Flintshire Local Flood Risk Management Strategy

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Flintshire County Council

CYNGOR Sir y Fflint Flintshire COUNTY COUNCIL

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Glossary and Abbreviations of words and phrases commonly used in flood risk management

Term	Meaning / Definition
Act	A Bill approved by both the House of Commons and the House of Lords and formally agreed to by the reigning monarch (known as Royal Assent).
Aquifer	A layer of porous substrate that contains and transmits groundwater.
AONB	Area of Outstanding Natural Beauty.
AMP	Asset Management Plan periods – Water Industry operates in five year cycles, where by the companies set their prices for the five year cycle.
Asset Register	Register of structures or features which are considered to have an effect on flood risk.
Bill	A proposal for a new law or a proposal to change an existing law that is presented for debate before Parliament.
BGS	British Geological Survey.
Building Regulations	The UK Building Regulations are rules of a statutory nature to set standards for the design and construction of buildings. Primarily to ensure the safety and health for people in and around those buildings, but also for the purposes of energy conservation and access to and about other buildings.
Cadw	Cadw is the Welsh Government's historic environment service.
Catchment	An area that serves a river with rainwater; that is, every part of land where the rainfall drains to a single watercourse is in the same catchment.
CFMP	Catchment Flood Management Plan – plans that provide an overview of the flood risk across each river catchment and estuary. They recommend ways of managing those risks now and over the next 50-100 years.
Climate Change	The change in average conditions of the atmosphere near the Earths surface over a long period of time.
CCRA	Climate Change Risk Assessment.
Coastal Erosion	The wearing away of coastline, usually by wind and/or wave action.
Coastal Erosion Risk	Measures the significance of potential coastal erosion in terms of likelihood and impact.
Coastal Erosion Risk Management	Anything done for the purpose of analysing, assessing and reducing a risk of the wearing away of coastline.
Coastal Flooding	Occurs when coastal defences are unable to contain the normal predicted high tides that can cause flooding, possibly when a high tide combines with a storm surge (created by high winds or very low atmospheric pressure).
Coastal Squeeze	Where the coast is protected by engineering structures, the rising sea level results in a steepening of the intertidal profile, known as coastal squeeze.

Term	Meaning / Definition
Community Infrastructure Levy	A mechanism for raising additional funding at the local level.
Consenting	Process of obtaining permission to add/amend structures in/near a watercourse or flood defence structure.
CRR	Community Risk Register.
CCW	Countryside Council for Wales – is the Government's statutory advisor on sustaining natural beauty, wildlife and the opportunity for outdoor enjoyment on Wales and its inshore waters.
Critical National Infrastructure	Infrastructure that supplies essential services, e.g. water, energy, communications, transport etc.
Cultural Heritage	Buildings, structures and landscape features that have an historic value.
Culvert	A covered structure under road, embankment etc, to direct the flow of water.
Defences	A structure that is used to reduce the probability of floodwater or coastal erosion affecting a particular area.
DCC	Denbighshire County Council.
Defra	Department for Environment, Food and Rural Affairs.
Deposition	The process whereby sediment is placed on the sea bed, shoreline, river bed or flood plain.
DG	Director General – is the professional head of an executive agency.
Draft Bill	A Bill published in draft before introduction before Parliament.
DCWW	Dŵr Cymru Welsh Water – supplies water, sewerage and trade effluent services in Wales
EMC	Emergency Management Centres.
EA / EAW	Environment Agency and Environment Agency Wales - Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs and a Welsh Government sponsored Public Body responsible to the Welsh Ministers.
ESF	Environment Social Fund.
ERDF	European Regional Development Fund.
EU	European Union.
FCC	Flintshire County Council.
Flood	Any case where land not normally covered with water becomes covered by water.
FCERM	Flood & Coastal Erosion Risk Management.

Term	Meaning / Definition
FAG	Flood Alleviation Grant.
FDGiA	Flood Defence Grant in Aid.
FFS	Flood Feasibility Study.
FIR	Flood Investigation Report.
Flood Risk	Product of the probability of flooding occurring and the consequences when flooding happens.
Flood Risk Management	The activity of understanding the probability and consequences of flooding, and seeking to modify these factors to reduce flood risk to people, property and the environment. This should take account of other water level management and environmental requirements, and opportunities and constraints.
Flood Risk Management Measures	The way in which flood risks are to be managed.
Flood Risk Management Wales	The Regional Flood and Coastal Committee (RFCC) for Wales.
Flood Risk Regulations 2009	Regulations which transpose the EC Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks) into domestic law and to implement its provisions.
Floodline Warnings Direct	Is a free service that provides flood warnings direct to you by telephone, mobile, email, SMS text message and fax.
FWMA	Flood and Water Management Act 2010 **-** An Act of Parliament updating and amending legislation to address the threat of flooding and water scarcity, both of which are predicted to increase with climate change.
Fluvial Flooding	Flooding from rivers including ordinary watercourses and main rivers.
FCW	Forestry Commission Wales – Government Body Responsible for managing Britain's public forests.
Groundwater	Water held underground in the soil or in pores and crevices in rock.
Groundwater Flooding	Occurs when water levels in the ground rise above the natural surface. Low lying areas underlain by permeable strata are particularly susceptible.
LDP	Local Development Plan.
LDC	Land Drainage Consent.
Local Flood Risk	Defined within the Flood and Water Management Act 2010 as including surface runoff, groundwater and ordinary watercourses.
LFRMS	Local Flood Risk Management Strategy - Required in relation to Wales by Section 10 of the Flood and Water Management Act 2010 Local Flood Risk Strategies are to be prepared by Lead Local Flood Authorities and must set out how they will manage local flood risks within their areas.

Term	Meaning / Definition
LLFA	Lead Local Flood Authority - the County Council or the County Borough Council for the area (Local Authority).
LRF	Local Resilience Forum - A group required under the Civil Contingencies Act, 2004 who are responsible for the coordination of emergency planning in local areas.
Main River	A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers.
Managed Realignment	A coastal defence technique which aims to achieve sustainable flood defence by recreating eroded salt marsh and mudflat habitats.
NPPF	National Planning Policy Framework – Document that rationales the planning legislation.
NMWTRA	North & Mid Wales Trunk Road Agency – responsible for the maintenance of the trunk roads in Flintshire.
NWRF	North Wales Resilience Forum – made up of strategic level managers of each of the Category 1 responders (Local Authority, Emergency Services, and Local Health Boards) to ensure that there is an appropriate level of preparedness to enable an effective multi-agency response to an emergency.
Ofwat	Water Services Regulation Authority – the body responsible for economic regulation of the privatised water and sewerage industry in England and Wales.
Ordinary Watercourse	All watercourses that are not designated Main River.
PDZ	Policy Development Zone.
PFRA	Preliminary Flood Risk Assessment.
Recovery	The process of rebuilding, restoring and rehabilitating the community following an emergency.
RWA	Regional Water Authorities.
RFCC	Regional Flood and Coastal Committee - An Environment Agency committee, responsible for consenting medium and long term plans and operational plans to the Agency's Board and Head Office. Monitors and reports on progress. In Wales there is only one RFCC and this is the FRMW (Flood Risk Management Wales) Group.
Reservoir	An artificial lake where water is collected and stored until needed. Reservoirs can be used for irrigation, recreation, providing water for municipal needs, hydroelectric power or controlling water flow.
Residual risk	The risk that remains after risk control measures have been put in place.
Resilience	The ability of the community, services, area or infrastructure to avoid being flooded, lost to erosion or to withstand the consequences of flooding or erosion taking place.
RSG	Revenue Support Grant.
Risk	Measures the significance of a potential event in terms of likelihood and impact. In the context of the

Term	Meaning / Definition
	Civil Contingencies Act 2004, the events in question are emergencies.
Risk Assessment	A structured and auditable process of identifying potential significant events, assessing their likelihood and impacts and then combining these to provide an overall assessment of risk to inform further decisions and actions.
Risk Management	Anything done for the purpose of analysing, assessing and reducing a risk.
RMA	Risk Management Authority - A Welsh risk management authority is defined in Section 6 of the Flood and Water Management Act 2010 as the Environment Agency, a Lead Local Flood Authority, a district council for an area for which there is no unitary authority, an IDB for an internal drainage district that is wholly or mainly in Wales and a water company that exercises functions in relation to an area in Wales.
Risk Management Schemes	A range of actions to reduce flood frequency and/or the consequences of flooding to acceptable or agreed levels.
River flooding	Occurs when water levels in a channel overwhelms the capacity of the channel.
Roll Back	As natural defences fail the coast will 'roll back' naturally, creating an opportunity for the expansion of intertidal and coastal habitats.
Royal Assent	Method by which the constitutional monarch formally approves an act of parliament.
Sewer	An artificial conduit, usually underground, for carrying off sewage (foul sewer) or rainwater (storm or surface water sewer) or both (combined sewer).
SMP	Shoreline Management Plans **-** A large-scale assessment of the risks associated with coastal processes and helps reduce these risks to people and the developed, historic and natural environments.
SEA	Strategic Environmental Assessment. An SEA is a system of incorporating environmental considerations into policies, plans, programmes and strategies.
SFRA	Strategic Flood Risk Assessment.
SuDS	Sustainable Drainage Systems - Approach to surface water management which helps to deal with excesses of water by mimicking natural drainage processes and patterns.
Surface Water Flooding	In the urban context, usually means that surface water runoff rates exceed the capacity of drainage systems to remove it. In the rural context, it is where surface water runoff floods something or someone.
Surface Water Runoff	This occurs when the rate of rainfall exceeds the rate that water can infiltrate the round or soil and flows over ground.
SWMP	Surface Water Management Plan.
SAB	SuDS Approval Body.
TAN 14: Coastal	Technical Advice Note 14 supports Planning Policy Wales and covers all aspects of planning for new development and the coastal zone.

Term	Meaning / Definition
Planning	
TAN 15: Development & Flood Risk	Technical Advice Note 15 supports Planning Policy Wales and makes it clear how local authorities should make decisions about different types of development on flood plains, providing clear tests for justification and acceptability of flooding consequences, and enabling the consideration of risks over the lifetime of the new development.
UKCP09	United Kingdom Climate Projections – is the working name for the UK Climate Projections, which forecasts the potential impacts of future climate change based on sound science.
WaSC	Water and Sewerage Company.
Wales Flood Group	A sub group of a Wales Resilience Forum.
Watercourse	A channel natural or otherwise along which water flows.
Water Company	A company which holds an appointment under Chapter 1 of Part 2 of the Water industry Act 1991 or a licence under Chapter 1A of Part 2 of that Act.
WFD	Water Framework Directive.
WG	Welsh Government.
WLGA	Welsh Local Government Association - Represents the interests of Local Authorities in Wales. The three fire and rescue authorities, four police authorities and three national park authorities are associate members.
Welsh Risk Management Authorities	Risk Management Authorities as defined in Section 27 of the Flood and Water Management Act 2010.

Executive Summary

Flintshire County Council (FCC), as a Lead Local Flood Authority (LLFA) is required to prepare a Local Flood Risk Management Strategy. The purpose of the Local Strategy is to address potential flood risk arising from local sources within the boundaries of the Authority area. An important part of the Local Strategy will be to ensure that our communities are aware of what risks exist, aware of what the Council and other Risk Management Authorities (RMA's) responsibilities are in terms of flood risk and what communities can do to involve themselves.

The Local Strategy will complement and support the National Strategy published by Welsh Government in November 2011, which outlines a national framework for flood and coastal risk management, which aims to balance the needs of communities, the economy and the environment. *The National Strategy for Flood and Coastal Erosion Risk Management* (Wales) sets the following objectives:

1. **Reducing the impacts** on individuals, communities, businesses and the environment from flooding and coastal erosion;

2. **Raising awareness** of and engaging people in the response to flood and coastal erosion risk;

3. **Providing an effective and sustained response** to flood and coastal erosion events; and

4. **Prioritising investment** in communities most at risk.

The Local Strategy aims to pull together the existing policies and actions the Authority undertakes which have implications with regard to flood and coastal erosion risk management, any new actions or policies introduced as a result of the Flood and Water Management Act 2010 and Flood Risk Regulations 2009 also any proposed actions or policies to be introduced to further manage flood risk.

The LLFA must specify objectives to manage flood risk and suggest measures to achieve those objectives. The Local Strategy must show how and when any measures are to be introduced and how they will be funded. The implementation and funding of some of the proposed actions may not be clear at this stage, as they involve sections of the Flood and Water Management Act 2010 (FWMA) not yet implemented.

The LLFA has a responsibility to consider the flood risk management functions that it may exercise to reduce the impact and risk from flooding. In support of the aim of a general reduction of flood risk across the district, the Lead Local Flood Authority will prioritise investigations and works identified in this strategy to the best of its abilities, based on perceived and evidenced risk and with limited resources.

Considering the current pressures on public funding, the money available for addressing flood risk is unlikely to be adequate and pressures will only increase with the rising future risk brought about by further development and a changing climate. As such flood risk management will need to be supplemented by everyone working together and by those at risk from flooding taking responsibility to protect and help themselves.

1. Introduction

Around 220,000 properties in Wales, or about one in six buildings, are at risk of flooding, of which 64,000 are at significant risk. 97,000 of these are also vulnerable to surface water flooding with a further 137,000 properties susceptible to surface water flooding alone.

Flooding in Wales – National Assessment of Flood Risk
Environment Agency

1.1 Introduction

The increase in occurrence and severity of flooding in recent years including that of summer 2007 sparked a UK government-commissioned investigation into the flooding, known as the Pitt Review[1]. It summarised the failings of historic flood management, resulting in an extensive set of recommendations which were transposed into the Flood and Water Management Act 2010[2] (FWMA). The FWMA created a responsibility for County and Unitary Councils to act as Lead Local Flood Authorities (LLFA's) which meant they were required to take leadership for the coordination and management of local flood risk.

Flintshire County Council (FCC) has been designated as a LLFA in Wales, and is required under Section 10 of the FWMA to develop, maintain, apply and monitor a Local Flood Risk Management Strategy (LFRMS) in its area. The purpose of the LFRMS is to address potential flood risk arising from local sources within the boundaries of the Local Authority area. Local flood risk is defined as any flood risk from surface runoff, groundwater and ordinary watercourses. An ordinary watercourse is defined (in the Water Resources Act 1991) as any watercourse, including lakes and ponds that is not a main river.

It is likely that changes in our climate, such as increased severity of storms and wetter winters, will increase the risk and impact of flooding. Flooding already poses a serious risk to the people, economy and environment of Flintshire and climate change is expected to increase this risk, as well as the rate of coastal erosion, in the coming decades[3]. Communities at risk of flooding and coastal erosion can expect to see those risks realised more frequently and the magnitude of the impacts to be increased. It will not be practicable to continue to build more and bigger drainage systems and defences in response to this increased risk; the response has to be rooted in the principles of risk management, providing a holistic approach to identifying flooding issues, and managing the risks, and their consequences.

This flood risk strategy begins a new chapter of Flood and Coastal Erosion Risk Management (FCERM) for Flintshire. It highlights the steps that are to be taken to improve knowledge of flood risk in the county, to work better with organisations and the public towards reducing those risks whilst aiming to balance the need of communities, the economy and the environment.

The strategy provides information on the legislation that underpins Flood and Coastal Erosion Risk Management activities, the nature of flood risks in Flintshire and what further information is needed to help build a better picture of local flood risks. It then identifies the authorities and organisations involved and what part each will play in helping reduce the risk of flooding in Flintshire. The next section will describe the strategic objectives for managing flood risk and the measures that might be implemented to achieve them.

[1] The Pitt Review; Learning Lessons from the 2007 Floods - Full Report
[2] Flood and Water Management Act 2010
[3] Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales, December 2011

This will be supplemented by annual action plans in order to give a more detailed overview of what FCC want to achieve that year and how it will be undertaken.

Considering the current pressures on public funding, the money available for Flood and Coastal Erosion Risk Management is unlikely ever to be adequate to deal with all existing flood risks and the increasing future risk brought about by further development and a changing climate. As such flood risk management will need to be supplemented by everyone working together and by those at risk from flooding taking responsibility to protect and help themselves.

2. Guiding Principles

The following are the guiding principles which Flood and Coastal Erosion Risk Management in Flintshire will be based on:

- Floods are natural events and will continue to occur, regardless of any efforts to prevent them. The danger from flooding will never be eliminated and therefore it is important to focus as much on reducing the disruption that flooding causes as on measures to prevent it;
- There are opportunities to derive significant benefits in the wider context of sustainability, environmental and social improvement in the Flood and Coastal Erosion Risk Management function;
- The public and private costs created from flood damage can be reduced in the long term by effective flood risk management;
- The decisions on where local resources are focused should be evidence-based and made against clear justifiable criteria;
- The level of knowledge about flood risk across all stakeholders needs to be improved;
- To ensure the long term success of flood risk management across Flintshire, all relevant organisations and public funded bodies will have to work collectively to manage the risks of flooding;
- No organisation is able to ensure that all households and businesses are safe from flooding. Householders and business holders have responsibility for protecting their properties, but the relevant Risk Management Authority has a duty to inform property owners of their risk and advise what steps they can take to make their property more resilient;
- Encourage an increase in total investment in flood risk management beyond levels provided by the Welsh Government (WG) alone;
- New developments should not only ensure that there is no increase in flood risk but where practical, should address any flood risk currently there;
- The cumulative impact of small developments on flood risk shall be assessed to the same level as major developments, to ensure the threat of flood risk doesn't increase; and
- Climate change and how it could affect future flood and erosion risk needs greater understanding and all options should be appraised to enable adaptation to changing risk.

3. Legislative Context

3.1 History of flood risk management

The responsibility for flood risk management has changed considerably over the past 30 years. Prior to 1989, the regulation of national environmental issues (including flood risk management, drainage and water quality) was carried out by ten Regional Water Authorities (RWAs). The Welsh National Water Development Authority (which came into existence by virtue of the Water Act 1973) covered the area which is now FCC. In 1989 the National Rivers Authority (NRA) was set up, a national body that took over the roles and responsibilities for flood risk management, drainage and water quality in England and Wales. The Water Act 1989 was passed by Government which privatised the Water Supply and Sewerage functions of the Water Authorities with Dŵr Cymru Welsh Water (DCWW) becoming a PLC (Since 2001 DCWW has been owned by Glas Cymru, a company limited by guarantee).

In December 1991, a number of pieces of legislation were enacted which aimed to consolidate 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 NRA. The Statutory Water Companies Act and the Water (Consequential Provisions) Act were also enacted at the same time.

The Environment Agency[4] (EA) was established by the Environment Act in 1995. The EA came into existence on 1st April 1996 and took over the roles and responsibilities of the NRA and also the 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; the county of Flintshire falls within the Environment Agency Wales region.

