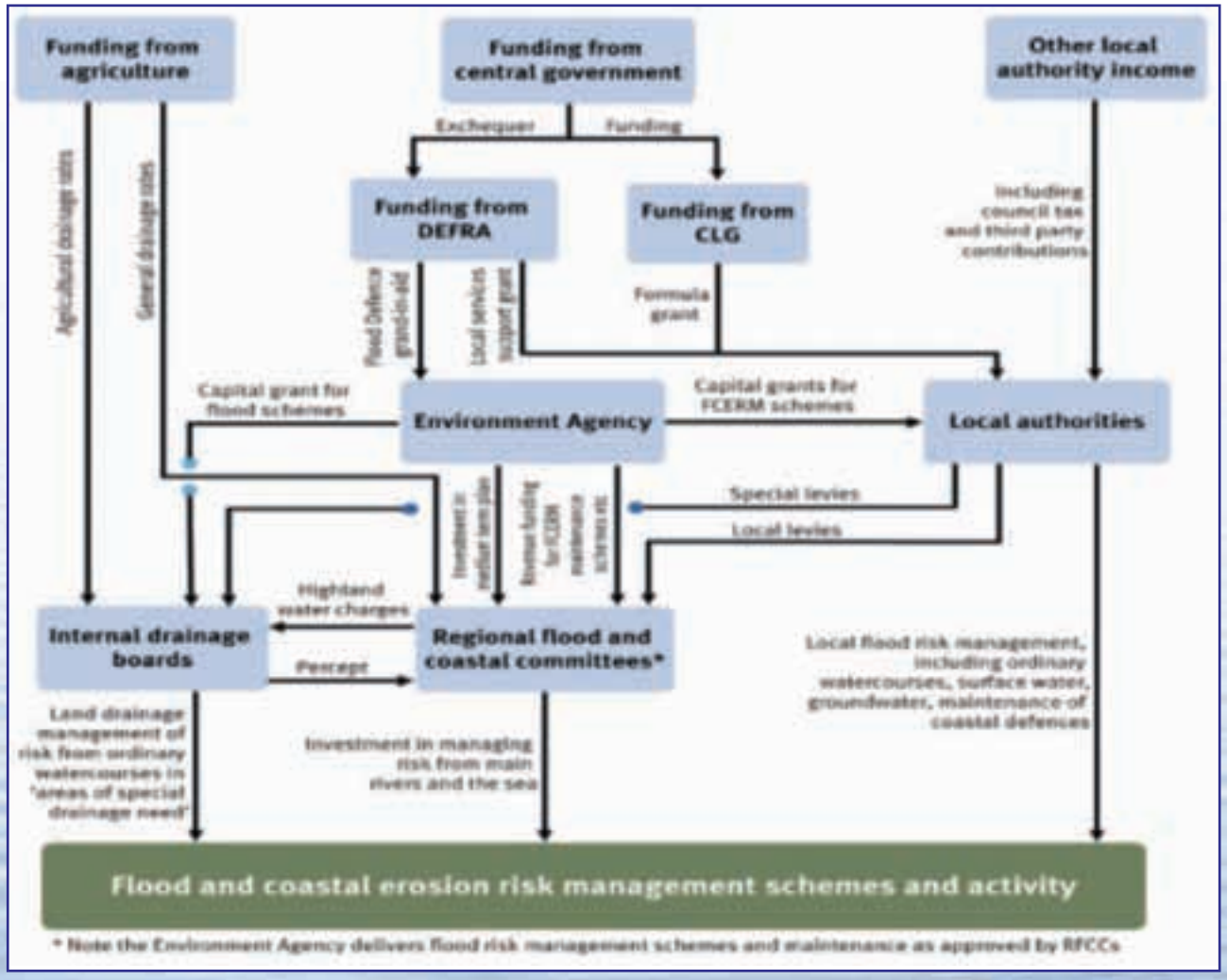


Figure 6.1 – source: EA National Strategy

6.1.1 Public funding

With less direct government funding available, it is clear that changes are needed to the traditional approaches to funding flood risk management. The current situation of government flood risk management funding is summarised below:

- Defra expects to spend an average of £540 million a year for the next four years on flood and coastal erosion risk management in England (this includes funding provided to the Environment Agency). This is approximately 8% less than spent by Defra over the previous four years.
- The Defra money includes 'programme' spend, such as maintenance, flood forecasting, and incident response, and 'admin' spend on Environment Agency staff and office costs.
- Defra remains committed to fully funding lead local flood authorities to carry out their new responsibilities under the Flood and Water Management Act. Up to £36 million a year will be provided directly to lead local flood authorities.
- For Suffolk County Council, this will equate to £392,000 in 2012/13 and thereafter to spend on local flood risk management activities.
- Local authorities also have money available through a formula grant from the Department for Communities and Local Government (DCLG). This money will support the ongoing flood risk management responsibilities, including drainage activity and the maintenance of ordinary watercourses and coastal defences, and payments of levies to the Environment Agency (local levy) and internal drainage boards (special levy).
- The Department for Communities and Local Government (DCLG) have indicated that local authorities are spending around £30million each year on additional schemes funded through the Regional Flood Defence Committee's local levy. To date this has only been available for tidal flooding or fluvial schemes, but since the Flood and Water Management Act and the creation of Regional Flood and Coastal Defence Committees, this money is now also available for surface water schemes.

Capital funding through 'Payment for Outcomes' and 'Flood Defence Grant in Aid' schemes

The Pitt Review recommended that 'Government should develop a scheme that allows and encourages local communities to invest in flood risk management measures'. Defra has now developed a new system, under which all schemes would be offered a fixed payment based on the benefits delivered ('Payment for Outcomes').

The scheme aims to encourage communities and businesses to take more responsibility for the flood risk that they face and aims to deliver more benefit by encouraging total investment to increase beyond the levels that Defra alone can afford.

The new approach will see funding levels for each scheme relating directly to benefits, in terms of the number of households protected, the damages being prevented plus other scheme benefits such as environmental benefits, amenity improvement, agricultural productivity and benefits to business. In addition to these elements, payment rates for protecting households in deprived areas will be higher so that schemes in these areas are more likely to be fully funded by the Government.

Under this system some schemes will continue to receive complete funding, if the benefits significantly outweigh the costs, and for others partial funding would be available. It is hoped that this approach will encourage people to find cheaper ways to achieve positive outcomes and/or find other funding mechanisms to pay the remaining cost of the scheme.

The underlying principles and objectives behind the new national funding system include:

- Encourage an increase in total investment in flood risk management by operating authorities, beyond levels provided by central Government alone.
- Enable more local choice within the system and encourage innovative and cost-effective options to be promoted.

- Rather than some projects being fully funded and others not at all, now some funding will be available to all potential projects.
- Funds from central government should prioritise protecting those most at risk and least able to help themselves.
- All flood and coastal erosion projects, regardless of which risk management authority is leading it, should be treated equally based on the benefits delivered and damages avoided.
- The general taxpayer should not pay to protect new development in areas at risk of flooding, now or in the future.
- Greater local input and decision making should not come at the expense of creating a stable pipeline of projects.
- All investment should be made within a nationally consistent framework to take account of policies and findings within CFMPs and SMPs.
- Maintain the widespread take-up of flood insurance by helping to keep insurance affordable through risks being managed properly.

Figure 6.2 illustrates the 'Payment for Outcomes' approach and the importance of the local levy in fully funding flood defence and maintenance schemes.

Payment for outcomes puts a strong emphasis on the need for external contributions. Suffolk County Council will continue to work with key stakeholders including:

- Defra and the Environment Agency.
- District and Borough Councils.
- Water Companies and OFWAT.
- Internal Drainage Boards.
- NGOs.
- Private sector developers.
- Highways Agency.
- Other infrastructure providers such as Network Rail.
- New Anglia Local Enterprise Partnership.

Suffolk County Council will take the lead partner role for surface/local flood risk and will:

- Identify and plan projects.

Figure 6.2: The 'Payment for Outcomes' approach and importance of the local levy

- Establish funds required.
- Outline responsibilities.
- Present to Regional Flood Defence Committee.

Working through the Suffolk Flood Risk Management Partnership and Suffolk Coastal Forum the partners will endeavour to ensure a balanced programme of flood and coastal risk management projects covering all sources of flooding and coastal erosion. The partnerships will also need to work closely to seek and deliver external sources of funding.

The following fictitious example is taken from Defra's consultation document on 'Future funding for flood and coastal erosion risk management'.

Case Study 1: Rural Defence Project

A small market town is at a 1 in 20 risk of being flooded, and a £2 million scheme has been prepared by the LLFA that would protect 75 homes to a 1 in 200 year standard, achieving £10 million in long term benefits.

The comparatively low cost benefit ratio means that the project has in the past been deferred and remains low priority.

Under payment for outcomes, the scheme has the potential to attract approximately £900,000 of the necessary funds through Flood Defence Grant in Aid (rather than the full £2 million). In addition, the scheme will be supported by the Regional Flood and Coastal Committee whose members vote to provide a further £500,000. With a reduced and clear funding goal to aim for the LLFA and local community groups work hard to raise the remaining £600,000 required to allow the scheme to go ahead.

Funding through the Community Infrastructure Levy

The Community Infrastructure Levy came into force in April 2010 and potentially could provide Suffolk's councils with an alternative source of funding for flood defence schemes. It allows local authorities to raise funds from new development in their area in order to pay for the impact that the development has on local infrastructure. The levy is based on the concept that almost all development has some impact on infrastructure and services, so it is fair that development should contribute towards the cost of maintaining or upgrading local infrastructure.

It is estimated that the introduction of the levy has the potential to raise several hundred million pounds a year of funding for local infrastructure by 2016. Local authorities can use this funding for infrastructure needed to support the development; it can be used to construct new infrastructure, increase the capacity of existing infrastructure or repair failing existing infrastructure. The Planning Act 2008 includes a broad definition of the infrastructure that can be covered by this scheme including transport, flood defences, schools, hospitals and parks.

Suffolk County Council and the District Councils will look into how this funding could be used to fund flood alleviation schemes within the county. However, it must be recognised that there will be other demands on this source of funding, many with a higher priority than flood alleviation.

6.1.2 Private funding

Section 106 funding – Developer Contributions

Section 106 of the Town and Country Planning Act 1990 allows a local planning authority to enter into an agreement with a landowner or developer in association with the granting of planning permission. A Section 106 agreement is used to address issues that are necessary to make a development acceptable, such as supporting the provision of services and infrastructure.

One of the recommendations of 'Making Space for Water' was that local planning authorities should make more use of Section 106 agreements to ensure that there is a strong planning policy to manage flood risk. This means that any flood risk which is caused by, or increased by, new development should be resolved and funded by the developer.

A good example of how Section 106 agreements can be used to collect contributions from developers within Suffolk is described in the Weymouth case study below.

Case Study 2: Weymouth Flood Defence Contributions Policy

Weymouth Flood Defence Contributions Policy is a good example of a proposed scheme to collect financial contributions from new development in order to fund flood defences in Weymouth town centre.

Under the proposed scheme, developers would make a payment towards flood defence schemes using a tariff basis that ensures all new development in the town centre makes a contribution. The contributions policy is expected to deliver around £4 million by 2030. Contributions must be secured through a legal agreement such as a Unilateral Undertaking or a Section 106 Agreement.

Funding from developers will be the primary mechanism for financing the flood defence scheme in this case. As more money is collected, it provides a much enhanced business case on which to bid for capital funding from the government.

Local fundraising

In addition to contributions from developers, another important funding mechanism will come from local fundraising from the local communities and businesses who benefit from the proposed flood defence schemes. Fundraising may appear to be a daunting task but the best place to start is with who stands to benefit from the project.

Some examples of success stories include in the case studies below:

East Lane, Bawdsey: In 2007 a group of local landowners and residents formed the East Lane Trust to raise £2.2m to implement a coastal protection and flood defence scheme for a 250m section of coast. The money was raised by selling plots of land in nearby villages. In 2007, the government granted special permission to allow 26 homes to be built on the plots which were not previously available for residential development. The money raised was given to the District Council to commission a sustainable coast protection scheme which was completed in summer 2009

East Hanney (Thames region): Volunteers cleared weeds from a local brook, increasing the brook's capacity, and also constructed a flood defence bank and footpath. The Environment Agency provided soil, the hire of two mini-excavators and two dump trucks. The local authority paid for coir rolls used to help stabilise the new bank.

A scheme in North Yorkshire aims to help homeowners to protect their properties with a number of flood protection products including door guards and brick covers. The Parish Council (through EA support) has provided 2/3 of the costs and homeowners the remaining 1/3. Additional support is provided to low income families. The EA funding has come from the local levy fund which is raised from Council tax.

6.1.3 Other possible sources of funding

All possible sources of funding will be pursued as they become available, including European funding.