Within England and Wales, recent flood risk management policy changes were accelerated by major flood events in 1998 and 2000, which led to the release of Planning Policy Guidance 25 (PPG25): Development and Flood Risk in England during 2001. Technical Advice Note 15 (TAN15), the Welsh equivalent of PPG25 was released in 2004 and aims to direct development away from areas of high flood risk with justification and assessment of consequences required if this cannot be achieved. TAN15 also encourages a presumption in favour of Sustainable Drainage Systems (SuDS) for any development where this will be effective.

In England, Planning Policy Statement 25 (PPS25) superseded PPG25 in 2006 and reinforced the requirement for sustainable surface water management in new developments. This has now been replaced by the National Planning Policy Framework (NPPF) which looks to rationalise the amount of planning legislation and bring it all together in one coherent document. The Wales Office[5] has welcomed the changes to the English planning guidelines and encourages the Welsh Government to seek to adopt this new simplified planning regime.

[4] An Executive Non-departmental Public Body responsible to the Secretary for Environment, Food and Rural Affairs and in Wales a Welsh Government Sponsored Body responsible to the Minister for Environment and Sustainable Development

[5] The Wales Office supports the Secretary of State for Wales

3.2 The Flood and Water Management Act (2010)

Following Royal assent in April 2010 The Flood & Water Management Bill became an Act of Parliament. The Act reinforces the need to manage flooding in a holistic and sustainable manner and places a number of new roles and responsibilities on councils such as Flintshire, which is designated as a Lead Local Flood Authority under the FWMA extending their previous responsibilities for flood risk management. The preparation of this LFRMS is just one of the duties placed upon FCC under this piece of legislation.

There are two key drivers behind the new legislation; one being the review in to the summer 2007 floods by Sir Michael Pitt, most often referred to as the Pitt Review. The other key driver behind the Act is the EU Floods Directive which has been transposed into UK law by the Flood Risk Regulations, 2009. Both of which are summarised in the following sections:

3.3 The Pitt Review

Sir Michael Pitt carried out an independent review of national Flood and Coastal Erosion Risk Management practices after the widespread and catastrophic floods during the summer of 2007, in which over 55,000 households were affected and damages exceeded £4 billion[6]. The Pitt Review was published in June 2008 and called for urgent and fundamental changes to the way flood risk was being managed. The report contained 92 recommendations for the Government, Local Authorities, Local Resilience Forums and other stakeholders which were based around the concept of Local Authorities playing a major role in the management of local flood risk, through coordinating with all relevant authorities. Many of the recommendations contained in the Pitt Review have been enacted through the FWMA.

3.4 The Flood Risk Regulations 2009

The Flood Risk Regulations (FRR) came into force in December 2009 and transposes the EU Floods Directive into law for England and Wales. The Flood Risk Regulations require three main pieces of work:

Preliminary Flood Risk Assessment (PFRA) – This involves collecting information on past and future floods from surface water, groundwater and ordinary watercourses, assembling the information into a PFRA report and identifying Indicative Flood Risk Areas[7]. No Indicative 'Flood Risk Areas' were identified in Flintshire. The PFRA for Flintshire has been completed and can be found on the Environment Agency website.

Flood Hazard and Flood Risk Maps – Any authorities identifying an Indicative Flood Risk Area are required to produce hazard and risk maps for those areas by 22nd December 2013.

Flood Risk Management Plans – The final stage is for authorities with an Indicative Flood Risk Area to produce a Flood Risk Management Plan for those areas by 22nd December 2015.

[6] The Costs of the summer 2007 floods in England – Environment Agency (Project: SC070039/R1) Published January 2010

[7] Flood Risk Area is defined in the report as an affected population greater than 5,000 people at risk, as defined in the WAG/ Defra guidance document 'Selecting and Reviewing Flood Risk Areas for local sources of flooding – Guidance for Lead Local Flood Authorities'.

The PFRA did not identify any 'Flood Risk Areas' within the county of Flintshire. Flood Risk Areas termed in the PFRA have been defined by WG guidance as an affected population greater than 5,000 people at risk. Under this guidance, no areas were identified by Environment Agency Wales (EAW) within Flintshire County, and as such FCC are not required under the FRR to undertake the flood hazard and flood risk maps and flood risk management plans.

These requirements will be reviewed on a six yearly cycle; the first cycle will take place in conjunction with the revision of the PFRA in 2017. Should this review identify a Flood Risk Area, flood hazard and flood risk maps and flood risk management plans will need to be completed during this cycle. It is proposed that a review of the local strategy should take place in 2017 following the review of the National Strategy in 2016, and to coincide with the review of the PFRA.

3.5 The National Strategy for Flood and Coastal Erosion Risk Management

The Flood and Water Management Act 2010 requires the Welsh Government (WG) to develop, maintain, apply and monitor a National Strategy for flood and coastal erosion risk management in Wales. It can be found at the following location:

http://wales.gov.uk/docs/desh/publications/111114floodingstrategyen.pdf

The National Strategy sets four overarching objectives for the management of flood and coastal erosion risk in Wales, which are as follows:

- Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion;
- Raising awareness of and engaging people in the response to flood and coastal erosion risk;
- Providing an effective and sustained response to flood and coastal erosion events; and
- Prioritising investment in the most at risk communities.

Implementing these objectives will be the responsibility of everyone involved in or affected by flood and coastal erosion risk management, from the WG to the Welsh Risk Management Authorities and the people of Wales themselves.

The FWMA states that Local Strategies must be consistent with the National Strategy for Wales. Being consistent ensures that the strategic aims and objectives in the National Strategy are translated into meaningful objectives for their own particular area.

The WG have a wide range of measures which they propose will meet their objectives. The following measures have been assigned to LLFA to lead delivery on:

- Development of Local Flood Risk Management Strategies;
- Implementation of statutory responsibilities including those set out within the Flood and Water Management Act 2010 and the Flood Risk Regulations 2009;

- Approval and adoption of SuDS drainage systems by the SuDS Approving and Adopting Body (SAB);
- Development of a register of natural and manmade structures or features likely to have an effect on flood risk;
- Establishment of a programme of regular and appropriate maintenance for flood and coastal erosion risk management assets (for assets owned by the LLFA);
- Designation of natural and manmade structures or features likely to have an effect on flood or coastal erosion risk over the life of the Strategy;
- Programme of community based awareness and engagement activities, utilising the Flood Risk Management Community Engagement Toolkit (in partnership with the Environment Agency);
- Identification of at risk groups within communities, including vulnerable individuals;
- Development of procedures for the effective clearance of debris (following a flood event);
- Development of repair schedules including provision for the installation of resilience measures; and
- Investigations into the causes of flooding to be undertaken where necessary within one month.

There are additional measures for local authorities in their capacity as local planning authority and as Category 1 responder under the Civil Contingencies Act 2004.

3.6 Other Legislation

Flood Risk Management is affected by a range of other legislation. Which include the following:

- The Climate Change Act 2008;
- The Civil Contingencies Act 2004;
- The Strategic Environmental Assessment (SEA) Directive 2001;
- Conservation of Habitat and Species (Amendment) Regulations 2012;
- The Land Drainage Act 1991;
- The Water Framework Directive 2007;
- Wildlife and Countryside Act 1981;
- Countryside and Rights of Way Act 2000;
- Coast Protection Act 1949;
- Natural Environment and Rural Communities Act 2006;

- Public Health Act 1936; and
- Highways Act 1980.

4. Flood Risk in Flintshire

4.1 Introduction

The European Union (EU) Floods Directive defines a flood as a covering by water of land not normally covered by water. It can occur from a number of sources, including rivers, the sea, small local watercourses, below ground drainage systems and direct surface water run-off. Understanding both the sources of and reasons for flooding, ensures that FCC can take steps to manage and reduce the risks of flooding.

Flood risk is the product of the likelihood or chance of flooding, multiplied by the consequences or impacts of flooding. The likelihood (or chance) of flooding occurring in any one year can be expressed as a probability or an annual chance; a 1% annual probability of flooding equates to a 1 in 100 chance of flooding at a location in any year. The consequences (or impacts) of flooding can have serious effects not only on people and property, but also on essential services, infrastructure and the environment.

4.2 Local Flood Risk

Flintshire has experienced widespread flooding in recent years in a number of locations including Mold, Flint, Rhydymwyn, Hendre, Pontblyddyn, and Bagillt in 2000, where some 150 residential properties were flooded including a number of commercial properties. In this incident it was apparent that the County had not experienced an isolated flooding incident but that significant areas of the country were affected simultaneously. As a result of this flooding incident significant emergency works were conducted and a number of capital works schemes were carried out in the county.

Flintshire County is exposed to the combined potential risk from river, tidal and coastal flooding. Urban drainage and surface water problems have also contributed to the county's history of flooding.

The administrative area of FCC is the 12th largest within Wales and covers an area of approximately 438 km². FCC serves a total resident population of 152,500, and contains a number of large settlements that are located on the coast including Flint, Connah's Quay and Shotton both at the mouth of the Dee. Away from the coastal strip, the area is predominantly rural, and includes a significant region of upland mountainous terrain scattered with small villages and a few larger settlements adjacent to rivers. FCC is responsible for approximately 34 km of coastline, the majority of which are artificially protected with exceptions around Gronant and Talacre.

The county falls into two river basin districts, the Dee River Basin District, which covers the majority of the county and drains over 85% of the county and the Western Wales River Basin District which covers the remaining 15% of the county which is located within the north western corner of the county.

A few examples of historical flooding have been provided above however flood risk is widespread across Flintshire; more details on specific locations can be found in the PFRA and a link provided in Chapter 6.

4.3 Types of Flooding

Flooding can result from a wide variety of sources and interactions between those sources. The FWMA defines 'local flood risk' as being a flood risk from:

- Surface water runoff;

- Groundwater; and
- Ordinary water courses.

These sources are defined below. It should be noted that in many cases these sources can be interrelated and flooding can be caused by a combination of sources including those not considered local sources such as main rivers or the sea.

Although this strategy is directed at managing risk from flooding from local sources, this document takes into account the aims and objectives identified in the *National Strategy for Flood and Coastal Erosion Risk Management* in Wales, published by the WG in November 2011. As such, and for completeness, all types of flooding that may occur in the county and that are covered by both strategies (local and national) have been described in the following sections.

4.3.1 Surface Water Flooding (pluvial)

Surface water flooding also know as runoff or pluvial flooding is caused by water flowing overland following periods of prolonged or intense rainfall, leading to flows or ponding of water. Surface water flooding can happen anywhere with very little warning and can disappear with a similar speed. Areas which have been historically subject to this type of flooding are likely to experience a higher probability of repeat flood events in the future according to climate change projections.

Simplistically surface water flooding is caused by the inability of rainwater to be absorbed into the ground quicker than it falls as precipitation, causing a build up and flows across ground. Precipitation that has entered a watercourse, public sewer, or drainage system and overflows from there onto the surface is not within the definition of surface runoff.

Surface water flooding is complex in nature and can be exacerbated by a number of factors. These include; poor infiltration rates where water is unable to (or slow to) discharge to ground including areas of impervious natural materials (for example clay soils, non-porous rocks) or man-made materials (hard-standing, roofs); poorly maintained structures (blocked or silted gullies and pipe work) or under designed local drainage capacity allowing for insufficient attenuation of surface water runoff following periods of heavy rainfall; and obstructions in watercourses leading to overtopping and flows over land.

Significant work has been undertaken by FCC to identify the risk and the probability of flooding from surface water under section 10 of the FWMA. As part of their responsibilities FCC produced a PFRA in 2011 to identify the areas within the county that are at risk from flooding.

4.3.2 Groundwater Flooding

Groundwater is the term used to describe water that is stored underground in permeable rocks which are known as aquifers. The aquifers are fed through the process of precipitation which percolates through the ground and includes all of the water that is not lost to surface water runoff and evapo-transpiration. Groundwater forms the foundation of the base-flows of rivers and stream which are topped up by surface run-off. Groundwater flooding occurs when the water held underground rises above these levels. It is important to note that the term groundwater does not include any water that is carried in buried pipes or held underground in containers.

Predicting groundwater flooding is often complex as groundwater levels are heavily influenced by the underlying geology and the topography and geology of the surrounding catchment areas. Groundwater flooding can occur following extended periods of heavy rain (either local or within the aquifer catchment) and can occur many hours or even days after the precipitation has finished and can remain in-situ for long periods of time. Other factors that can influence groundwater levels can include; reduced abstraction rates, or changes to underground flows.

In Flintshire flooding attributed directly to groundwater is extremely difficult to apportion as groundwater flooding usually occurs in combination with pluvial and fluvial flooding. As groundwater flooding occurs in low lying areas, basements of residential housing are usually impacted by this type of flooding.

Residents may not even be aware that their property has been flooded or they are aware that flooding has occurred previously (and do not store valuable goods in basements) and do not report incidents to the Council as limited damage to personal belongings has occurred. As such historical records relating to groundwater flooding within Flintshire are limited.

4.3.3 Fluvial Flooding

Fluvial flooding occurs when a river or ordinary watercourse reaches its capacity and overflows beyond its natural channel. This type of flooding can be influenced by a large number of factors, but usually occurs following prolonged and heavy rainfall within the rivers catchment area.

Under the Water Resources Act 1991, main rivers are defined on the main river map (see Figure 4.1 below) and the EAW can exercise their powers relating to them. Fluvial flooding from main rivers is outside the scope of this strategy, as it only deals with flooding from ordinary watercourses. However, as the main rivers have an impact on ordinary watercourses the strategy does take the flooding issues from main rivers into account where appropriate.

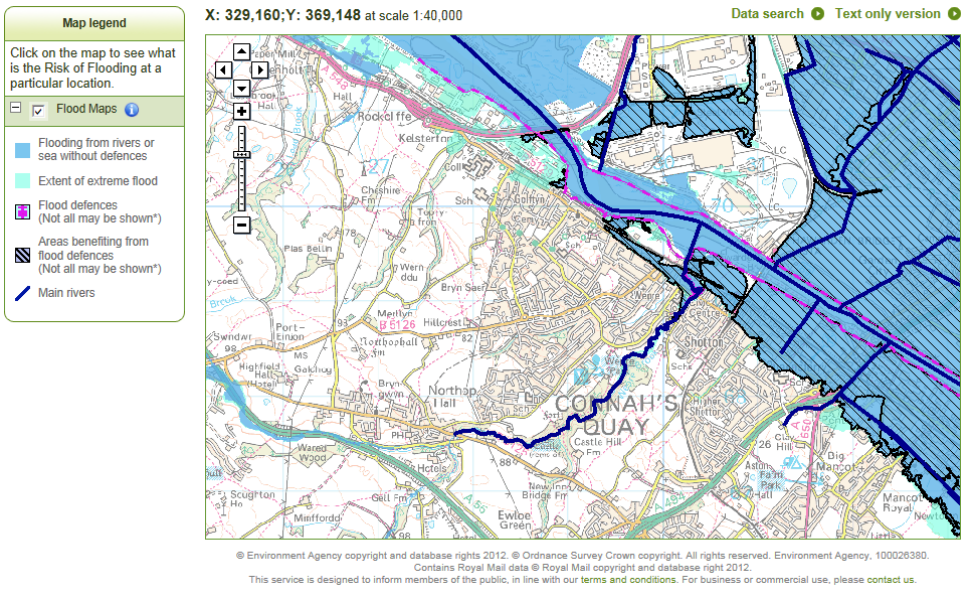


Figure 4.1: The Environment Agency Main River Map – Main rivers and risk of flooding from rivers and sea

Overseeing the management of local flood risk from ordinary watercourses that are not designated Main River, are the responsibility of Local Authorities. In terms of ordinary watercourses the LLFA manages the risk from local flood under its responsibilities identified in the Land Drainage Act 1991[8] and the FWMA. The roles and responsibilities of the partners, organisations and landowners that manage the different flood risks are detailed further in Section 7 of this report.

Flintshire's historical records identify one incident of historical flooding where 12 properties were flooded at Pontblyddyn by a Main River; the River Alyn. There are also flood risks from smaller watercourses and tributaries within other areas of the County.

4.3.4 Sewer or Highway Flooding

Sewer or Highway flooding is caused when flows or volumes of surface water exceed the capacity of drainage infrastructure or where a blockage occurs. This type of flooding generally occurs following periods of intense rainfall leading to the drainage systems being overwhelmed. This type of flooding can be exacerbated in autumn when drainage gullies become blocked with leaves or other detritus. FCC is the Highway Authority within Flintshire responsible for maintenance of highway drainage systems.

Within Flintshire, Dŵr Cymru Welsh Water (DCWW) is the water and sewerage company with the responsibility for managing and maintaining drainage systems (surface water and combined sewers). DCWW are required to record and report on property flooding within their management areas, as part of their service indicators known as Director General (DG) Registers. The register which records the flooding incidents within the county is known as DG5, which is provided to the Water Services Regulatory Authority, or Ofwat.

4.3.5 Reservoir Flooding

Flooding attributed to reservoirs occurs when a reservoir dam is overtopped or fails due to damage or collapse of the structure. The Pitt Review undertaken as a result of the floods in 2007 recommended that the Government should provide flood maps to identify areas that could be affected by a breach or overtopping to allow plans to be prepared for an emergency response. In 2008 the Department for Environment, Food and Rural Affairs (Defra) instructed the EA to assess the impact of dam breach flooding from all large raised reservoirs in England and Wales which were registered under the Reservoirs Act 1975.

The Reservoir Act 1975 classifies a registered reservoir as one that is capable of holding at least 25,000 cubic metres of water above the lowest natural ground level. More recently The Flood and Water Management Act 2010 proposes that a raised structure or area is "large" if it is capable of holding 10,000 cubic metres of water above the natural level of any part of the surrounding land.

Within Flintshire County there are 5 reservoirs that fall under the Reservoir Act and the maximum extent of flooding has been modelled by the EAW to show the areas that would be impacted by a breach or failure of the dams. All of these reservoirs have been designated by the EAW and it is the duty of FCC to produce off-site plans for these reservoirs for an emergency response. It is the duty of the undertaker (owner or operator) to maintain their reservoir and to inform the Reservoir Supervising Engineer (if known) of a potential breach, and following that to notify the emergency services.

[8] Land Drainage Act 1991, schedule 2 paragraph 29

There are no historical records of a dam failure within the County.

4.3.6 Coastal Flooding

Sea flooding occurs when water levels or waves overtop the crest of the costal defences, or when defences are breached or collapse. The probability of breach is dependent on four main factors: weather conditions (generating large waves); wind direction (on-shore); high tides (particularly during spring tides) and the condition of the coastal defences. When these conditions combine the risk of flooding can be greatly enhanced as the predicted tide level can be raised by several metres. This phenomenon is known as a storm surge.

The most extreme recent event within Flintshire occurred at Ffynnongroyw on 26th February 1990 when a combination of gale-force winds, high tides and rough seas cause a breach in British Rail's coastal defence. This resulted in temporary closure of the railway and approximately 150 people had to be evacuated. British Rail had to rebuild approximately 1000m of the coastal defence wall as a consequence of breach.