One example might include the **"Growing Places"** Funding recently announced by the government. This fund will provide £500m to help with the investment in the physical infrastructure which unlocks development (e.g. transport, utilities and flood defence). Suffolk is currently considering this as a potential source to fund flood management measures that would allow regeneration of the Lake Lothing area of Lowestoft.

Coastal Communities Fund – The government has announced a new fund financed through the allocation of 50 per cent of the revenues from the Crown Estate's marine activities. The fund is designed to support the economic development of coastal communities. It is unlikely that local flood and coastal protection alone will be eligible but could be included as part of economic/ environmental enhancement. The fund will be available on a bid basis, administered by the Big Lottery Fund.

Suffolk County Council Corporate Regeneration Fund: Supporting community based activities which look at social, environmental or economic development in line with the County councils priorities. The fund can pay for 20% of the cost of the capital cost of a project, up to £30,000

"Wellbeing" funds: have been used for small surface water flood projects that deliver real benefits to local communities.

Defra is currently producing a good practice guide to support LLFAs called 'Solutions for joint funding of surface water schemes'. This project will explain the funding mechanisms and time cycles, approval processes of key partners and benefits of joint funding of local flood risk management. Suffolk County Council will refer to this document when it is published, to inform practical approaches to securing joint funding.

The county council recognises the need to increase success in preventing or mitigating flood risks, not only to reduce occurrences of flooding within Suffolk but also to limit the increasing demands on response and recovery capabilities for any larger scale flood event. Dealing with these risks will be part of Suffolk's strategy for adaptation to climate change.

7. Achieving county wide environmental benefits through effective flood and coastal risk management

The primary purpose of this report is to set out the strategy for reducing flood risk in Suffolk but if this is done with sensitivity, good design and planning it is possible to derive significant benefit in respect to countywide aspirations in the wider context of sustainability, environmental and social improvement.

The Environment Action Plan for Suffolk sets out 'Suffolk County Council's contribution to creating the 'Greenest County'. It supports a radical, pro-active approach to environmental issues which are be mirrored by objectives and related plans of action identified in this Suffolk Flood Risk Management Strategy.

This document sets out some parameters which have particular relevance for water.

In 2008 the Suffolk Strategic Partnership developed the new community strategy for 2008-2028 called "Transforming Suffolk". It has a 20 year vision:

By 2008 we want Suffolk to be recognised for its outstanding environment and quality of life for all; a place where each person can realise their potential, benefit from ans contribute to Suffolk's economic prosperity and be actively involved in their community.

Extract from 'Suffolk County Council's Environment Action Plan[31]

- Recent UK Climate Projections 2009 predict that by 2080 the East of England will experience:
  - 3.6 °C increase in average summer temperature.
  - 20% increase in winter rainfall leading to increased winter flooding.
  - 20% decrease in summer rainfall leading to summertime droughts and impacts on crop yields.
- At a local level, the future implications of these climate projections could include:
  - Increased coastal and flood-plain flood events leading to damage to property and disruption to economic activity.
  - Water shortages.
  - Higher incidence of damage to transportation, utilities and communications infrastructure caused by an increase in the number of extreme weather events (e.g. heat, high winds and flooding).

Effective surface water management will give rise to improved water cycle management generally and also derive benefits for the human and natural environments. In addition to this there are opportunities for deriving benefits in terms of carbon use reduction.

The environmental benefits that can be achieved in relation specifically to flood risk reduction need to be considered in the wider context of sustainability in Suffolk as embodied in 'Suffolk

31. http://www.suffolk.gov.uk/NR/rdonlyres/375F0B65-1E52-43AD-98E8-6BF6EB42ABB8/0/SCCsEnvironmentActionPlanv2.pdf

Power-cuts chaos after major storm

Thousands of peole were left without power last night after a fierce storm brought chaos to the region with a series of lightning strikes ... The storm, which swept across the region, caused flooding as well as chaos for commuters after Ipswich railway station had to be evacuated due to a lightning strike.

Source: East Anglian Daily Times, June 2009

Flash Flooding in Lowestoft

Dykes burst their banks, after a months worth of rain fell in a day, causing thousands of pounds worth of damage, when homes were flooded, pets were rescued and schools were closed. Anglian Water also admitted that the volume of water seen, a 1 in a 100 year event, overwhelmed their networks.