In the above event the surge was caused by the coincidence of a severe depression of 950 millibars and the highest tides of the year which led to record sea levels being recorded some 1.50 m higher than predicted. It was estimated that this extreme event would only occur once every 500 – 1000 years.

As a result of the sea defence failures a House of Commons committee held an enquiry into the flooding. The incident was important as it alerted authorities around Britain to the importance of ensuring that coastal defences are adequate for a future of increasing sea levels and extreme weather events, which are likely to be increasingly common.

Flintshire's tidally influenced flooding risks encompass Gronant, Talacre and the low lying towns adjacent to the Dee Estuary.

4.4 A Combination Event

Detailing individual sources of risk does not imply that flooding can only ever occur for one reason. Any or all of these sources mentioned previously can come together to produce what are called combination events.

An example of a combination flood event is one occurring during a period of intense or prolonged rainfall. The rain would increase water levels in watercourses, saturate the ground, increase flows through the drainage systems and could enter the public sewerage system. Any of these factors combined, watercourses, drains and sewers could all reach maximum capacity and overflow / surcharge resulting in flooding.

On the coast, a combination event could involve sea flooding caused by a storm surge, occurring at the same time as a high tide and during prolonged rainfall on land. This results in an increase in tide and wave levels at the same time as river flow to the sea increases. If the two meet, coastal communities could experience a mix of flooding from the sea and river.

Depending on the intensity of the rainfall and the waves, such an event could also cause an increase in coastal erosion, resulting in long term damage to the coast, which could increase future flood risks.

Where there are complicated interactions from different sources, the LLFA will take a lead to ensure that investigation, assessment and appropriate mitigation measures are carried out[9].

4.5 Coastal squeeze

A Defra (2003) guidance note on managed realignment defined coastal squeeze as; the process by which coastal habitats and natural features are progressively lost or drowned, caught between coastal defences and rising sea levels[10]. Figure 4.2 illustrates the processes of coastal squeeze.

As sea levels rise, increasing wave height and intensity, sea waters move further inland with the consequential loss of low lying habitats and damage to the features of the habitat and associated species within it. This loss of intertidal habitat is referred to as coastal squeeze, and while generally referred to in relation to habitat, it can also have an impact on flood and coastal erosion risk.

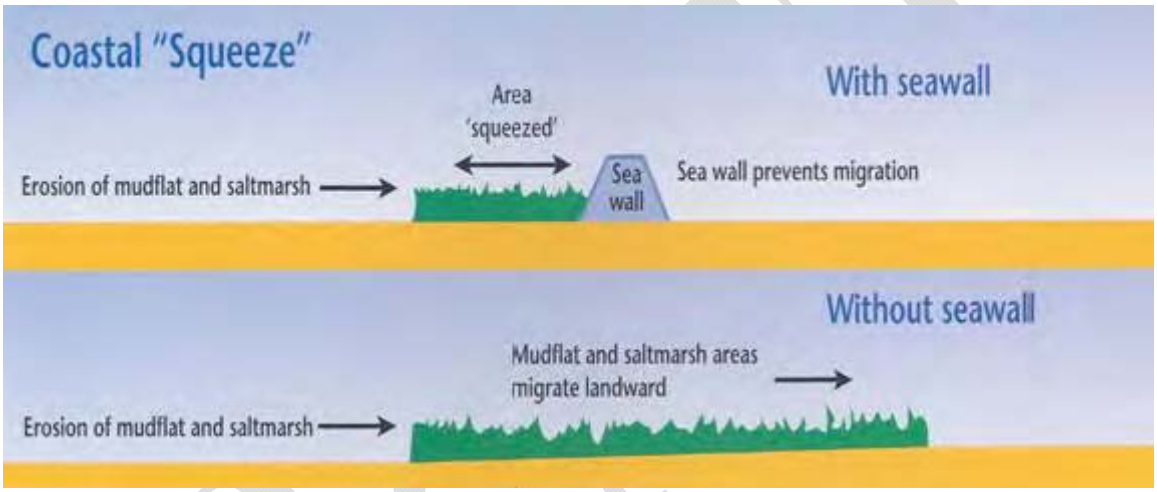


Figure 4.2: Coastal Squeeze (The National Strategy for Flood and Coastal Erosion Risk Management)

Decreasing the extent of foreshore in front of a defence, for example, can create deeper water with a consequent increase in wave size. This can undermine defences or make it more likely that defences are overtopped.

It is important to note the role that coastal features like beaches and sand dunes can play in wider coastal protection. They can be significant natural buffers to sea flooding if considered as part of an integrated management strategy using natural processes and through this potentially reduce the maintenance costs or increase the lifespan of structures protected by them.

They also provide important ecological benefits such as fish nurseries and dune habitat, for example, as well as recreational and tourism opportunities for local communities. These habitats can provide multiple benefits to society, the economy, and the environment.

[9] Chapters 4.4 and 4.5; National Strategy for flood and coastal erosion risk management in Wales

[10] Defra (2003) Guidance Note on Managed Realignment: Land Purchase, Compensation and Payment for Alternative Beneficial Land Use. Defra, London, UK.

4.6 Factors increasing flood risk

Flood risk is a combination of probability and consequence. There are a number of factors which will lead to higher probability of flooding in the future and more serious potential consequences, which will result in an increase in the risk of flooding in Flintshire. There are many factors that can increase flood risk including those which are provided in the Table 4.1 below.

Factors which may increase flood risk in Flintshire		
Weather	**Hydrological**	**Human**
■ Rainfall; ■ Intense storms; ■ Small-scale storms; ■ Temperature; and ■ Snowfall and snowmelt.	■ Soil moisture level; ■ Groundwater level prior to storm; ■ Natural surface infiltration rate; ■ Presence of impervious surfaces; ■ Channel cross-sectional shape and roughness; ■ Presence or absence of over bank flow; ■ Synchronization of run-offs from various parts of the catchment; ■ Flow obstruction; ■ Tide locked conditions; and ■ Water borne debris.	■ New development and changes in land use (e.g. hard standing surfaces due to urbanization) increase run-off; ■ Building within the flood plain; ■ Obstructions to flows within flood plain areas; ■ Lack of maintenance on open watercourses and small culverts; ■ Deterioration in the condition and performance of existing drainage infrastructure; ■ Climate change - more frequent and more severe extreme weather; ■ Diversion of watercourses; and ■ Illegal connections to sewers.

Table 4.1: Factors which may increase flood risk in Flintshire

4.7 Methodology for Identifying Areas of Risk

As part of the Council's responsibilities under the FRR 2009, FCC produced a Preliminary Flood Risk Assessment (PFRA) in June 2011. The purpose of this report was to identify areas within the county that were at risk of flooding with significant consequences which were termed as 'Flood Risk Areas'.

Significant consequences were defined by the Welsh Government (WG) and the Department for Environment, Food and Rural Affairs (Defra) within the guidance document '*Selecting and Reviewing Flood Risk Areas for local sources of flooding – Guidance for Lead Local Flood Authorities*' as:

'Clusters of areas above flood risk threshold with an affected population greater than 5,000 people at risk'

Under this guidance, no Flood Risk Areas were identified within the boundary of Flintshire County. However, EAW have identified some 1 km square areas (blue squares) of lower flood risk threshold described as locations where 'flood risk is an issue'.

As the population densities were unlikely to trigger the regulations for the majority of North Wales the LLFA's for each county (in conjunction with EAW) derived new local thresholds to identify flood risk areas within their boundaries. Based on the PFRA local flood risk thresholds were used to identify where flood risk is an issue also defined as where flooding to a depth of more than 0.3 m by a rainfall event with a 1:200 annual return period based on the following criteria:

- Where more than 200 people are affected; or
- More than 20 businesses affected; or
- More than 1 critical service affected.

On this basis the LLFA undertook the PFRA to provide an assessment of the flood risks using historical records held by the county overlain with flood modelling data provided by EAW, to identify the local Flood Risk Area's within the County. The report determined that within the bounds of Flintshire a total of 18 locations were identified that exceeded the thresholds and which had been subject to historical flooding incidents.

4.8 Limitations of data

The assessment of flood risk to date within Flintshire has been completed using the best information that is currently available. However, there are inherent limitations with this information and it is important that these are identified (See Table 4.2 below). The main data limitations were the consistency and reliability of the collection of past flooding information.

Dataset	Main limitations	Future improvement
Flood Map for Surface Water	Modelling used a national methodology with a standard set of assumptions (such as storm duration, sewer loss allowance, etc) which may not be suitable for the whole of Flintshire.	Detailed surface water modelling within locally important flood risk areas will provide a better understanding of flood risk, mechanisms and consequences.
Areas Susceptible to Groundwater Flooding	This is a very high level dataset describing the proportion of each grid square that may be susceptible to groundwater flooding. It does not show the likelihood of groundwater flooding occurring.	Obtain the complete British Geological Survey (BGS) dataset for key areas, which provides a more accurate overview of areas where geological conditions suggest groundwater might emerge.
Flood history across Flintshire	Flood history collected through the PFRA is generally poor and inconsistent. It is difficult to make a fair and accurate assessment of flood risk across Flintshire based on this alone.	More comprehensive flood recording and flood investigation in the future is essential (this is currently underway, as a requirement of the FWMA and will provide a better level of flood history in the future).

Table 4.2: Limitations of main datasets used to prioritise locally important flood risk areas

5. Climate Change

'Communities living behind good coastal defences currently protecting them against a flood with a chance occurrence of 1 in 100 each year would experience a drop in standard of protection by the end of the century to as low as 1 in 5 each year if we were to follow a business-as-usual flood management policy.'

Future flooding in Wales: Flood defence. Possible long-term investment scenarios Environment Agency Wales

5.1 Climate Change

Climate change is one of the most serious threats facing the world's economy and society. The devastating floods, droughts and storms that we have seen in the UK and across the world in recent years show all too clearly how vulnerable we are to climate extremes and how devastating the consequences can be.

There are no easy solutions and to achieve a long term response to climate change a fundamental shift is required in the way we conduct our lives, generate and use energy over the coming century. In the UK the government is committed to implementing a programme to reduce our emissions through legislation, education, substantial investment in clean technologies and green electricity generation.

Significant scientific research has been conducted on climate change by United Kingdom Climate Projections (UKCP09), which is funded by the Department for Environment, Food and Rural Affairs (Defra) on behalf of the UK Government and the Devolved Authorities. The research is based on sound science and projections provided by the Metrological Office (Met Office), which is focused on the UK. The aim of the research and projections are to assist those needing to plan how they will need to adapt to a changing climate.

To assess the potential impacts that climate change may have on extreme rainfall, river flood flows, sea level rise and storm surges, UKCP09 have provided a large toolkit of information and data including 'change factors' which have been developed to help Risk Management Authorities use the UKCP09 information in a timely and cost-effective way and to provide a consistent approach. The change factors quantify the potential change (as either mm or percentage increase, depending on the variable) to the baseline.

Guidance has been provided on Climate Change from WG; *Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales, December 2011'*. It is recommended here that options are developed, planning for the change factor covering the whole of the decision lifetime. Change factors for river flood flows, extreme rainfall, mean relative sea level rise and storm surges are provided in the guidance and are to assist in investment planning decisions.

Short term flood risk management decisions and actions should be set within a longer term strategic planning framework. In Wales there are plans in place to address the increasing flood risk and to guide adaptation to climate change. The strategic plans are:

- Catchment Flood Management Plans[11] – produced by Environment Agency Wales.
- Shoreline Management Plans[12] – Produced by Coastal Groups, composed of maritime Local Authorities, Environment Agency Wales, Countryside Council for Wales and others.

[11] CFMPs are high level non statutory plans for inland flood risk produced by Environment Agency Wales

Catchment Flood Management Plans consider inland flood risk now and in the future, up to 100 years ahead, and assess the potential impacts of climate change and land use change on future flood risk. Similarly, Shoreline Management Plans assess the threat to the coast from erosion and flooding. These plans look at the current and future scenarios over a 100-year timeframe. Both Catchment Flood Management Plans and Shoreline Management Plans are subject to periodic review as new information becomes available. The policies and actions set out in the plans may change with time to reflect adaptation to increasing risks and climate change[13].

5.2 Climate Change in Wales

A climate change risk assessment for Wales was produced by Defra in January 2012 as part of the UK Climate Change Risk Assessment (CCRA), under the Climate Change Act 2008. The assessment reviewed all of the relevant and available data drawing on sector reports and recent research literature, to provide projections for climate change for the 2020s, 2050s and the 2080s compared with recorded weather data from 1961 to 1990. The document reviewed Low, Medium, and High Emissions scenarios for each of the time periods and produced predictions for changes and perceived impacts on variations in temperature and weather conditions.

The report states that there will be an increase in flooding events on the coast and inland, affecting people, property and infrastructure. It is predicted that flooding will increase from a combination of different sources which will cause increased disruption to communities, the economy and employment. Flooding will also affect water supplies, waste water disposal, energy supplies and health services for areas not directly impacted by the flooding.

The key findings for Wales from the 2050's Medium Emissions scenario are:

- An increase in mean winter temperatures of 2.0 °C (very unlikely to be less than 1.1 °C and very unlikely to be more than 3.1 °C);
- An increase in mean summer temperatures of 2.5 °C (very unlikely to be less than 1.2 °C and very unlikely to be more than 4.1 °C);
- An increase in mean winter precipitation of 14% (very unlikely to be less than 2% and very unlikely to be more than 30%);
- A decrease in mean summer precipitation of 17% (very unlikely to be less than a 36% decrease and very unlikely to be more than a 6% increase); and
- Sea level rise is projected to increase by between 0.10 m and 0.32 m by the 2050's.

The WG is working with the EAW to develop updated guidance on what we should plan for in relation to climate change when undertaking flood or coastal erosion risk management works.

[12] SMPs are high level non statutory plans for coastal erosion and flooding produced by Coastal Groups

[13] Future flooding in Wales: flood defences. Possible long-term investment scenarios

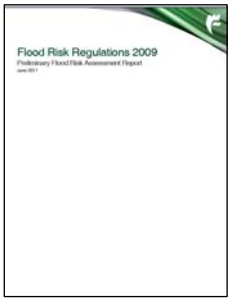
6. Regional and Local Plans

There are a variety of publically available documents which identify flood risk within Flintshire. These include:

- Flintshire County Council Preliminary Flood Risk Assessment;
- Conwy and Clwyd Catchment Flood Management Plan;
- River Dee Catchment Flood Management Plan;
- North West England and North Wales Shoreline Management Plan SMP2;
- Flooding in Flintshire "Consulting With You";
- Tidal Dee Flood Risk Management Strategy;
- River Basin Management Plans – Dee River Basin District and Western Wales River Basin District; and
- Multi Agency Flood Plans.

A brief review of each document is provided in the following sections:

6.1 Flintshire Council Preliminary Flood Risk Assessment



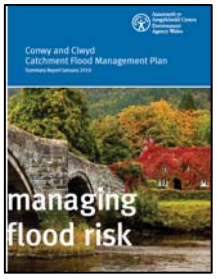
The Flintshire County Council Preliminary Flood Risk Assessment (PFRA) was published in December 2011 (as per the Flood Risk Regulations 2009). The PFRA is aimed at providing a high level overview of flood risk from local sources, including surface water, groundwater and ordinary watercourses. It combines modelling of rainfall events carried out by the Environment Agency with historical locally collected information to identify the local flood risk across the county.

The Environment Agency Wales has used a national methodology, which has been set out by Welsh Government, to identify Indicative Flood Risk Areas across Wales. Flintshire does not have any Indicative Flood Risk Areas within its boundary and therefore Flintshire County Council are not required to carry out further action under the Flood Risk Regulations until the next review of the PFRA in 2017.

The full report can be found here:

http://cdn.environment-agency.gov.uk/flho1111bvfj-e-e.pdf

6.2 Conwy and Clwyd Catchment Flood Management Plan

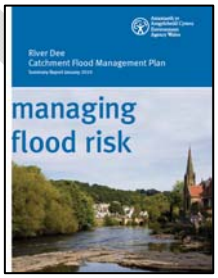


The Conwy and Clwyd Catchment Flood Management Plan looks at fluvial flood risk and covers an area of approximately 1,500 km^2 which includes a very small section of Flintshire on the north western boundary of the county. Some surface water flooding is also identified but is based on limited evidence.

The full summary report can be found here:

http://publications.environment-agency.gov.uk/PDF/GEWA0110BRKU-E-E.pdf

6.3 River Dee Catchment Flood Management Plan



The River Dee Catchment Flood Management Plan looks at fluvial risk. The River Dee is 110km long and its catchment includes most of Flintshire except the western boundary of the county. The main sources of flood risk are from the River Dee and the River Alyn including tidal flood risk from the Dee Estuary. Surface water flooding is also highlighted as a risk in the lower Dee and lower Alyn catchments.

The highest risk areas within Flintshire are found in Deeside, Mold, Flint and Sealand. The risks in Sealand and Deeside are projected to significantly increase with climate change while Mold and Flint are projected to have moderate increases in risk.

The Deeside, Wirral and North Flintshire sub-area containing Deeside, Sealand, Flint and Holywell is given a policy to take further action to reduce flood risk while the Mold sub-area has a policy where effective flood risk management is taking place but further actions may be needed to keep pace with climate change.

The full summary report can be found here:

http://publications.environment-agency.gov.uk/PDF/GEWA0110BRKO-E-E.pdf

6.4 North West England and North Wales Shoreline Management Plan SMP2

The North West England and North Wales Shoreline Management Plan SMP2 covers the coastline from the Great Orme in Llandudno, Conwy to the Scottish Border on the Solway Firth. It also covers the major estuaries within this area including the River Dee. Sub-Cell 11a – Great Orme's Head to Southport contains all of the Flintshire Shoreline that is covered within this SMP.

The SMP provides high level policies for management of the coast in relation to flood risk, coastal erosion, natural environment, historic environment and the economy. It also looks at how management should change within 3 epochs over the next 100 years in order to achieve sustainable management of the coast.

The dune frontages west of the Point of Ayr are to be maintained through a Managed Realignment policy, this allows natural processes to continue while monitoring whether beach recharge or secondary defences are required in the future. Along the Dee

Estuary frontages a Hold the Line policy is adopted where there is significant development, infrastructure or other assets. Managed Realignment will be explored in the medium to long term where there may be opportunities for habitat creation elsewhere.

The full SMP and appendices can be found here: http://www.mycoastline.org

6.5 Flooding in Flintshire "Consulting With You"

This plan was completed following widespread flooding in Flintshire during October and November 2000. It comprises a report of the consultation process carried out with those affected by the floods and an action plan highlighting what improvements could be made to flood protection and response in the case of a similar incident.

The communities highlighted as being affected by the flooding were:

Flint, Bagillt, Oakenholt, Hendre, Rhydymwyn, Cilcain, Afonwen, Mold (3 areas), Padeswood, Northop, Northop Hall, Pentre, Sandycroft, Mancot, Pontblyddyn, Caergwrle, Pontybodkin, Treuddyn, Leeswood, Buckley Common and Alltami.

The report is not available electronically however please visit the council's Engineering Consultancy department to view a paper copy.

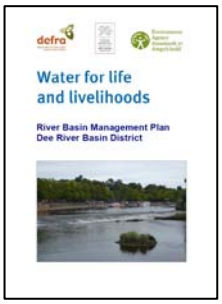
6.6 Tidal Dee Flood Risk Management Strategy

The Tidal Dee Flood Risk Management Strategy is being produced by the Environment Agency to recommend a plan for flood risk management of the Dee Estuary over the next 100 years.

A consultation was carried out between November 2009 and January 2010. These consultation documents can be found at:

http://www.environment-agency.gov.uk/research/library/consultations/107010.aspx

6.7 River Basin Management Plan – Dee River Basin District and Western Wales River Basin District



The River Basin Management Plans for the Western Wales River Basin District and the Dee River Basin District are plans to achieve Water Framework Directive requirements to improve the water quality of surface water bodies.

While these plans do not identify flood risk or consider management of flood risk, they must be taken into account when carrying out any flood risk management works. Works must not cause the deterioration of water quality in any surface water body or prevent improvement targets from being met. The plan also encourages sustainable drainage systems (SuDS) to be used in new development to remove contaminants from surface water as well as reducing flood risk.

The Dee River Basin Management Plan report can be found here:

http://www.environment-agency.gov.uk/research/planning/124748.aspx

The Western Wales River Basin Management Plan report can be found here:

http://publications.environment-agency.gov.uk/PDF/GEWA0910BSWP-E-E.pdf

The EAW intend to publish a revised plan in December 2015 following a consultation conducted in December 2012.

6.8 Multi Agency Flood Plans

The North Wales Local Resilience Forum (LRF) has identified flood risk as a very high risk in the North Wales Community Risk Register. The LRF produce Multi Agency Plans for responding to emergencies within North Wales including flooding.

Within Flintshire the Joint Emergency Planning Unit also produce their own Multi Agency Plans in consultation with the LRF and the Category 1 Responders (Police, Fire, Ambulance, Health, Environment Agency, Coastguard, Local Authorities etc) for specific flood risks in the county. The plans currently in place include the Multi Agency Response Plan for flooding in Flintshire.

The plan covers the River Alyn Catchment and its communities including Rhydymwyn, Mold, Pontblyddyn and Llong, and the Triton Tidal Sites of point of Ayr, Ffynnongroyw, Greenfield to Baglit, and the Hawarden Embankment and North Embankment of the canalised section of the River Dee. The plan also includes the Reservoir Inundation impact for the 5 main reservoirs in Flintshire namely Cilcain 3 and 4, Oakenholt (Flint), Ysceifiog (Caerwys) and Flour Mill (Holywell).

7. Managing the likelihood of flooding

The Pitt Review identified inadequate and unclear responsibilities across the organisations that undertake a flood management role and it was seen as a significant factor in the poor response to historic flooding. The Pitt Review recommended[14] that future legislation (the Flood Water Management Act 2010[15]) addresses all sources of flooding, clarifies responsibilities and facilitates flood risk management. The FWMA subsequently defined organisations that act as 'Risk Management Authorities' in Wales who have roles and responsibilities relating to flooding. The Risk Management Authorities in Flintshire are:

Environment Agency Wales is responsible for managing flood risk from **main rivers, reservoirs** and **coastal** flooding, and also has a strategic overview role over all flood and coastal erosion risk management. EAW also has a key role in providing flood warnings to the public.

Flintshire County Council as a lead local flood authority, is responsible for taking the lead in managing flood risk from all local sources, including **surface water, groundwater** and **ordinary watercourses.**

Dwr Cymru – Welsh Water is the regional water supply and sewage treatment company serving the Flintshire area. Welsh Water is responsible for flood risk from **sewers** and **water supply.**

Dee Valley is a water supply company serving part of the Flintshire area. Dee Valley Water is responsible for flood risk from **burst pipes.**

Flintshire County Council as a Highways Authority is responsible for managing flood risk on roads and **highways** within the County. Local Authorities in Wales act as highway authorities in respect of local roads. This function is undertaken by Street Scene Services.

North and Mid-Wales Trunk Road Agent (NMWTRA) is responsible for the maintenance and improvement of **trunk roads** across the areas of 8 Local Authorities – Ceredigion, Conwy, Denbighshire, Flintshire, Gwynedd, Isle of Anglesey, Powys and Wrexham, on behalf of the Welsh Government.

[14] The Pitt Review, Section 3, Chapter 8, Recommendation 28

[15] Section 6(15) of the Flood and Water Management Act 2010: http://www.legislation.gov.uk/ukpga/2010/29/contents

Contact details for each of these Risk Management Authorities can be found in Appendix A.

All of the risk management authorities identified above have the following new responsibilities under the Act:

- **A duty** to co-operate with other risk management authorities within the function of their flood and coastal erosion risk management role, which includes sharing flood data and information; and
- **Authority to take on** flood and coastal erosion functions from another risk management authority when agreed by both sides.

Co-operation with other risk management authorities includes the following:

- Discussing with other risk management authorities before designating structures;

- Report local flooding incidents to the FCC Engineering Consultancy on a monthly basis;
- Record and Register flood assets, as defined by agreed criteria, as and when they are made known;
- Assist with Flood Investigation Reports when required;
- Provide local knowledge on SUDS regarding planning applications in their area;
- Ensure that members of the public are guided to the appropriate authority or organisation; and
- Share expertise, data, information and local knowledge and work jointly to understand and reduce flood risk across Flintshire.

Each risk management authority also has specific responsibilities under the FWMA; which are described in the next section.

Flooding is not something that can be left solely in the hands of Flood Risk Management Authorities. Finances dictate that RMA's will not be able to prevent all flooding or allay public concerns. **Households, businesses and landowners** have their part to play. Hence the powers and responsibilities of Flintshire's citizens are also described in this section.

7.1 Responsibilities of Environment Agency Wales

Asiantaeth yr Amgylchedd Cymru
Environment Agency Wales

The Environment Agency Wales (EAW) has always led on the management of the risks of flooding from main rivers and the sea. However, in recognition of the links between coastal flooding and coastal erosion, particularly in terms of consequences, and as an outcome of the FWMA the EAW has new operational responsibilities in relation to coastal erosion as well as operational responsibilities for flooding from rivers and the sea. The EAW also has a wider oversight role for all flood and coastal erosion risk management in Wales.

As part of their oversight role the EAW will lead on the provision of technical advice and support to the other Risk Management Authorities. They will also lead on national initiatives such as Flood Awareness Wales, the national awareness raising programme, and the single point of contact for enquiries and information on flood risk, currently being piloted via their Floodline Warning Service.

The Flood and Water Management Act 2010 places a number of statutory duties on the Environment Agency Wales including:

- Reporting to the Minister on flood and coastal erosion risk in Wales including the application of the National Strategy; and
- The establishment of a Regional Flood and Coastal Committee (Flood Risk Management Wales).

The Environment Agency Wales will be the sole Risk Management Authority charged with monitoring and reporting on the National Strategy's implementation. In undertaking this role they will:

- Collect data on progress from Risk Management Authorities using existing avenues wherever possible;
- Report factual information to Welsh Government; and
- As requested, provide interpretive advice to the Welsh Government.

It will be for the Welsh Government to determine what, if any, action should be taken if the reports from the Environment Agency Wales suggest the National Strategy is not being implemented or that actions being taken are increasing levels of risk.

In addition to their statutory duties, the Environment Agency Wales has a number of what are called permissive powers. These are powers that allow them to do something, but do not compel them to and include:

- Powers to request information;
- The ability to raise levies for local flood risk management works, via the Regional Flood and Coastal Committees;
- Powers to designate certain structures or features that affect flood or coastal erosion risk;
- The expansion of powers to undertake works to include broader risk management actions; and
- The ability to cause flooding or coastal erosion under certain conditions.

These new responsibilities are also consistent with the EAW's role in relation to the Flood Risk Regulations 2009. These allocate specific responsibility for conducting assessments in relation to mapping and planning the risks of flooding from main rivers, the sea and reservoirs to the EAW, as well as providing guidance to Local Authorities on flooding from other sources.

Under the Regulations the Environment Agency Wales will also take on an assessment and coordination role at a national level, ensuring the correct information is passed back to the European Commission.

The Environment Agency's Local Operational Role as a coastal erosion risk management authority, includes emergency planning, advising on the planning process and managing flooding from main rivers, reservoirs and the sea.

7.1.1 Coastal Erosion Risk Management Authority

EAW 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. Importantly since October 2011 Lead Local Flood Authorities have required Environment Agency approval to undertake coastal protection works.

7.1.2 Emergency Planning

EAW contributes to the development of multi-agency flood plans, which are developed by Local Resilience Forums (LRFs) to help the organisations involved in responding to a flood to work better together. They also contribute to the National Flood Emergency Framework for England and Wales which includes guidance on developing and assessing these plans.

They are 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.

They work with the Met Office to provide forecasts and warnings of flooding from rivers and the sea in England and Wales.

The EAW 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.

7.1.3 Main Rivers

Main Rivers are a specific type of watercourse. A main river is defined as a watercourse marked as such on a main river map designated by Defra (Under the Water Resources Act 1991), and can include any structure or appliance for controlling or regulating the flow of water in, into or out of a main river. The EAW powers to carry out flood defence works, apply to main rivers only. The overall responsibility for maintenance of Main Rivers, however, rests with the riparian owner.

The EAW 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.

7.1.4 Coastal Flooding

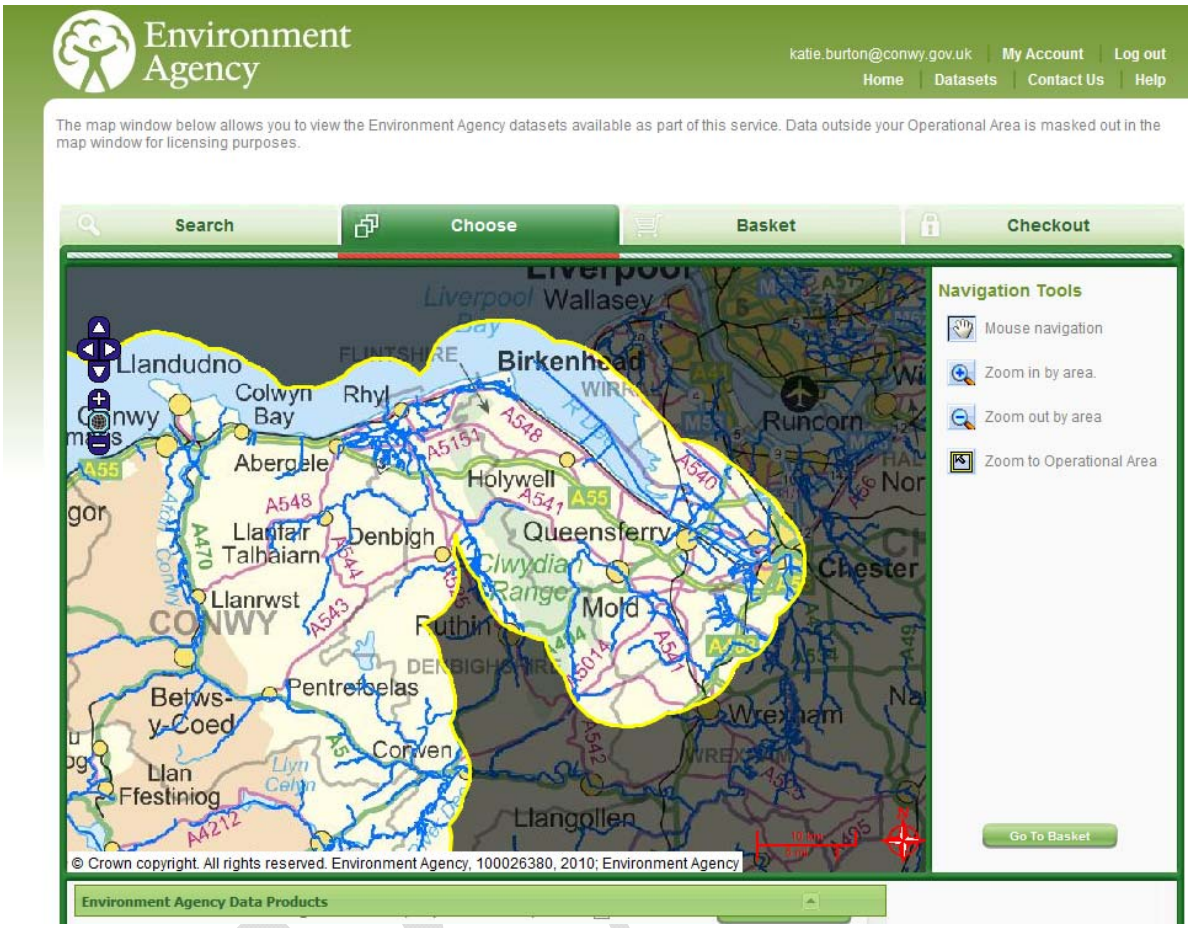


Figure 7.1: Map of main rivers from EA Datashare website

EAW is the lead organisation responsible for all flood and erosion risk management around the coastline of Wales, including tidal flood risk. EAW leads the country in developing a coastal management plan that works at local, regional and national level, with partner organisations, including local authorities, putting agreed plans into practical action.

EAW also has a regulatory role in consenting works carried out by others in, or adjacent to main rivers and sea/tidal defences to ensure that they have regard to flood risk and do not cause unnecessary environmental damage or impacts.

7.1.5 Reservoirs

EAW enforces the Reservoirs Act 1975, which is the safety legislation for reservoirs in the United Kingdom. EAW is responsible as the Enforcement Authority in Wales for reservoirs that have a storage capacity greater than 25,000m³ and, once the relevant parts of the Flood and Water Management Act have been commenced, reservoirs with a capacity in excess of 10,000 m³.

As Enforcement Authority the Environment Agency must ensure off site 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 on site flood plans. The Environment Agency is also responsible for establishing and maintaining a register of reservoirs, and making this information available to the public.

7.1.6 Single Environment Body for Wales

The Welsh Government is currently reviewing the role of the environmental public bodies operating in Wales; primarily the EAW, the Countryside Council for Wales (CCW) and the Forestry Commission. One of the options under consideration is the merger of these bodies insofar as they operate in Wales and the establishment of a Single Environment Body for Wales.

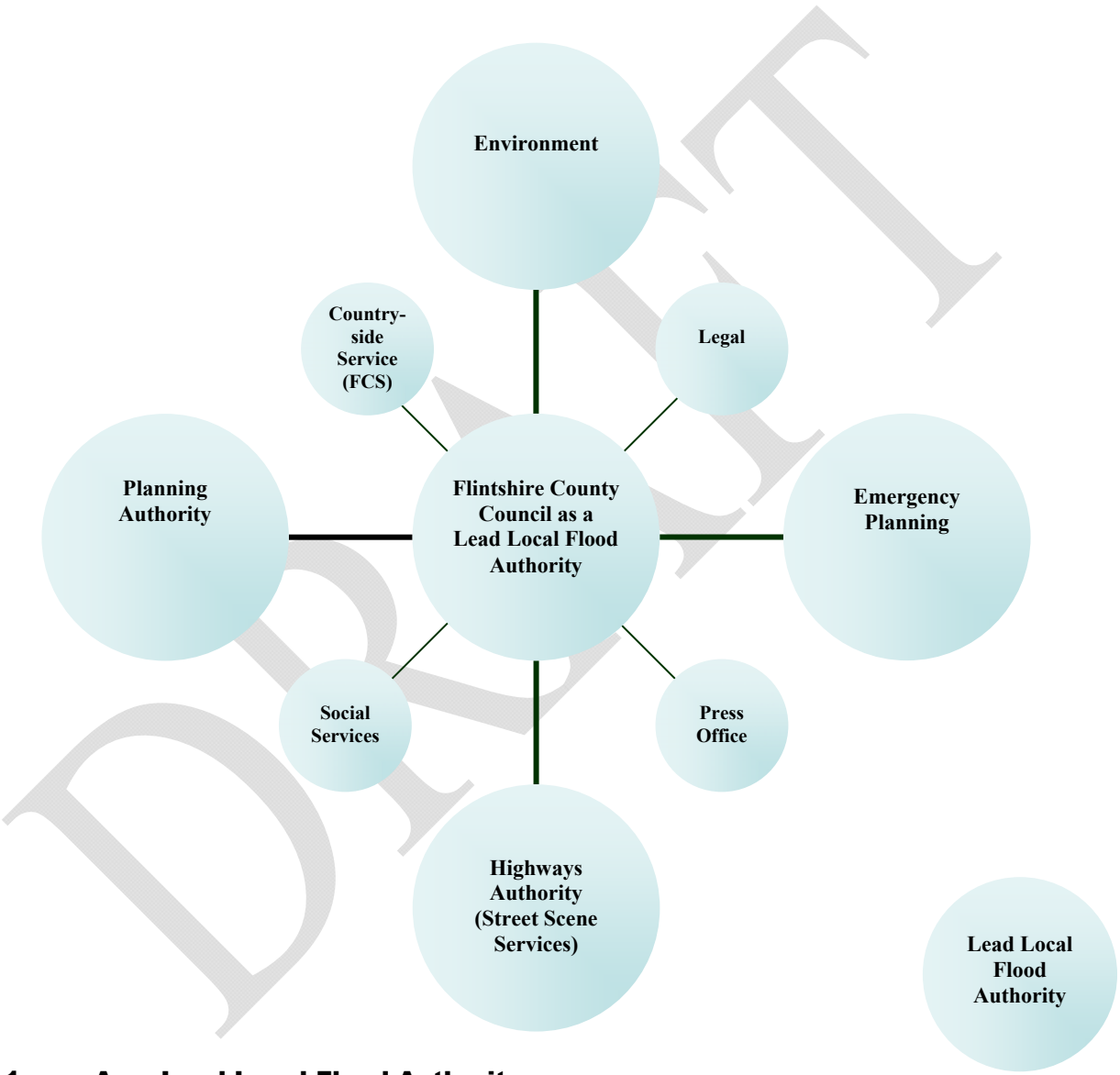
When established, a Single Environment Body for Wales will take on the functions of these three organisations insofar as they operate in Wales. This new body would take on all of the responsibilities of the Environment Agency in relation to flood and coastal erosion risk management in Wales currently undertake.

7.2 Powers and responsibilities of Flintshire County Council

The Flood and Water Management Act 2010 identified Flintshire County Council (FCC) as the Lead Local Flood Authority for its area. FCC are 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. FCC also has other related roles in emergency planning, regulatory services and highway drainage; detailed in the following sections.