Source: Lowestoft Journal, September 2006

Extracts from 'Suffolk County Council's Environmental Action Plan'

County Council's Environmental Action plan' which outlines the council's contribution to creating the "Greenest County".

The benefit which can be achieved for the human and natural environments through water sensitive design will need to be a continuing 'thread' in the strategy. In fact an innovative approach to surface water design can often reverse the 'not in my back yard' mentality to proposed drainage infrastructure activity, creating elements such as ponds and rain gardens that people actually want to have in the places where they live and work.

Surface water management has been historically regarded as something that has to be sorted out at the end of the development design process almost as an afterthought. The strategy should encourage emphasis on the positive benefits that can be achieved through early consideration of surface water issues.

Water resource planning, urban scene enhancement, biodiversity, carbon use reduction are all important areas where drainage engineers are able to provide considerable assistance to people from other disciplines.

The key areas to focus on will be water cycle management, opportunities to enhance both the natural and human environments and opportunities for reducing carbon use.

The paradigm shift, which will be required if the 'industry' is to make real headway in flood risk reduction, will only occur when key professionals such as planners and developers start to appreciate that early involvement of drainage specialists can offer real benefit in furthering the aspects that they perceive, from their own perspective, to be important.

An Important Note for Developers

The creative use of water can give rise to an *increase* in property value maximising income from new development.

7.1 Water cycle management opportunities

The South East of England is already suffering a shortage of water for human consumption and this situation will be exacerbated by climate change and the planned increase in development in the region. The object of water cycle management is to make better use of the water that we have. Even Suffolk, noted as a relatively dry county, experiences times of rainfall sufficient to cause flooding and what is required is to manage water surplus and shortage effectively.

Planning for water

There is a finite capacity within the environment, and it cannot simply provide more and more water. Equally, there is a limit to the amount of waste water that can be safely returned to our rivers and the sea without having a detrimental impact on the environment. Furthermore, we know that extreme rainfall can overwhelm drains and overtop flood defences. Climate change is bringing fresh challenges as patterns of rainfall are predicted to change, with more intense rainfall events. We must also make sure that water infrastructure contributes to the shift to a low carbon economy that is essential if greenhouse gas emissions are to be reduced. Planning for water has to take into account these natural constraints, and factors such as the timing and location imposed by the development itself.

Extract from Water Cycle Study Guidance - Environment Agency 2009

In the context of flood risk reduction this argues for a complete change in the way that we deal with new development and endeavour to deliver flood risk reduction and these new practices are being employed increasingly.

Climate change will bring about changes in rainfall with warmer drier summers and wetter warmer winters. Rainfall may occur in heavier downpours which could lead to more flooding and droughts. It is predicted that the amount of water in rivers and groundwater reserves will decrease which could lead to shortfalls in water supply. Reducing water use places less demand on decreasing resources and reduces carbon emissions as water supply and treatment processes use energy.

Extract from 'Water Resources Strategy for England and Wales 2009' Environment Agency

Source control is the primary means of supporting improved overall water management through better surface water management. Source control can take a number of forms but the basic philosophy is to emulate the natural pre-urbanisation situation where water is held close to where it falls rather than being rushed over impermeable surfaces and into sewers from where it can be disposed of, rather than used. This can be achieved in a number of ways:

- Ground infiltration – where ground conditions permit the passing of rainwater into the ground has a number of benefits:
  - Reduced loading on receiving surface water sewers.
  - Possibility for recharging underground water aquifers *(The use of underground sources of water to feed into water supply is becoming more important. Ground infiltration can provide a means of topping-up these supplies of water so that they can be used at times of water shortage. Aquifer re-charge is also beneficial in respect to maintaining healthy flows in watercourses that are fed primarily from underground sources and in so doing contributing to the maintenance/enhancement of biodiversity).*

Note: Ground infiltration is generally not possible in areas, such as in the Fens area where there is a high water table.

- Roof gardens and living walls.
- Water features such as ponds and rills.
- Rain gardens.
- Underground storage of storm flows.
- Swales *(open ditches or indentations in landscaped areas to provide attenuation of flow).*

Green roof on a shed

Swale

Detention Basin and permeable paving, Ipswich

Detention basin in dry state, Ipswich

Some examples of SuDS that increase infiltration. The two above are taken from a practical example at Lambs Drove, Cambourne, Cambridgeshire[32], the others in Ipswich.