Following implementation of the Act, the Cabinet members for FCC determined that the Environment Directorate would take the lead in ensuring the Council's compliance with the legislation and to ensure that all relevant Departments and external agencies assist to fulfil the requirements of this Act. The Environment Directorate already carried out similar duties and had formed the necessary relationships with other departments and external bodies to carry out this role.



7.2.1 As a Lead Local Flood Authority

The FWMA 2010 identifies FCC as the LLFA for the administrative County of Flintshire. This gave the council a number of **statutory duties** in overseeing the management of local flood risk from surface water, groundwater and ordinary watercourses such as streams and ditches (including lakes and ponds). It also gave FCC a number of **permissive powers** which allow them to do something, but do not compel them to and are included in Table 7.1 below:

Statutory duties	Permissive powers
■ Strategic leadership[16]; ■ Comply with the National Strategy[17]; ■ Co-operate with other authorities[18]; ■ Recording and investigating flood incidents[19]; ■ Keep a register of assets likely to affect flood risk[20]; and ■ Contribute to Sustainable development[21]	■ Powers to designate structures and features that affect flood or coastal erosion risk; ■ Powers to request information; ■ The expansion of powers to undertake works to include broader risk management actions; and ■ The ability to cause flooding or coastal erosion under certain conditions.

Table 7.1: Flintshire County Council Statutory Duties and Permissive Powers

It is anticipated that LLFA's in Wales will also take on the role of the SuDS Approval Body (SAB) in relation to sustainable drainage systems. In this role they will be responsible for both approving the original design of the SuDS and adopting and maintaining the finished system.

The minimum statutory content of Local Flood Risk Management Strategies is set out in Section 10 of the FWMA and LLFA's are required to consult with the public in preparing them.

A number of Local Authorities in Wales are also designated coastal erosion risk management authorities under the Coast Protection Act 1949, providing them with certain responsibilities in respect of coastal erosion and coastal protection. Formally referred to as Coastal Protection Authorities they may also be referred to as Coastal Local Authorities or Maritime Authorities and retain their current permissive powers in relation to coastal erosion risk management.

Further explanation of these duties and powers is provided in the following sections.

Environment

7.2.2 Environment Directorate Leading LLFA Role

FCC Environment Directorate have taken the lead in delivering and implementing the requirements of the Act. This task requires input and a partnership working with the other relevant departments in FCC. Some of the measures outlined have been core activities for the council for a number of years and processes are in place to deliver those measures. Other measures, however, relate to the new responsibilities which have recently been assigned and will require new processes to be implemented.

[16] Section 10(1) of the Flood and Water Management Act 2010
[17] Section 10(5) of the Flood and Water Management Act 2010
[18] Section 13 of the Flood and Water Management Act 2010
[19] Section 19 of the Flood and Water Management Act 2010
[20] Section 21 of the Flood and Water Management Act 2010
[21] Section 27 of the Flood and Water Management Act 2010

7.2.2.1 Strategic Leadership

FCC is responsible for co-ordinating and overseeing Flood and Coastal Erosion Risk Management on a day to day basis across the County. In practice FCC took the lead in dealing with surface water and ordinary watercourse flooding incidents prior to the changes contained within the FWMA; however the responsibility has now been allocated to FCC by law. At the onset, this involves developing this strategy which will set out FCC's approach to dealing with flooding identified under the Act. It also involves ensuring all flood risk authorities are aware of their responsibilities, monitoring progress and activity by all organisations involved and communicating with the public and between organisations

Initially, this involves developing this strategy which will set out FCC's approach to dealing with flooding identified under the Act. It also involves ensuring all flood risk authorities are aware of their responsibilities, monitoring progress and activity by all organisations involved and communicating with the public and other organisations.

7.2.2.2 Recording of Flood Incidents

To assemble an accurate record of flood risk across Flintshire requires the collection of information relating to flood incidents which have occurred across the County.

A LLFA has a duty to record all sources of significant flooding events. FCC propose to set a standard to record and assess every known flood incident that occurs in the county. A detailed investigation will be carried out when certain criteria are met, which is explained in more detail in the next section.

FCC Environment Directorate intend to categorise the different types of incidents that they record; flood incidents caused by overcapacity during storm events, land drainage issues caused by factors such as blockages not caused by storm events and drainage infrastructure related problems.

FCC proposes to record and manage all future drainage investigations and flood incidents occurring across the county by importing them into Asset Management system. When combined with mapping of future flood risk in the county the historic records will help provide a picture of the highest flood risk areas in Flintshire.

All statutory bodies, including DCWW will also receive and record information regarding flood incidents which may come under FCC responsibility; therefore there needs to be a process where data can be efficiently shared across the authorities. The responsibilities of other relevant flood authorities are detailed in further sections of this report.

Partnership working and collaboration is an integral part of managing flood risk and is reflected in the duty to co-operate within the Act. The task for the future is to build stronger links with local community groups, the public, landowners and private organisations that are expected to take a proactive role in flood risk management and provide FCC with information on flood incidents.

FCC's aim is to obtain comprehensive information on flooding incidents that occur across Flintshire and in order to do this we encourage the public to use the Council's website to provide relevant information.

In order to build consistent and accurate records of local flooding in Flintshire we need as much information as possible on historical and recent flood events from individuals, businesses and stakeholders.

If you become aware of a flood in your area, please provide us with the following information via email at streetscene@flintshire.gov.uk or complete the online form click on this link Reporting a Flood or by writing into The Environment Directorate, County Hall, Mold, Flintshire, CH7 6NF or by telephone on 01352 704723

Your name and contact details:

- Date of flood;
- Location of the flood (map references or precise address);
- The duration of flood;
- The depth of flood at its worst;
- Where did the water come from? e.g. overflowing river;
- What was the weather preceding the flood, rainfall if known;
- Did water enter a property? Which ones;
- What damage did the flooding cause? e.g. blocked road for several hours;
- Was any action taken at the time to reduce the flood risk? e.g. sand bags;
- Any other relevant information; and
- Photographs and videos of the flood and damage caused by the flood.

7.2.2.3 Investigation of Flood Incidents

An LLFA has a duty to investigate flooding events as it considers necessary or appropriate. The extent of the investigation will be determined by the severity of the incident and the resources available. In the event of very widespread flooding affecting large areas of Flintshire, our ability to investigate every incident in detail is likely to be severely limited or time dependant.

The aim of flood investigations is to bring all useful information together in one place, providing an understanding of situations, outlining possible causes of flooding and potential long-term solutions to protect people and their homes from flooding. Further recommendations will also be made to highlight potential flood risk management actions. It is intended that these reports will provide a clear understanding of flooding situations, but the duty to investigate does not guarantee that problems will be resolved and cannot compel other authorities to take action.

A flood investigation will involve consultation with the relevant risk management authorities, landowners and private organisations involved, all of whom will be expected to cooperate and provide information and comments.

The legislation makes provision for fines in the case of requests for information being denied.

There are 2 stages of flood investigations for flooding incidents and land drainage issues in Flintshire:

- **Stage 1**: Carry out an initial assessment; including a site inspection to identify what the problem is; and
- **Stage 2**: Carry out a detailed investigation (Flood Investigation Report) to identify the source of flooding, how many properties are affected, and what tasks can be carried out to prevent a reoccurrence. This report will be published.

Stage 1 – Initial Inspection

Once an incident of flooding or drainage issue has been reported and recorded, if is has been identified that Flintshire is the responsible authority; a site inspection will be carried out to identify the extent and cause of the problem.

When an inspection is carried out, it will ascertain which authority has an involvement in the flood incident, and inform them accordingly. FCC will record every known flood incident that occurs in the county using a Site Inspection Report and officer notes. The Asset Management System will then be updated with this information.

If there has been a report of internal flooding historically in the same location, an investigation needs to be prioritised and Stage 1 and 2 will be completed simultaneously.

Stage 2 - Detailed Investigation

For Stage 2 investigations, a Flood Investigation Report (FIR) is required, which aims to bring all relevant information together to provide an understanding of the incident, outline possible causes of the flooding, and highlight which authority has an involvement in the flood incident, and identifying potential long-term solutions.

A detailed investigation should be carried out where the following eligibility criteria are met, or it is in the public interest to do so:

- Where there is a risk to life as a result of flooding; or
- Where there is ambiguity surrounding the source or responsibility of a flood incident; or
- Where internal flooding of one property has been experienced; or
- Where a major transport route was closed for more than 10 hours as a result of flooding; or
- Where critical infrastructure (e.g. power station) was affected by flooding for more than 3 hours.

It is intended that the FIR will be published within 3 months of a qualifying flood event being reported to FCC. However there will be cases where this time frame will have to be extended (e.g. widespread flooding across the county or resource issues).

During widespread flooding, the method for prioritising flood investigation will initially be based on the number of properties flooded internally.

Once completed all FIR's will be published on the FCC website at http://www.flintshire.gov.uk and copies will be available to view at County Hall, Mold.

7.2.2.4 Register of Flood Risk Assets

An asset in the context of flood risk management is an artificial or natural structure that operates as a flood defence or as part of a drainage system or other feature considered likely to have a significant impact on flood risk. Examples could be a trash screen, culvert, pumping station, walls or banks of a river channel embankment etc.

Flintshire County Council is required to keep an **asset register** of structures or features which it considers are likely to have a significant effect on flood risk. The register will be made available for inspection by the public at all reasonable times.

The register will take the form of a computer database, which will be updated in the light of flood incidents, flood investigations and changes to infrastructure. New sustainable drainage assets will be registered and asset data may also be captured through local drainage studies. The registering of assets will be prioritised by its location; future flood risk mapping and known flood risk areas taken from the Preliminary Flood Risk Assessment will be used to analyse the 'significance' of each flood risk asset. The vulnerability of the asset's surroundings will also be a factor in to determining the consequences of its failure.

The council is also required to keep an **asset record** in addition to the register which will indicate information of ownership and state of repair of that asset.

Assets require inspection and maintenance in order to prevent failure, which otherwise may result in flooding. Previously 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.

Within Flintshire the coastal defence assets can be the responsibility of FCC, Network Rail or private land owners. Network Rail only has a responsibility to protect the railway line although their defences in effect do provide protection to properties and highway infrastructure. The EAW have defences and embankments on the River Dee which provide tidal protection.

It will take many years before the register is sufficiently comprehensive to be of real value in flood risk management. Flintshire County Council has begun to populate a register of all existing information on structures that are likely to have a significant effect on flood risk. These assets include:

- Coastal defences;
- Ordinary watercourses on FCC owned land;
- Fluvial assets on privately owned land;

- Demountable defences;
- Pumping Stations;
- Embankments;
- Gabion / retaining walls;
- Grillages; and
- Tidal flap valves etc.

FCC will develop a standard inspection form to be completed when an inspection or maintenance operation is carried out. An example of how each asset will be assessed is:

- Stage 1: Review all existing information relating to an asset and transfer into the Asset Management System ;
- Stage 2: Carry out a visual survey of each asset to establish dimensions, structural condition, construction details and layout;
- Stage 3: Confirm who is responsible for each asset by way of land searches and discuss the maintenance regime with the landowner;
- Stage 4: Carry out a risk assessment for each asset;
- Stage 5: Consider any improvement works that are required for each asset; and
- Stage 6: Develop an appropriate maintenance plan for each asset.

The register will be published on the FCC website and will also be available to view at County Hall, Mold.

7.2.2.5 Sustainable development

FCC has a duty 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 Welsh Ministerial guidance on this topic.

The guidance provided, *Sustainable Development: Guidance to Risk Management Authorities Section 27 – Sustainable Development Nov 2011*, does not prescribe a single approach that must be followed, rather it provides a variety of suggestions of how FCC can aim to make a contribution towards the achievement of sustainable development while carrying out its duty in managing local flood risk under the Act.

The ways in which FCC will work towards achieving sustainable development in the Flood and Coastal Erosion Risk Management role are described in Chapter 10.

7.2.2.6 Designating Assets

The relevant clauses of the Flood and Water Management Act have now been commenced (August 2012), therefore empowering Flintshire County Council and the Environment Agency Wales as 'designating authorities'. That is, they have the permissive powers to 'designate' features or structures, which they consider affects flood risk and is not owned by the LLFA or the Environment Agency.

If an asset becomes 'designated' its owner cannot alter, remove or replace a designated structure or feature without the consent of the designating risk management authority. The aim of designating flood risk assets is to safeguard them against damage which could increase flood risk in the area. Designating features or structures is not something that will be done regularly, only when there are concerns about the asset.

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

7.2.2.7 Meeting the Flood Risk Regulations

Provisions within the FRR are consistent with those contained within the FWMA. All LLFA were required to produce a PFRA. The first PFRA was prepared in June 2011 and published in December 2011 and can be found in the following location:

http://cdn.environment-agency.gov.uk/flho1111bvfj-e-e.pdf

The information contained within the PFRA will be reviewed in 2017 and every six years thereafter. The Flood Risk Regulations require that LLFA's with indicative flood risk areas prepare Flood Hazard and Flood Risk Maps to be published by December 2013. This will be followed by a Flood Risk Management Plan published in December 2015. However, Flintshire is not required to comply with this process within this cycle of the PFRA as there was no indicative Flood Risk Areas identified.

7.2.2.8 Consenting Works on Ordinary Watercourses

FCC are responsible for the regulation of ordinary watercourses. This includes issuing consents for any changes or obstructions that may affect the flow and enforcement action etc. action to rectify unlawful and potentially damaging work that has been undertaken to a watercourse. This role was previously carried out by the EA but has been transferred to LLFA's to enable them to implement their new roles and responsibilities in respect of local flood risk. The EAW still retain their responsibility for consenting works on main rivers.

If riparian owners or other bodies wish to culvert an ordinary watercourse or insert any diversion or obstruction, then consent is required. The purpose of ordinary water course regulation is to control activities that may have an adverse impact on flooding.

It is essential that anyone who intends to carry out works either temporary or permanent in, over, under or near a watercourse or flood defences (including sea defences) should obtain any necessary consents before commencing works.

Riparian owners are encouraged to contact the Council to discuss any proposals and consent application forms will be provided. It is widely recognised that culverting has many adverse effects and applications to

culvert a watercourse will generally only be granted where it has been demonstrated that there is no viable alternative available. However where there is an overriding requirement for the works and proposed mitigation measures are acceptable to FCC as supported by WG guidance. The Authority supports a general statement to discourage culverting of watercourses.

7.2.2.9 As SuDS Approval Body (SAB)

Sustainable drainage systems (SuDS) are a change of approach from conventional drainage which aimed to convey water away from a development as quickly as possible, often causing excessive flows in watercourses downstream with the potential to cause flooding. The key principles that influence the planning and design of SuDS are:

- Storing runoff and releasing it slowly (attenuation);
- Allowing water to soak into the ground (infiltration);
- Slowly transporting (conveying) water on the surface;
- Filtering out pollutants; and
- Allowing sediments to settle out by controlling the flow of the water[22].

SuDS are also an opportunity to ensure that amenity and biodiversity are considered in conjunction with managing flow rates and volumes of water.

The Flood and Water Management Act 2010 assigns Flintshire County Council the role of a SuDS Approval Body (SAB) for the county of Flintshire. When this aspect of the Act is implemented (Possibly 2013 / 2014) full details of requirements and procedures will be agreed with partners and publicised widely. This approach is in line with the presumption towards SuDS contained in Planning Policy Wales (Edition 5, November 2012) and TAN 15.The SuDS approval process will be integrated with the planning process; with discussions commencing at the earliest possible opportunity.

Under the new Act any development requiring planning permission will also require a drainage approval. At the moment there is no distinction for changes of use which would not create any additional run-off and it should also be recognized that some large buildings (e.g., agricultural) can be permitted development. It is therefore envisaged that criteria governing the need for drainage approval will be established and when the SAB is established, it will be required to:

- Assess the drainage design for all construction work which has drainage implications;
- Adopt all SuDS schemes which serve more than one property; and
- Ensure that all adopted SuDS schemes are properly maintained.

[22] http://www.ciria.com/suds/suds_principles.htm

SuDS draining public roads will be adopted by the Highway Authority. FCC as a SAB has a duty to consult with Water and Sewerage Companies, the EAW and the Highway Authority before determining an application of the local Planning Authority.

An important provision in the Flood and Water Management Act 2010 includes the removal of the automatic right to connect surface water to the public foul and combined sewers and to limit the discharge of flows to public surface water sewers. Connection to existing surface water is conditional on the SAB approving the proposed drainage system.

Drainage is a complex issue and should be considered at the earliest stage of the development process. It is proposed that FCC will be producing a local SuDS Design Guide in accordance with National Standards, to advise on design requirements for SuDS systems. It is anticipated that this guide will be consulted on in conjunction with national guidance.

After a SuDS feature has been constructed there will be a maintenance period to ensure it functions as intended before it is formerly adopted by FCC, who will then be responsible for future maintenance.

Note: FCC are waiting for additional information and guidance from Welsh Government regarding the adoption of SuDS therefore the information above is subject to change.

7.2.2.10 Environment Directorate Current Duties

The Environment Directorate also have other duties relating to flooding that are not new specific duties under the Act; these are detailed in the following sections.

Responding to Flood Events

Flood events are usually preceded by flood warnings from the EAW and / or the Met Office. If a significant event is expected, a teleconference is usually held with the EAW, Met Office, Emergency Responders, FCC, Highways and Emergency Planning departments to discuss likely issues.

During Council normal daytime work hours, flood calls are received by StreetScene Services and out of hours go through to the Galw Gofal Service and are reported to a Streetscene officer on call. If a severe warning is received or if incoming calls are too numerous to be dealt with by the on call officers then the decision will be made for additional staff to be deployed.

Sandbag stocks will be checked and replacements ordered if required however there is a limit to both the availability and the ability to distribute sandbags, particularly when wide-scale flooding is being experienced. Reliance on the County Council to provide sandbags should not be considered as being the primary means of protection. The Council will give priority to known flooding black spots, where there is the potential of several properties being flooded.

Checking council maintained trash screens is carried out before the event if possible and key locations will be visited during the event. Response to flood calls can involve clearing trash screens, pumping or delivering sandbags. If it is found that other parties have a responsibility to respond to flooding incidents they will be contacted (e.g. informing Welsh Water of sewer flooding / pumping station problems). Sandbags are only delivered to residential properties at risk of internal flooding and only during an event. It is recommended that people provide their own protection where possible to make their property more resistant and resilient to flooding, more detail is given in Section 7.6.

Coast and Land Drainage Inspections

FCC have responsibility for maintaining coastal defences on the Dee Estuary that are in its ownership. This includes checking that tidal flaps are operating effectively to prevent the inflow of water onto low lying land. Additionally an annual inspection of the coastline is undertaken to record the condition of both council and privately owned defences. If any remedial works or defects are identified the relevant owner will be informed.