(Courtesy of Cambridgeshire County Council)

32. See www.ciria.org.uk/suds/cs_lamb_drove.htm

The benefit of source control to water cycle management can be summarised as:

- Reduction in peak flow to sewers and watercourses.
- Reduction in flood ponding volumes (pluvial flooding reduction).
- Retention of water in the catchment for recreational use, biodiversity enhancement, potential water supply improvement, etc.

7.2 Human environment enhancement potential

Human beings have an affinity to water, and built environments that use water effectively are generally regarded as being of greater interest as places for people to live and work. This is evidenced by the focus of development adjacent to the sea, rivers, canals, docks, and lakes.

Good design in respect to surface water management can often improve the human and natural environment. Where a significant volume of attenuation is required for surface water it might be possible to design more facilities which have recreational value for humans. Fairlands Lakes in Stevenage for instance (see figure 7.1), are part of the surface water management system but they have been designed in such a way that they have become recognised as a regionally important recreational facility. Separate areas have been designed to cater for wildlife in soft engineered areas, model boating, sailing and also for fishing.

Figure 7.1: Angling area within a recreational complex in Hertfordshire

7.3 Natural environment enhancement potential

See also section 5.5.2 in respect of green-blue infrastructure provision.

Key action for Suffolk (LT 8)

Increase the % of county wildlife sites under active conservation management.

Extract from 'Suffolk County Council's Environmental Action Plan'

TThe availability of good quality water is often a critical factor in maintaining bio-diversity in natural environments. Effective surface water management can support the preservation of those existing environments that need a supply of clean water by maintaining the quantity and quality of the surface water that they need but also has the potential for generating new water based environments. For example a design for a new development may require not only source control surface water management features located within a development but also perhaps the further attenuation of water in 'regional' facilities such as lakes, ponds or water meadows. This offers the opportunity to create an asset which not only satisfies the surface water management requirements but also deliver an environmental and water quality (WFD) improvements.

There are a number of examples where water meadows have been used to attenuate flow from new development to protect receiving watercourses from the inundation of surface water which would have caused environmental damage and property flooding. These meadows provide the required attenuation almost un-noticeably and as naturalised areas are very valuable for both water reliant and dry flora and fauna.

An additional benefit of designing facilities which enhance biodiversity is that environmental charities, e.g. Wildlife Trusts, may be happy to take on responsibility for some element of the ongoing costs of maintenance of the asset, thus reducing the ongoing funding liability.

In fluvial and tidal flood management, the practise of 'making space for water' and working with the natural environment (for example encouraging salt marsh in front of coastal defences) have been common practise for many years and demonstrate that working with nature is not only effective but often the cheapest option for local flood management.

Figure 7.2: Water Meadows in Bury St Edmunds in dry state (left) and after heavy winter rainfall (right). An example of natural sustainable drainage

Case Study: River Quaggy, Sutcliffe Park, southeast London

A series of flood alleviation works along the culverted River Quaggy within Sutcliffe Park reinstated the channel along its previous meandering alignment. The old culvert was retained to accommodate excess water. The previously underused park was converted into a substantial flood storage area which also incorporates a diverse range of park and wetland habitats. As well as reducing flood risk to 600 properties and 4000 people, the project is seen as an excellent example of a multifunctional solution to flood risk that works with natural processes. The works were completed in 2004 and Sutcliffe Park is now recognised by conservation groups such as the National Trust.

Photographs of the watercourse before and after restoration[33]

7.4 Carbon use reduction potential

In order to deliver Suffolk's vision to be the Greenest County, it is essential that all flood and coastal management authorities aim to reduce their carbon footprint. Sensitive flood and coastal management can assist as a consequence of:

- The reduced embedded carbon in soft engineered flood risk reduction measures when compared to conventional solutions using reinforced concrete, metal etc.
- The minimisation of the pumping requirement for surface water and the consequent reduction in the need to use energy. *(Keeping water above ground for as long as possible using source control features integrated with natural surface flow paths can minimise the requirement to pump surface water to a 'disposal' point, minimising the likelihood that pumping will be required in the system).*
- The reduced energy needed for water treatment by minimising the amount of surface water entering foul/combined sewer systems.
- Water storage areas and wetlands (including inter-tidal areas) for flood management also act as areas of carbon capture.

33. www.qwag.org.uk/home/

A key component of mitigating climate change and moving Suffolk towards a low carbon economy is to tackle energy use. By reducing energy use and increasing energy efficiency the county council can save finite resources, reduce carbon emissions, save money and make its buildings and operations more sustainable.

Extract from 'Suffolk County Council's contribution to creating the Greenest County'

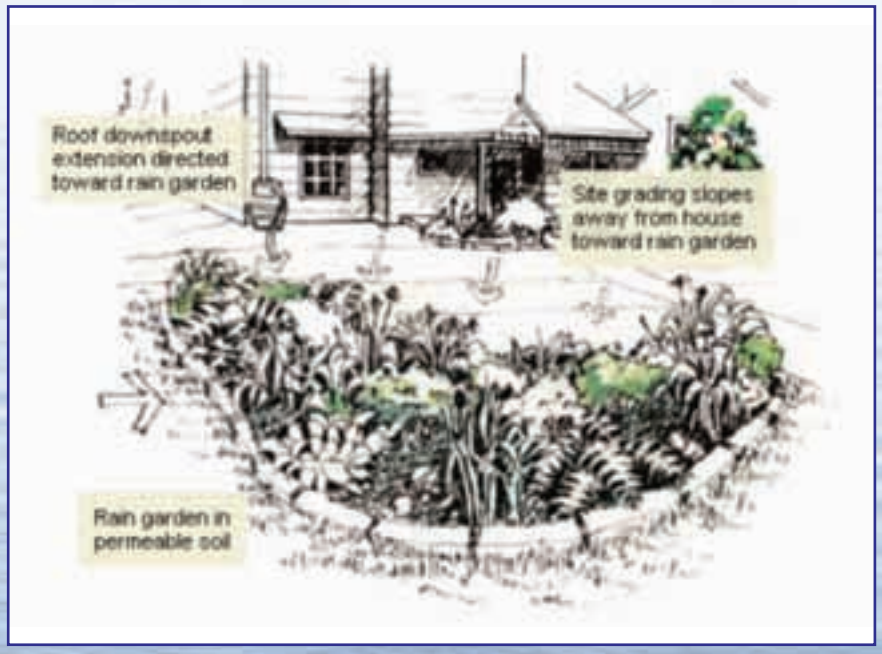
7.5 Things which residents and business owners can do to assist

There are a number of ways in which local residents and business owners can make a contribution in regards to water sustainability, which if repeated on a wide scale could be significant at County level.

People who are currently experiencing flood problems may be more motivated towards some innovative surface water management methods but for others it is unlikely that flood risk alleviation in itself would be a sufficient motivation. What is required is the identification of facilities that have a dual role, being aesthetically pleasing as well as having a role in flood reduction and landscape/ biodiversity enhancement.

There are a number of arrangements that could help:

- Rainwater harvesting (e.g. using water butts) – a very easy way of reducing flow received by the sewers and watercourses while at the same time reducing potable water consumption.
- Rain gardens – aesthetically very pleasing naturally planted areas that serve as attenuation for rainwater by slowing the flow of water passing to receiving sewers but also facilitate evapo-transpiration from plants and allow water to penetrate into the ground for irrigation of vegetation (see example below).
- Ground infiltration of one type or another – arrangements that enable rainwater to be passed into the ground rather than to a sewer or watercourse.
- use of drive and pathway materials that facilitate the direct passing of flow into the ground. Gravel type drives give rise to far less if any flow passing into sewers.



Rain garden design

7.6 The Water Framework Directive

This Anglian River Basin Management Plan[34] outlines the pressures facing the water environment in the Environment Agency's Anglian region, and the actions that will address them. It was prepared to satisfy the requirements of the Water Framework Directive, and is the first of a series of six-year planning cycles.

Note: We will not be focussing on the Water Framework Directive statutory requirements alone, but will follow the principles included in it in non-regulatory approaches.

The objectives which are relevant to this local flood risk management strategy are:

- to prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- to achieve at least good status for all water bodies by 2015. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve good status by 2021 or 2027;
- to promote sustainable use of water as a natural resource;
- to conserve habitats and species that depend directly on water;
- to progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;

The Anglian River Basin District is a unique environment; the landscape ranges from gentle chalk and limestone ridges to the extensive lowlands of the Fens and East Anglian coastal estuaries and marshes. Water is essential to the maintenance of the rivers, lakes, estuaries, coasts and groundwater that underpins these landscapes and their wildlife. And it is vital to the livelihoods of those who live and work here. In the past there has been considerable progress in protecting the natural assets of the river basin district and in resolving many of the problems for the water environment. However, a range of challenges remain, which will need to be addressed to secure the predicted improvements.