Where a watercourse runs through council owned land the same riparian responsibilities apply to the council as any other landowner. There is a regular maintenance regime for all council watercourses and inspection of trash screens is a particularly important role to ensure that blockages do not occur which could increase flood risk. During flood events weather conditions often cause blockages to occur rapidly and regular inspection of trash screens during flood events is usually the first priority to proactively prevent flood issues occurring. It is not possible to inspect all non-council owned watercourses but where maintenance issues are reported to the Council an inspection will be undertaken. Where maintenance is necessary the riparian land owner will be informed of their duties under the Land Drainage Act to carry out works. FCC has powers to enforce necessary works to be carried out if they are not completed in a reasonable length of time.

Press Statements

Information about flooding is passed through to the Corporate Communications Office who will arrange for it to be published on the Council's web site and issue news releases to the media. Media interest in the event could generate requests for broadcast media interviews and an officer(s) would need to be nominated to do this in English and Welsh if required. As part of any Communication plan relevant Cabinet members, local members and Assembly and Parliamentary representatives would also need to be briefed about the incident.

Drainage Maintenance

The FCC Streetscene Service carry out gully emptying on a regular basis across the County, with less frequent cleansing occurring in lower risk situations and increased frequency of gully and soakaway cleaning in areas in known flood risk areas. Non-functioning gullies are recorded for more frequent or detailed attention. Material arising from all road drainage emptying has potential implications for pollution and is therefore disposed of correctly in accordance with Environment Agency (EA) guidelines. Processes are already in place to encourage coordination of operations when works require traffic management. At present this is limited to works on the A55, A548 and A541dual carriageways.

The culverts and gratings in all know problem areas are inspected and cleaned regularly in accordance with the appropriate maintenance schedule. However in the event of a severe weather warning these will be immediately checked, and during heavy or prolonged rainfall, regularly inspected to ensure they are free from debris. In lower risk areas culverts and manholes should be inspected every five years by default and cleaned where necessary, and piped drainage should be checked and flushed if necessary during regular service inspections.

Streetscene also inspect and maintain non-Welsh Water pumping stations and other Council installations organise Jetting to clear and unblock systems and clean out soakaways which have been identified through routine inspections or following complaints or requests for service.

Emergency Planning

7.2.3 Carrying out Emergency Planning

The introduction of the civil contingencies Act 2004 required a restructure of joint-agency planning in Wales. This resulted in the creation of Local Resilience Forums (supported by various co-ordinating groups) based on the four police force areas in Wales.

The Joint Emergency Planning Unit (JEPU) for Flintshire and Denbighshire Councils works closely with the North Wales Resilience Forum (NWRF), which was established in March 2005. The membership of the NWRF is made up of the strategic level managers of each of the Category 1 responders (Local Authorities including FCC, Police, Ambulance, Local Health Boards, Fire & Rescue Services and other relevant bodies). Its overall purpose is to ensure that there is an appropriate level of preparedness to enable an effective multi-agency response to emergencies including floods which may have a significant impact on the communities of North Wales.

The Resilience Forum's objectives are[23]:

- To agree on joint strategic and policy approaches relating to North Wales preparedness and response;
- To approve the Community Risk Register (CCR) and ensure it provides a robust basis for planning;
- To ensure that appropriate multi-agency plans, procedures, training and exercises necessary to address identified or foreseeable local and wider area hazards are in place and outstanding gaps identified;
- To direct and oversee the activities of working groups as they are established and allocate measures to them as appropriate;
- To receive reports from the working groups on current threat levels, gaps in planning and progress on actions measured;
- To ensure that appropriate resources are made available to working groups to fulfil statutory and measure-based responsibilities;
- To co-ordinate the individual approaches and responsibilities of each organisation to ensure that they complement each other and dovetail with partners' arrangements; and
- To consider the implications of legislation, national initiatives and decisions of the Regional Resilience Forum for the North Wales Resilience Forum area.

The role of the JEPU in terms of FCERM includes:

- Emergency planning responsibilities;
- Provision of a 24/7 Duty Officer system for Flintshire and Denbighshire County Councils;
- The preparation of flood contingency plans which detail the arrangements for responding to a disaster or major flood incident in Flintshire;

[23] North Wales Community Risk Register 2012 Produced by North Wales Resilience Forum, Version 10 January 2012 - Final

- Assess Flintshire's risks in accordance with lead responsibility and coordinate local authority input to community Risk Register;
- Develop Emergency Plans in accordance with lead responsibility;
- Develop local authority Business Continuity Management arrangements;
- Develop arrangements for Civil Preparedness information available for public use with other relevant FCC services;
- Working with communities to ensure that they are informed and prepared for civil emergencies such as flooding, and are able to recover following an emergency i.e. flood partnerships;
- Maintain system for warning, informing and advising public in event of an emergency;
- Share information with other Flintshire responders;
- Co-operate with other Flintshire responders to enhance co-operation and efficiency; and
- Provide advice and assistance to businesses and voluntary organisations about business continuity management, during and after an emergency.

The JEPU supports the Authority in the following during a crisis:

- 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; and
- 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.

In the event of a major flood emergency, the Council should be able to:

- Support the emergency services with evacuation;
- Provide temporary accommodation, including emergency feeding and rest centres;
- Provide social and welfare support to the vulnerable and persons suffering from stress or shock;
- Assist in the provision of body holding areas and a temporary mortuary in liaison with North Wales Police and the local coroner;
- Arrange temporary or permanent re-housing;
- Deal with and provide advice on health hazards and environmental issues;
- Assist in the response to public health matters;
- Ensure safety of highways and traffic and structural engineering related matters; and
- Provide any other services that normally fall within the day to day responsibilities of the Council.

Planning Authority

7.2.4 As a Planning Authority

Within Flintshire County Council's role as Local Planning Authority there are two main aspects of the planning service which will have an input into the way the LFRM Strategy will be operated: Planning Policy and Development Management.

One of the main roles of Planning Strategy (Policy) section will be the production of a Local Development Plan (LDP) which will eventually take precedence over the recently approved Unitary Development Plan (UDP). The LDP will be supported by a number of strategic assessments and will involve the production of Supplementary Planning Guidance (SPG) documents. For all land allocations in the LDP and new development assessed through the planning application process, certain statutory bodies are consulted and the comments of EAW as well as the Council's own Environment Consultancy Department in relating to flood risk are key factors in the assessment of development and developable land and whether sites are allocated or not.

Planning Policy and Development Management impact upon Flood Risk Management in the following key ways:

- Through specific policies in the UDP and LDP regarding SuDS issues;
- Providing input into Environment Directorate plans (such as Shoreline Management Plan);
- Considering flood risk in identifying potential land uses and development through allocations as part of the LDP process;
- Assessing flood alleviation works in the context of current allocations;
- Responding to WG or EAW on consultations involving flooding issues;
- In advising potential developers of flood risks based on the TAN15 (DAM);
- Taking account of flood risk issues in determining planning application;
- To work alongside developers (and in the future the SuDS Approval Body [SAB]) in ensuring that development is complaint with the LFRM Strategy and in considering flood risk assessments submitted in support of applications (particularly on those which are outside EAW's remit.

When considering flood risk in developing the Local Development Plan (LDP), the Planning Authority will need 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 Plan (LDP) that carefully considers flood and coastal erosion risks. This is a statutory planning document which can be used to resist inappropriate development in the floodplain. Consequently the LDP should support the Strategic Flood Risk Assessment (SFRA), the Preliminary Flood Risk Assessment and Surface Water Management Plan (where applicable). This should allow the LDP to assess and record the flood risks for new developments and steer development

to areas of lowest flood risk. Equally there is a 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;

- 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;

- Promote development in areas of lowest probability of flooding through embedding the sequential approach referred to in TAN 14 – Coastal Planning, and TAN 15 - Development and Flood Risk into the LDP;

- Safeguard land for critical infrastructure; and

- Develop action plans, where necessary, to support sustainable spatial planning and ensure all plans are integrated and firmly linked to local strategies.

When the SAB comes into force, co-operation between the Planning Authority and the SAB requires the Planning Authority to:

- Alert developers and land owners at the pre-application planning stage of the need to consult with the SuDS Approval Body about drainage issues on the site;

- Ensure that the SuDS Approval Body are involved in pre-application discussions, if appropriate;

- Ensure that when the planning application arrives, any 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, it is clear that local planning authorities are able to reject planning applications on the basis that they have failed their drainage application; and

- Where appropriate, advise developers 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.

7.3 Dŵr Cymru – Welsh Water

Dŵr Cymru – Welsh Water (DCWW) is responsible not only for the provision of water supply in Flintshire, but also for making appropriate arrangements for the drainage of foul water, the treatment of waste, surface water sewers and combined sewers. They have primary responsibility for floods from water supply and sewerage systems, which can include sewer flooding, burst pipes or water mains or floods causes by system failures.

Figure 7.2: Dŵr Cymru Welsh Water boundaries (North and South)

The Flood and Water Management Act 2010 places a number of statutory duties on water and sewerage companies including:

- A duty to act consistently with the National Strategy;
- A duty to have regard to the content of the relevant Local Strategy; and
- A duty to co-operate with other relevant authorities in the exercise of their flood and coastal erosion risk management functions.

Water and sewerage companies often hold valuable information which could greatly improve the understanding of flood risks faced by communities across Wales.

7.3.1 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 to consumers 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.

7.3.2 Responsibilities for the Sewerage System

The Water Industry (Schemes for Adoption of Private Sewers) 2011 Regulations facilitated the transfer of private sewers, lateral drains and pumping stations to Water and Sewerage Companies in England and Wales. The transfer is illustrated in Figure 7.3 below and shows a transfer of responsibilities from home owners to DCWW. Before October 2011 home owners were responsible for their private drains up to the point where they connect to the public sewer and where a pipe served several properties the home owners were jointly and equally responsible. After October 2011 DCWW became responsible for these private sewers and the section of drain beyond the property owners boundary known as the lateral drain.

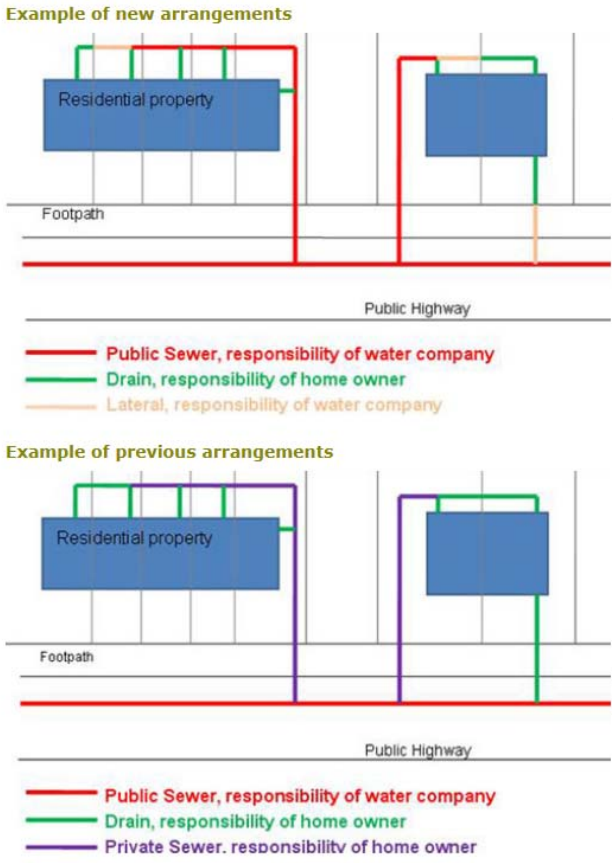


Figure 7.3: The transfer of responsibilities from homeowners to DWCC

7.3.3 Sewer Flooding

When sewage escapes from a pipe, through a manhole, drain, gully or by backing up in the toilet this is known as sewage flooding. Sewer flooding can be caused either by sewer overload or otherwise by a blockage occurring. Overloading is caused by a sewer pipe having insufficient capacity to deal with the flows draining into it. A blockage can occur due to a build up of debris or fat, root penetration, collapse or misuse of the system. The location of a problem can actually be a considerable distance away from where the flooding occurs.

7.3.4 Flood Risk Management

Water and sewage companies have the following responsibilities recording 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 for the purpose of effectually draining an area;
- May be subject to scrutiny from lead local flood authorities' democratic processes;
- Have a duty to adopt private sewers; and
- Statutory consultee to the SAB when a surface water drainage system is proposed to communicate with the public sewer.

7.3.5 Reducing sewer flooding

DCWW is responsible for dealing with flooding from their public foul, combined and surface water sewers, and from burst water mains.

The majority of flooding is reported to the DCWW call centre on **0800 085 3968** (The lines are open 24 hours a day, 7 days a week). The call centre agent will check if the flooding incident involves their assets. If it does, they will provide an incident number and advise that a field team will attend within a target time of 4 hours. After the flooding has subsided an initial clean up will be undertaken and a field team will return later if necessary.

If internal flooding is present details will be recorded on the 'DG5 Form'. The incident will be investigated which may lead to it being recorded 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. Necessary investment for infrastructure improvements to alleviate sewer flooding is closely allied to the DG5 register.

7.3.6 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 their 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 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.

Under current legislation when planning permission has been granted for a development, Water and Sewerage companies have no powers to prevent connections from any development being made to their public sewers, for this reason DCWW provide observations on the capacity of their public sewers in response to consultations for consideration by the Local Planning Authority.

However, this will be amended once the relevant section[24] 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 DCWW will be a statutory consultee). This will only apply to surface water drainage; the 'right to connect' will still apply to foul drainage systems.

7.3.7 Reservoir Undertaker

DCWW owns many reservoirs in Wales and as such they are responsible for their maintenance as a reservoir undertaker. They will also be affected by the change to the Reservoirs Act 1975 which has been amended to state the following; all undertakers with reservoirs over 10,000m³ must register their reservoirs with the Environment Agency as they are subject to regulation and all undertakers must report any flood related incidents.

[24] Section 16 of Schedule 3, Flood & Water Management Act 2010

7.4 Dee Valley Water

Dee Valley Water Plc supplies water to approximately 258,000 customers in Chester and North East Wales and North West England including parts of Flintshire County (see Figure 7.4 below). Dee Valley is responsible for the provision of 23 million tonnes of water per year over an area of 831 square kilometres. As such, they have the primary responsibility for floods from their water systems, which can include burst pipes or water mains or floods caused by system failures.

Dee Valley has a duty to prevent and reduce leakage and promote water efficiency. They also have a duty to prevent wastage and promote the efficient use of water by their customers.

Figure 7.4: Dee Valley Water boundaries

7.4.1 Flood Risk Management

Water companies have the following responsibilities around flood risk management:

- Respond to flooding incidents involving their assets;
- Produce reports of the flood incidents; and
- May be subject to scrutiny from lead local flood authorities' democratic processes.

7.4.2 Reservoir Undertaker

Dee Valley own 8 reservoirs in Wales and as such they are responsible for their maintenance as a reservoir undertaker. They will also be affected by the change to the Reservoirs Act 1975 which has been amended to state the following; all undertakers with reservoirs over 10,000 m³ must register their reservoirs with the Environment Agency as they are subject to regulation and all undertakers must report any flood incidents.

7.5 Flintshire County Council as a Highways Authority

Flintshire County Council Streetscene Services is the department responsible for the network of non-trunk roads in Flintshire County. The Welsh Government is responsible for trunk roads and motorways in Wales which are maintained by the North and Mid Wales Trunk Road Agency (NMWTRA) in Flintshire on behalf of the Welsh Government.

All Highways Authorities are Risk Management Authorities according to the FWMA and must adhere to all the responsibilities of risk management authorities. In addition to their responsibility as a risk management authority, Highways Authorities also have further responsibilities:

7.5.1 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 and culverted watercourses under the highway are cleared. Regular inspections are carried out to meet this requirement.

7.5.2 Adoption of SuDS

Highways Authorities currently have the power to adopt SuDS that serve the highway through Section 38 of the Highways Act but are under no obligation to do so. Under the Flood and Water Management Act, Highways Authorities will be required to adopt any SuDS approved by the SuDS Approval Body that will be located within the highways boundary.

7.5.3 Powers to deliver works

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 and 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.

7.5.4 Response in an Emergency Flooding Event

In the event of an emergency or major incident Flintshire's Streetscene Services 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; and

- Assistance in the management of the transportation network to restore the flow of traffic in the event of an evacuation or to divert traffic 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.

7.6 North and Mid Wales Trunk Road Agency on behalf of the Welsh Government

Llywodraeth Cymru
Welsh Government

Trunk roads in Flintshire are maintained by the North and Mid Wales Trunk Road Agency (NMWTRA) on behalf of the Welsh Government. The Trunk Road network in North and Mid-Wales consists of approximately 1175 km (730 miles) of trunk road covering 8 Welsh Local Authorities – Ceredigion, Conwy, Denbighshire, Flintshire, Gwynedd, Isle of Anglesey, Powys and Wrexham. NMWTRA must ensure that:

- Road projects do not increase flood risk; and
- Road discharges do not pollute receiving waterbodies[25].

Figure 7.5: The map shows the full extent of the NMWTRA

The NMWTRA have responsibility for the drainage on the following trunk roads in Flintshire County:

- A55 from Junction 30 the Travellers Inn near Caerwys to Junction 36A at Broughton Shopping Park;
- A550 from Queensferry Roundabout to the County Boundary at Deeside Park; and
- A494 from Queensferry Roundabout to Cadole near Gwernymynydd.

[25] http://www.highways.gov.uk/knowledge/18542.aspx

7.7 Flintshire Countryside Service (FCS)

Flintshire Countryside Service (FCS) is a team of countryside managers and specialists with the job of managing and protecting Flintshire landscapes for people and wildlife. They encourage management techniques that sustain wildlife habitats and landscape features, and promote environmental awareness through community involvement and countryside interpretation.

The underlying philosophy of the service is to work closely with local people to protect and develop opportunities for wildlife and recreation on the urban fringes and in more rural areas.

FCS has management responsibilities for a number of countryside sites across Flintshire such as country parks, greenspace and wildlife areas both publicly owned and under agreement from the private sector. FCS also has an interest in the wider countryside to include public rights of way and stand alone projects.

Where there is a watercourse (land drain or riparian) across a FCC owned site which FCS has been charged with management responsibility, they will undertake management and maintenance of such watercourse. In terms of flood management FCS will react accordingly but currently do not have emergency plans in place and not all sites carry a dedicated budget.

Where there is a watercourse (including coast) which effects wider work carried out by FCS then FCS will monitor and report any flood, erosion issues to the landowner and/or FCC drainage engineer. FCS would not undertake any maintenance or management, unless there was agreement and subsequent funding to do so.

7.8 Responsibilities of Flintshire's Citizens (Businesses, Landowners and Local Households)

7.8.1 Property Owners and Residents

It is the responsibility of householders and businesses to protect their property from flooding. Consequently it is important that householders, whose homes are at risk of flooding, take steps to ensure that their house is protected. There are a number of measures which can be taken to make your property more resistant to flooding (stop water entering) and resilient (better prepared to recover) after flooding. These include:

- Check whether their household is at risk from flooding from the river, coast or local flood sources. All households in Flood Zones (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 EAW when the risk of river or coastal flooding is high. Go to Flood Map at http://www.environment-agency.gov.uk;

- Ensure that preparations have been made for the event of a flood. These include registering for the EA Floodline Warnings Direct service if flooding from rivers may be involved, keeping a 'grab bag' of essential items ready and having a plan to turn off electricity, gas and water supplies;

- Take resistance 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. See the National Flood Forum's independent Blue Pages directory: http://www.bluepages.org.uk/;

- The combined effect of many people paving over their front gardens can increase the amount of surface runoff which adds to the risk of flooding. See the Government 'Guidance on the permeable surfacing of front gardens' leaflet: http://www.communities.gov.uk/publications/planningandbuilding/pavingfrontgardens;

- Take measures to ensure 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;

- If your property is served by separate surface water and foul sewers, you have a responsibility to fix any pipes which may be wrongly connected. For example, dirty water from sinks, baths, showers, appliances and the toilet should go to the foul sewer to be treated, otherwise watercourses can be polluted. Gutters and gulleys collecting rainwater should connect to the surface water sewer – if these are wrongly connected to the foul sewer it can become overloaded which may cause flooding. See the leaflet 'Is your home connected right;

  http://www.environment-agency.gov.uk/homeandleisure/pollution/water/31424.aspx

- If you own land adjoining a watercourse then you are a riparian owner and you have a responsibility to pass on flow without obstruction or pollution, including maintaining the banks of the channel and any

vegetation so they remain clear of debris. See the Environment Agency leaflet 'Living on the Edge': http://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx; and

- Report a flood incident at floods@flintshire.gov.uk to help build evidence for action to be taken.

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, as detailed in the following link:

http://www.environment-agency.gov.uk/homeandleisure/floods/31624.aspx.

The National Flood Forum is a national charity dedicated to supporting and representing communities and individuals at risk of flooding. As detailed in the following link: http://nationalfloodforum.org.uk/

The National Flood Forum has several roles:

- Help people to prepare for flooding in order to prevent it or mitigate its impacts;
- Help people to return to normal once they have been flooded; and
- Campaign on behalf of flood risk communities and working with government and agencies to ensure that they develop a community perspective.

7.8.2 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. The riparian owner is likely to own the land up to the centre of the watercourse which may be confirmed by The Land Registry or by property deeds.

Riparian owners have a right to protect their property from flooding and erosion but in most cases will need to discuss the method of doing this with Flintshire County Council LLFA. 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: A guide to your rights and responsibilities of riverside ownership'* found at:

http://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx

7.8.3 Utility and Infrastructure Providers

Within Flintshire most of the defence assets are the responsibility of FCC, Network Rail or private land owners. Utility and infrastructure providers such as Network Rail, energy companies and telecommunication companies have a crucial role to play in flood risk management to ensure that the service they provide is not interrupted during a flood event.

Moreover they may have assets such as culverts on their land, 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.

8. Local Objectives and Measures

The following chapters of this report will set out the primary objectives for Flintshire County Council for managing flood and coastal erosion risk in Flintshire over the life of the Local Flood Risk Management Strategy. Potential measures will be proposed to meet these objectives including details of how and when these measures will be put in place. The costs and benefits will be assessed and research will be done into the possible sources of funding that may be available for the measures to be implemented.

Under the terms of the FWMA one of the requirements of the Local Flood Risk Management Strategy is the stipulation of the costs and benefits of any proposed measures. At this stage in the Strategy process, it is difficult to ascertain and quantify costs and benefits without knowing the exact scope of any required works. Secondly, quantification of benefits is difficult without knowing the accurate extent to which measures are able to reduce flood risk. It is felt that costs and benefits of detailed measures are better placed within the Annual Action Plans and/or Flood Risk Management Plans.

The objectives should be in-line with wider government policy and include a realistic timetable for delivery, which could include phasing over multiple flood risk management strategy cycles. It is important that the process, measures and actions to achieve the objectives are pragmatic and supported by all departments, partners and stakeholders. There should be demonstrable links between objectives and their contribution to tackling local priorities, in areas potentially vulnerable to flooding.

8.1 Flintshire County Council Strategic objectives

The objectives should be in accordance with the guiding principles of the Welsh Governments National Strategy[26] and Local Strategy guidance[27] and wider government policy. The objectives will set the vision for how the council and its partners intend to manage local flood risk.

Local Strategy guidance states that high level strategic objectives should be developed around the reduction of potential adverse consequences of flooding for human health, the environment, cultural heritage and economic activity. By adopting this approach, the objectives will be consistent with those required under the Flood Risk Regulations 2009 and assist in ensuring that this common approach is maintained across Wales.

Local Strategy Guidance also states that the more detailed objectives provide opportunities for LLFA's to capture and record both long and short term objectives including work that is already being carried out such as routine maintenance of drainage systems.

The EA has suggested that the LLFA should consider objectives under each of the three key headings; Social, Economic and Environmental.

FCC's objectives for managing flood and coastal erosion risk in Flintshire are listed overleaf:

[26] National Strategy for Flood and Coastal Erosion Risk Management in Wales, November 2011

[27] Local Flood Risk Management Strategies, Local Strategy, November 2011

Ten Objectives for Flintshire County Council

1. **To improve the understanding of flooding (surface water, groundwater and ordinary watercourses) and coastal risks;**
2. **Increasing individual and community awareness and preparedness for flood and coastal erosion events and the impacts of climate change on flood risk;**
3. **To work together (both FRMA, stakeholders and public) to reduce flood and coastal risks, sharing data and resources to the greatest benefit;**
4. **To reduce the impact and consequences for individuals, communities, businesses and the environment from flooding and coastal erosion;**
5. **To ensure that Flood Risk Management issues are considered when planning decisions regarding development are made;**
6. **Improve and/or maintain the capacity of existing drainage systems by targeted maintenance;**
7. **Take a sustainable approach to flood risks management balancing economic, environmental and social benefits;**
8. **Increase the use of approaches that utilise the natural environment;**
9. **Ensure the development of skills required to implement effective and innovative flood risk management; and**
10. **Identify projects and programmes which are affordable, maximising capital funding from internal and external sources.**

FCC has undertaken an assessment in the form of a compatibility matrix to make certain that these chosen objectives fit in line with National Strategy objectives, Local Strategy guidance and EA key headings. The matrix also states which objectives are long and short term objectives and can be found in Table 8.1 on the following page:

Objective number	Flintshire County Council LFRMS Objective	Four Overarching National Strategy Objectives				EA Key Headings			Long (L) or Short (S) term
		Reducing consequences	Raising awareness & engaging people	Providing an effective & sustained response	Prioritising investment	Environmental	Social	Economic	
1	Improve understanding	✓	✓			✓	✓		S
2	Increase awareness & preparedness	✓	✓	✓		✓	✓	✓	S
3	Working together	✓	✓	✓	✓	✓	✓	✓	S
4	Reduce impact and consequences	✓		✓	✓	✓	✓	✓	L
5	Inform planning decisions	✓	✓			✓	✓	✓	S
6	Improve/ maintain capacity of existing drainage	✓		✓	✓	✓	✓	✓	S
7	Sustainable approach to FRM	✓			✓	✓	✓	✓	L
8	Utilise the natural environment	✓		✓		✓	✓		S
9	Development of skills	✓	✓	✓	✓		✓	✓	S
10	Funding sources	✓		✓	✓	✓	✓	✓	S

Table 8.1: Matrix to demonstrate the links between FCC Local Strategy Objectives, National Strategy Objectives, and EA Key Headings

Short Term Objective – 0 - 20 years
Long Term Objective – 20 - 100 years

8.2 Potential Measures

A task can be defined as an activity, which will be undertaken to manage risk and achieve the agreed objectives. Local Strategy guidance states that a wide range of measures should be considered for the short (0-20 years), medium (20-50 years) and longer term (50-100 years). These should include both structural and non-structural activities; examples of these are included in Table 8.2 below:

Non-structural Measures	Structural Measures
■ Flood Warnings Systems; ■ Public awareness and preparedness workshops; ■ Community engagement; and ■ Surface water management plans.	■ Flood walls; ■ Flood embankments; ■ Trash screens; ■ Demountable flood barriers; and ■ Flood storage features.

Table 8.2: Examples of structural and non-structural activities

Measures which will achieve multiple benefits, such as water quality, biodiversity and amenity benefits are encouraged and should be promoted wherever possible.

The local strategy guidance also specifies that all LLFA's should consider measures under the following high level themes:

- Development planning and adaptation (encompassing both new and adaptations to existing developments / landscapes);
- Flood forecasting, warning and response;
- Land, cultural and environmental management;
- Asset management and maintenance;
- Studies assessments and plans;
- High level awareness and engagement (to increase individual and community resilience); and
- Monitoring (of the local flood risk issues).

FCC's potential measures for managing flood and coastal erosion risk in Flintshire County are listed below under each relevant objective:

1	**To improve the understanding of local flood (surface water, groundwater and ordinary watercourses) and coastal risks**
1.1	Record all flooding incidents and where appropriate carry out flooding investigations;
1.2	Record all appropriate structures/assets on watercourses so that ownership and responsibility can be identified in the event of a problem with flooding;
1.3	Develop a consistent approach to designation of flooding/drainage structures;
1.4	Identify and assess the condition of existing drainage assets within the County, to prioritise capital

	investment;
1.5	Develop a county wide map based record of flood risk assets, Flood Investigation Reports, historical flooding and areas at risk of flooding to allow a proactive risk management approach to be taken by the flood authority; and
1.6	Digitise all relevant paper reports and information to protect historical knowledge and make it accessible for future flood investigations.

2	**Increasing individual and community awareness and preparedness for flood and coastal erosion events and the impacts of climate change on flood risk**
2.1	Raise public awareness of the impacts of climate change on flooding and coastal erosion including possible failure of coastal defences;
2.2	Publish a public awareness strategy (Workshops, public awareness events, publish information on the Council Website, adverts in local press) and communicate it widely;
2.3	Develop a capacity to deal effectively and appropriately with non-emergency flood incidents;
2.4	To collaborate with statutory bodies to promote the existing flood warning service (EAW) and their proposed flooding awareness campaigns;
2.5	Collaborate with other FRA's to create an integrated county wide real time hydraulic and flood alert map (long term);
2.6	Make the public aware of available flood prevention and mitigation measures (resistance and resilience) to protect their property and assets; and
2.7	Target areas of historical flooding (or at high probability of flooding) to increase awareness of emergency procedures in the event of a flood.

3	**To collaborate with FRMA's, stakeholders and the public to reduce flood and coastal risks, and share data and resources to the greatest benefit**
3.1	Identify responsibilities of the riparian owners for managing their assets, through public engagement;
3.2	Continue to meet with the North Wales LFRMA's and Coordination Group to share knowledge, data and resources to develop best practice;
3.3	Develop an effective communication plan to ensure collaborative working and data sharing; and
3.4	Undertake stakeholder engagement, to identify responsibilities of flood risk partners.

4	**To reduce the impact and consequences for individuals, communities, businesses and the environment from flooding and coastal erosion**
4.1	Identify vulnerable groups within the community, and prepare action plans to be implemented in the

	event of flooding;
4.2	Identify areas at greatest risk of flooding, and develop a capital cost investment programme develop schemes to alleviate flooding;
4.3	Educate the general public on options for protecting their properties through flood prevention options and resistance and resilience measures; and
4.4	Assist and provide support and advice following a flood event.

5	**To ensure that planning decisions are properly informed by flooding issues and the impact future planning may have on flood risk management and long term developments**
5.1	Develop clear guidance for the Planning Department when assessing planning applications;
5.2	Develop a process with the Planning Department to create clear advice and direction to developers on FRMS and drainage (including incorporation of SuDS into new developments);
5.3	Establish a SuDS Approval Body (SAB);
5.4	Keep the Planning Department informed and up-to-date with information relating to flood risk areas in the County; and
5.5	Develop policies, development management and procedures which take account of flooding issues.

6	**Improve and/or maintain the capacity of existing drainage systems by targeted maintenance**
6.1	Identify and assess the condition of existing drainage assets within the County, to prioritise capital investment;
6.2	Develop a risk based proactive and cyclical maintenance regime; and
6.3	Develop a risk based programme for improving existing infrastructure assets.

7	**Take a sustainable approach to flood risk management balancing economic, environmental and social benefits**
7.1	Ensure the environmental consequences of implementing the LFRMS are properly balanced against the technical, economic and social benefits of development;
7.2	Consider the use of attenuation through wetlands or retention basins to increase the length of flow durations, store flood water, and provide amenity and ecological benefits; and
7.3	Consider the use of bioretention areas to reduce sediments and pollutants from entering ordinary watercourses.

8	**Increase the use of approaches that utilise the natural environment**
8.1	Adopt natural flood-risk management techniques including SuDS;
8.2	Explore new and innovative technologies for flood defence and flood management;
8.3	Where possible incorporate multiple benefits such as water quality, biodiversity and amenity benefits; and
8.4	Develop and implement a non-culverting policy.

9	**Ensure the development of skills required to implement effective and innovative flood risk management measures**
9.1	Provide appropriate staffing levels and develop staff expertise to deliver the requirements of the act;
9.2	Invest in appropriate software and hardware;
9.3	Outsource specialist skills to deliver specific projects, and
9.4	Collaborate and provide support, training and networking of staff across the region.

10	**Identify projects and programmes which are affordable, maximising capital funding from internal and external sources**
10.1	Identify potential funding sources which may include communities and local business's;
10.2	Undertake full lifecycle cost benefit analysis for projects including social, and environmental benefits; and
10.3	Investigate opportunities for match funding and grants.

FCC has undertaken an assessment in the form of a compatibility matrix to make certain that these potential measures fit inline with Local Strategy guidance and high level themes. The matrix also states which measures are structural and non-structural and whether they are long, medium and short term and can be found in Table 8.3 on the following page:

Task Reference Number	LFRMS Measures	High Level Themes							Long (L), Medium (M),Short (S) term	Structural (S), Non-structural (NS)	Status - Ongoing (O), Pending (P), Aspirational (A)
		Development planning & adaptation	Flood forecasting, warning & response	Land, cultural & environmental management	Asset management & maintenance	Studies, assessment & plans	High level awareness & engagement	Monitoring			
1.1	Record all flooding incidents & carry out investigations	-	✓	-	✓	✓	-	✓	S	NS	O
1.2	Consistent approach to recording of assets	-	-	-	✓	-	✓	✓	S	NS	O
1.3	Consistent approach to designation of structures	-	-	-	✓	-	-	-	S	NS	P
1.4	Identify and asses the condition of drainage assets/structures	-	-	-	✓	-	✓	-	S	NS	O
1.5	County wide flooding and drainage asset model	-	✓	-	✓	-	✓	✓	L	NS	A
1.6	Digitise all relevant paper reports and information	✓	-	✓	-	-	-	-	S	NS	A
2.1	Raise public awareness	-	-	-	-	-	✓	-	S	NS	O
2.2	Publish a public awareness strategy and communicate it	-	-	-	-	✓	✓	-	S	NS	A
2.3	Develop a capacity to deal with non-emergency flood incidents	-	✓	-	-	-	-	-	S	NS	O
2.4	Collaborate with statutory bodies	-	✓	-	-	-	✓	-	S	NS	A
2.5	Integrated county wide real time hydraulic and flood alert map	-	✓	-	✓	✓		-	M	NS / S	A
2.6	Public awareness of available flood prevention and mitigation measures	✓	-	✓	-	-	✓	-	S	NS	O
2.7	Target areas of historical flooding	-	-	-	-	-	✓	-	S	NS	A

Task Reference Number	LFRMS Measures	High Level Themes							Long (L), Medium (M),Short (S) term	Structural (S), Non-structural (NS)	Status - Ongoing (O), Pending (P), Aspirational (A)
		Development planning & adaptation	Flood forecasting, warning & response	Land, cultural & environmental management	Asset management & maintenance	Studies, assessment & plans	High level awareness & engagement	Monitoring			
3.1	Identify responsibilities of the riparian owners	-	-	✓	✓	-	✓	-	S	NS	P
3.2	Continue to meet with North Wales LFRMA's & Coordination Group	-	✓	-	-	-	✓	-	S	NS	O
3.3	Effective communication plan	-	-	-	-	✓	✓	-	S	NS	A
3.4	Stakeholder engagement, to identify responsibilities of flood risk partners	-	-	-	-	-	✓	-	S	NS	O
4.1	Identify vulnerable groups & prepare action plans	-	-	-	-	✓	-	-	S	NS	A
4.2	Identify areas at greatest risk of flooding, develop capital cost investment programme	✓	-	-	-	✓	-	-	S	NS	A
4.3	Educate general public on options for protecting their properties	✓	-	✓	-	-	✓	-	S	NS	O
4.4	Assist and provide support following a flood event	-	✓	-	-	-	-	-	S	NS	A
5.1	Develop guidance for Planning Department	✓	-	✓	-	✓	-	-	S	NS	A
5.2	Develop processes to create clear advise and direction to developers	✓	-	✓	-	✓	-	-	S	NS	A
5.3	Establish a SuDS Approval Body	✓	-	✓	-	-	-	-	S	NS	P
5.4	Keep the Planning Department informed and up-to-date with information relating to flood risk areas	✓	-	-	-	-	-	✓	S	NS	A

Task Reference Number	LFRMS Measures	High Level Themes							Long (L), Medium (M),Short (S) term	Structural (S), Non-structural (NS)	Status - Ongoing (O), Pending (P), Aspirational (A)
		Development planning & adaptation	Flood forecasting, warning & response	Land, cultural & environmental management	Asset management & maintenance	Studies, assessment & plans	High level awareness & engagement	Monitoring			
5.5	Develop policies which take account of flooding issues	✓	-	✓	-	✓	-	-	S	NS	A
6.1	Identify and assess condition of existing drainage assets	-	-	-	✓	✓	-	-	S	NS	O
6.2	Risk based proactive and cyclical maintenance regime	-	-	-	✓	✓	-	-	S	NS	O
6.3	Risk based programme for improving existing infrastructure	-	-	✓	✓	✓	-	-	S	NS	A
7.1	Environmental consequences of implementing LFRMS balanced	-	-	✓	-	-	-	-	S	NS	O
7.2	Consider using wetlands or retention basins	-	-	✓	-	-	-	-	S	NS	A
7.3	Consider bioretention areas	-	-	✓	-	-	-	-	S	NS	A
8.1	Adopt natural flood-risk management including SuDS	✓	-	✓	-	-	-	-	S	NS / S	P
8.2	Explore new and innovative technologies	-	-	-	-	-	✓	-	M	NS	A
8.3	Where possible incorporate multiple benefits	✓	-	✓	-	-	-	-	S	NS / S	A
8.4	Develop and implement a culverting policy	✓	-	✓	-	-	-	-	S	NS / S	O
9.1	Provide enough staff to deliver the requirements of the act	-	-	-	-	-	-	-	S	NS	O
9.2	Invest in appropriate software and hardware	-	✓	-	-	-	-	-	S	NS	O
9.3	Outsource specialist skills to deliver specific projects	-	-	-	-	-	-	-	S	NS	O

Task Reference Number	LFRMS Measures	High Level Themes							Long (L), Medium (M),Short (S) term	Structural (S), Non-structural (NS)	Status - Ongoing (O), Pending (P), Aspirational (A)
		Development planning & adaptation	Flood forecasting, warning & response	Land, cultural & environmental management	Asset management & maintenance	Studies, assessment & plans	High level awareness & engagement	Monitoring			
9.4	Staff support, training and networks	-	-	-	-	-	✓	-	S	NS	A
10.1	Identify potential funding sources	-	-	-	-	-	-	-	S	NS	O
10.2	Lifecycle cost benefit analysis	-	-	✓	-	✓	-	-	S	NS	O
10.3	Investigate opportunities for match funding and grants	-	-	-	-	-	-	-	S	NS	O?