The main challenges include:

- **point source pollution from sewage treatment works**
- **the physical modification of water bodies**
- **diffuse pollution from agricultural activities**
- **water abstraction**
- **diffuse pollution from urban sources**
- **the introduction and spread on non-native/invasive species.**

In order to meet these targets, it is important for everyone to play their part now and in the future. River basin management is an opportunity for this generation – for people and organisations to work together to improve the quality of every aspect of the water environment – to create an environment we are all proud of and can enjoy.

Extract from the Anglian River Basin Management Plan

34. http://publications.environment-agency.gov.uk/PDF/GEAN0910BSPP-E-E.pdf

- to progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants;
- to contribute to mitigating the effects of floods and droughts.

It is clear from the above that flood and coastal risk management activities have the potential to help deliver some of the improvements needed. Some examples of relevant actions that risk management authorities, land managers and the public can take to overcome the challenges are:

- Prevent pollution. It is essential to avoid pollutants from industrial and domestic drains entering water courses (everything from hazardous industrial chemicals to pouring oil down household drains). This can be achieved through education as well as regulation and any activities relating to watercourse. The correct application of infiltration SuDS will also assist in pollutants reaching watercourses and aquifers.
- Reduce sediments getting into water bodies through landscaping and use of SuDS and managing activities and soils prone to run-off.
- Protect and enhance wildlife – both through wetland creation schemes (could be part of SuDS) or by taking appropriate precautions with local flood management schemes.
- Save water – as outlined in Sections 5.4, 5.7 and 7.1 there is a clear need to think about flood management in a holistic way, looking at the whole water cycle.
- Avoid further artificial modifications to water bodies The use of more natural forms of flood and coastal defences is widely promoted and used where applicable, not only to deliver the aims of the Water Framework Directive but also because they are the most sustainable and least expensive option. The principle stated in Sections 2.4.7 and 5.11 to reduce structures in water courses (in part through the consenting process) will also help to deliver this aim. Flood management activities should also look for opportunities to remove existing barriers and, for example, introduce additional fish passes.
- Avoid introduction and spread of non-native invasive species. Any flood risk management activity must be carried out in a manner to reduce the introduction and spread of invasive species in and around the water environment – e.g. floating pennywort (see picture below). This can be achieve by ensuring operators are aware of the risks and ways to overcome them as well as educating the public about the issues.

The Environment Agency is providing a range of material in this respect, see **www.environment-agency.gov.uk/homeandleisure/wildlife/31350.aspx**

Floating pennywort (Hydrocotyle ranunculoides) ***©GBNNS, thanks to British Waterways***

8. Next Steps

Monitoring, reviewing and updating this Local Strategy will be essential both to ensure it continues to be 'fit for purpose' but also as a way of demonstrating success in delivering reduced flood risks to the people of Suffolk.

The Suffolk Flood Risk Management Partnership will initially undertake an annual review, commencing 2013, but may reduce in this frequency in the longer term.

The review will ensure the contents are compatible with current legislation and new information/plans as well as a report showing progress against the action plan – initially using a traffic light system to indicate progress:

Red: no progress has been made

Amber: action ongoing but not complete/some progress made towards it

Green: action completed satisfactorily

For Red and Amber actions there will be a short explanation of why the action has yet to be completed.

These amendments and the action plan report wil be scrutinised by the Suffolk Joint Flood Scrutiny Panel and through other local authority political processes as appropriate. It will be publically available.

The annual review will also include relevant case studies to illustrate successful activities in order to share best practice amongst Suffolk's flood risk management partners and our neighbours.

There are a number of ways of monitoring success and once we have established the baseline figures, in future we would expect to be able to report in more detail in terms of reduction in numbers of people at flood risk, area of enhanced/new habitat, progress against WFD targets, benefits delivered for money spent, etc. However, in the early years the action plan is not sufficiently specific/detailed to enable this level of reporting to take place.

Suffolk County Council will also report to Central government relevant information on flooding, flood risk management and SuDS as required within the "single data list".[35]

35. www.communities.gov.uk/localgovernment/decentralisation/tacklingburdens/singledatalist/

Notes

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Polish

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Farsi

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