Table 8.3: Matrix to demonstrate the links between FCC Local Strategy Measures and Local Strategy Guidance, and High Level Themes

- Short Term Task – 0 - 20 years
- Medium Term Task – 20 - 50 years
- Long Term Task – 50 - 100 years

- Ongoing – measures that are already currently undertaken by FCC and will continue
- Pending – measures that FCC are required to do under the FWMA
- Aspirational – measures that are not required but would be beneficial to implement

✓ = task supports the theme
- = task is not applicable to the theme

Some background information on specific measures has been given in the following section where it is felt further explanation is needed.

8.3 Adopt Natural Flood Risk Management Techniques

The EA has produced the first national report of how natural processes can help manage flood risk in England and Wales; '*Greater working with natural processes in flood and coastal erosion risk management, January 2012*' which is in response to the Pitt Review recommendation 27[28]. The definition of 'working with natural processes' taken from this report is shown below:

'Working with natural processes means taking action to manage flood and coastal erosion risk by protecting, restoring and emulating the natural regulating function of catchments, rivers, floodplains and coasts. This could, for example, involve using farmland to temporarily store flood water, re-instating washlands and wetlands to store flood water away from high risk areas or allowing cliffs to erode to provide sediment down drift.'

In the context of Flood and Coastal Erosion Risk Management, working with natural processes often means slowing down the flow of water (e.g. by re-establishing flood plains that hold flood waters) or speeding up the flow of water (e.g. by removing unnatural obstructions), to prevent flood waters from causing harm. Such techniques protect, restore or emulate natural processes which regulate flooding and erosion and, in doing so, may provide other ecosystem benefits such as biodiversity, carbon storage, and improved water quality. Natural processes operate across a continuum from mitigated engineering to full naturalisation (see Figure 8.1 below).

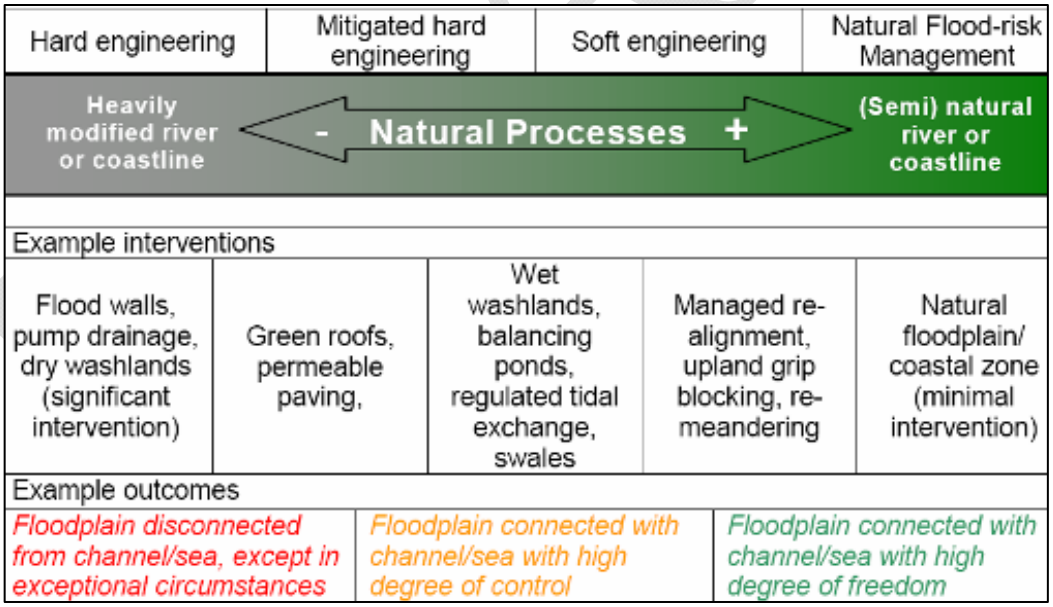


Figure 8.1: The Environment Agency' conceptual model of working with natural processes.

[28] "Defra, the Environment Agency and Natural England should work with partners to establish a programme through Catchment Flood Management Plans and Shoreline Management Plans to achieve greater working with natural processes"

Sustainable Drainage Systems (SuDS) reduce flood risk both at a development site and elsewhere in the catchment by replicating natural drainage processes. There are numerous varieties including detention basins (dry), retention ponds (wet), grassed swales, porous pavements, soakaways and 'green' roofs that store water within a building's own footprint. These interventions slow down and absorb surface water runoff and can create valuable habitats for wildlife while reducing flood risk to developments.

CASE STUDY to illustrate a technique of working with natural processes for FCERM:

Infilling of Low Spots within the Rear Coastal Dune System at Talacre, North Wales.

A natural coastal sand dune system protects part of the town of Talacre from tidal flooding. A man made embankment protects the remainder of the town. A beach nourishment project was undertaken in 2003 to protect the fore dunes and beach levels were raised by up to 1.80 metres.

At the time it was acknowledged that there were low spots within the rear dune system. If a breach occurred in the fore dune system then these dune low spots could be overtopped by tidal surge conditions which could result in flooding in Talacre. The dune system is environmentally sensitive and has 4 levels of protection including S.S.S.I, S.A.C. etc.

A scheme was undertaken to raise the levels of the low spots to create embankments using dredged sand from the River Dee. Approximately 3000 tonnes of sand was imported and placed to pre-determined levels and profiles using tracked dumpers and mini excavators. The sand was then covered with a bio-degradable hessian geotextile and planted with Marram Grass harvested locally on site. These low spots were then surrounded with a temporary Chestnut Paling fence until the Marram Grass has become well established. The fences should also assist in excluding the high flows of pedestrian traffic which would impact on the regeneration process.

Should a breach in the fore dunes now occur this secondary line of natural defence will protect the town of Talacre.

The picture shows an example of working with natural processes by raising the level and reinforcing the natural coastal sand dune system which will ultimately protect the village of Talacre.

9. Funding and Delivery

Some of the measures outlined in the previous section have been core activities for the council for a number of years and processes are in place to deliver those measures. Other measures, however, relate to the new responsibilities which have recently been assigned, most of which requiring a new set of skills, experience, processes and software that may take some time to develop or acquire.

It is important that the local strategy sets out where the funding will come from to acquire these resources in order to implement the measures within the strategy. Some measures will be delivered with existing council resources but others will require external funding support. Flintshire County Council must identify what funding sources are currently available to them and what actions will need to be taken to ensure that alternative funding is achievable.

Currently most funding for flooding and coastal erosion comes from Welsh Government. It is essential for the implementation of this strategy and for all statutory duties mentioned that the funding settlement from Welsh Government to FCC identifies an allocation to Flood Risk Management.

9.1 Current Funding Sources

At present Flintshire County Council receives funding from Welsh Government in two ways:

- A non-hypothecated grant (which can be used by the authorities for any purpose they choose in delivering the services for which they are responsible); An annual and unpredictable amount is provided through the Revenue Support Grant (RSG); and
- A hypothecated grant (which can only be used for the specific purposes for which they are provided); Flood Defence Grant-in-Aid (FDGiA) provided by bidding for Flood Alleviation Grants (FAG), on a scheme by scheme basis, under the Land Drainage Act 1991. Currently the FAG rate (money contributed from WG) for fluvial schemes is 85% and for coastal schemes its 65%. Flintshire County Council contributes the remainder to the scheme.

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
Flood and coastal erosion risk management (FCERM) Revenue Support Grant (RSG)	For the 2013 / 2014 financial year onwards funding to support each LLFA will be provided through the Revenue Support Grant (RSG) system.	£90+ Thousand	Flintshire County Council	LLFA duties under the FWMA. Maintenance of ordinary watercourses and related assets. Maintenance of coastal erosion mitigation measures.
Flood Defence Grant-in-Aid (FDGiA)	Welsh government funding for Flood alleviation grants (FAGS) on a scheme by scheme basis – recently revised to encourage a partnership approach to	£200 Thousand	Welsh Government	Medium to large capital FRM projects. FRM and coastal erosion management studies, strategies and

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
	maximise match-funding, work towards achieving specified objectives with a requirement to evidence a reduction in flood risk to properties			projects.
Private Contributions	Voluntary from the private sector and local communities. Funding from beneficiaries of projects could make contributions from national funding viable. Contributions could be financial or "in kind" e.g. land, volunteer labour	Unknown	Flintshire County Council	All projects
Water Company Investment	Investment heavily regulated by Ofwat but opportunities for contributions to area-wide projects which help to address sewer under-capacity problems	Unknown	Welsh Water	Projects which help to remove surface water from combined sewers
SAB Income	It is anticipated that Flintshire will receive application and inspection fees funded by developers in support of the approval and inspection of new development related SuDS. Funding of long-term maintenance of SuDS is currently unclear; although a range of solutions is available including payment of commuted sums by Developers. The long-term funding of maintenance is to form part of the Consultation with Welsh Government.	Unknown	Flintshire County Council	Development drainage approval and FRM issues
Flood and Coastal Resilience Partnership Funding	Some funding allocated for major capital projects require contributions into resilience measures.	Unknown	Flintshire County Council	Measures which address flood risk to communities and businesses
The Regional Competitiveness and Employment programmes	The Regional Competitiveness and Employment programmes comprise funding from two separate European Structural Funds: the European Regional Development Fund (ERDF) and the European Social Fund (ESF).	£1.1 million	Flintshire County Council	Mold Flood Alleviation Scheme
Local	An important funding mechanism will	Unknown	Flintshire	Measures which address

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
Fundraising	come from local fundraising from the local communities and businesses that benefit from the proposed flood defence schemes.		County Council	flood risk to communities and businesses
Riparian owners	Maintenance and repair of assets is normally the responsibility of riparian owners, awareness raising will assist in ensuring that assets are maintained; however, historic assets with uncertain ownership may require assistance in funding repairs or end of life replacement.	Unknown	Flintshire County Council	Measures which address flood risk to riparian owners

Table 9.1: FCC's current funding sources for Flood and Coastal Erosion Risk Management

9.2 Other Possible Funding Sources for the Future

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
Coastal Communities Fund (delivered on behalf of the government by the Big Lottery Fund)	The fund is available to Local Authorities in managing and adapting to flood and coastal erosion risk, and managing pollution risks associated with the coast, where this supports local economic development. The Fund opened for bids in March 2012 but is intended to be a rolling fund with annual bidding rounds. It is expected that there will be at least two future years of funding commencing in 2013 and 2014. The Coastal Communities Fund will open again for applications in early 2013.	£1.45 million currently available for Wales	Big Fund	Projects that help coastal communities to better enable them to use their assets (physical, natural, social, economic and cultural) to promote sustainable economic growth and jobs
Section 106 contributions (Town & Country Planning Act)	It is anticipated that Flintshire will require contributions from developers linked to specific development sites where off-site improvements to drainage infrastructure are required to make the development acceptable e.g.	Unknown	Flintshire County Council	Larger development sites and surrounding areas

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
	Green infrastructure with multiple benefits where there will be opportunities for Community groups to manage certain areas.			
Community Infrastructure Levy (CIL)	A local levy applied by the Planning Authority on developers. It allows local authorities to raise funds from new development in the 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. Flintshire County Council has not yet implemented a CIL scheme as this is linked to progress on the LDP. A bid for CIL would have to be made for flood management/drainage improvements against other competing council priorities.	Unknown	Flintshire County Council	All measures outlined in the Strategy
Business Rates Supplements	Agreement from local businesses to raise rates for specified purposes.	Unknown	Flintshire County Council	Measures which address flood risk to businesses
Collaborative schemes with other RMA's	There are opportunities for collaborative schemes with other RMAs, although the Water and Sewerage Company has limited scope for allocating funding to schemes outside their capital programme which is usually set several years' in advance; however early discussions and involvement may benefit all parties and the Community.	Unknown	Flintshire County Council	Key measures in the Strategy
Interreg Programmes 2013 - 2020	Interreg Wales Ireland Programme Interreg North West Europe Interreg Atlantic Area. To work in partnership with other countries on initiatives involving research, monitoring, awareness	Unknown	Flintshire County Council European Section	Revenue based projects

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
	raising, developing tools and strategies in flood and coastal erosion.			
LIFE Programme 2013 – 2020	LIFE Environmental Policy and Governance. To bridge the gap between research and development results and widespread implementation. Information, communication and awareness raising campaigns.	Unknown	Flintshire County Council European Section	Initiatives that are looking to move from R&D to implementation
Structural Funds Programmes 2013 - 2020	Structural Funds – potentially around climate change adaptation, risk prevention and management.	Unknown	Flintshire County Council European Section	Potentially medium to large capital projects
Welsh Government (WG) / Environment Agency (EA)	Other funding is being provided by WG and EA to help some individual homeowners to pay for the cost of installing individual property flood resilience measures in areas that are frequently flooded and do not benefit from community defences. The funding is being administered by the EA. WG are also funding work to understand and manage the risk from surface water and ground and groundwater flooding.	Unknown	Flintshire County Council	Installing individual property flood resilience measures

Table 9.2: FCC's possible future funding sources for Flood and Coastal Erosion Risk Management

10. Contribution to Wider Environmental Objectives

The main purpose of this report is to set out the strategy for implementing flood risk management measures across Flintshire. However there is an opportunity to derive significant benefit in the process, in respect to county and country-wide aspirations in the wider context of sustainability, environmental and social improvement. The aim is to provide better environments for residents and businesses as well as improving biodiversity and local habitats for wildlife.

Delivering multiple benefits will require working with partners to identify local priorities and opportunities. Where appropriate, and in line with the principles of the National Strategy, contributions that help to deliver these additional improvements could be sought from those partners that benefit. Higher levels of government funding may also be accessible when wider benefits are delivered as part of the Local Strategy.

The environmental objectives and measures that the local strategy will contribute to through the effective management of local flood risk are included below, some of which include national environmental objectives:

- To reduce the impact and consequences for individuals, communities, businesses and the environment from flooding and coastal erosion;
- To ensure that planning decisions are properly informed by flooding issues and the impact future planning may have on flood risk management and long term developments;
- Improve and/or maintain the capacity of existing drainage systems by targeted maintenance;
- Establish a SuDS Approval Body (SAB);
- The Flintshire SAB will embrace Welsh Government guidance on the encouragement, adoption and maintenance of SuDS. SuDS are an opportunity to ensure that amenity and biodiversity are considered with the same importance as managing volumes of water;
- Take a sustainable approach to flood risk management balancing economic, environmental and social benefits;
- Water Framework Directive targets (under Article 4.1) which are relevant to this local flood risk management strategy include;

  - Ensure no deterioration of surface water and groundwater and the protection of all water bodies (including coastal waters);
  - Achieve ‘good’ ecological status by 2015 for surface water and groundwater;
  - Reduction of pollution and hazardous substances in surface water and groundwater;
  - Reverse any upwards trends of pollutants in groundwater; and
  - Achieve standards and objectives set for protected areas.

- Increase approaches that utilise the natural environment;
- Enhance biodiversity and habitat creation within any future capital schemes. These schemes can also be used within urban areas to provide green spaces for amenity;

- Adaptation to climate change through local flood risk management measures, in order to build in community and operational resilience;
- Protect Sites of Special Scientific Interest (SSSIs) within Flintshire. All flood risk management authorities have a duty (under Section 28G of the Wildlife and Countryside Act 1981) to take reasonable steps to further the conservation and enhancement of SSSIs;
- Ensure no loss or degradation of habitat through flood risk management works to comply with the Biodiversity Action Plan (BAP). As a flood authority, Flintshire County Council has a duty (under Section 40(1) of the Natural Environment and Rural Communities Act 2006) to conserve biodiversity within Flintshire;
- Ensure the environmental consequences of implementing the LFRMS are considered against technical, economic and social benefits; and
- The strategy has undergone a thorough assessment against the Strategic Environmental Assessment (SEA) and the Habitats Regulations (HRA).

10.1 Strategic Environmental Assessment

A Strategic Environmental Assessment (SEA) has been undertaken to ensure that any significant environmental effects arising from this strategy are identified, assessed, mitigated, communicated to decision-makers, and monitored. Opportunities for public involvement were provided.

SEA is a generic tool that was introduced by the European Union Directive 2001/42/EC. The outcome of the Strategic Environmental Assessment Directive is to “to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development”(Article 1)”.

This requires national, regional and local strategic environmental assessment on certain plans and strategies that they promote, such as this strategy. Monitoring of the significant environmental effects of implementing the strategy will be undertaken to comply with Strategic Environmental Assessment Directive - Article 10.1, to ensure that any unforeseen adverse effects of the local strategy are recognised and dealt with.

The SEA for this strategy is being carried out as the strategy develops. The SEA scoping study has been undertaken in line with Government Guidance. After a period of consultation with Statutory Consultees (Environment Agency, Countryside Council for Wales and CADW); key stakeholders will be encouraged to comment on the findings of the SEA, and the comments received will be incorporated in to the final SEA.

The local strategy will need to be assessed for compliance with the Water Framework Directive to identify whether it will cause the deterioration of any water body and/or prevent the achievement of water body objectives.

10.2 The Water Framework Directive

The Water Framework Directive (WFD) is the most substantial piece of EC water legislation to date and is designed to improve and integrate the way water bodies are managed throughout Europe. It came into force on 22 December 2000 and was transposed into UK law in 2003 via the Water Environment (Water

Framework Directives) (England and Wales) Regulations 200361. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015. It is designed to:

- Prevent deterioration in the classification status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- Aim to achieve at least good status for all waters. Where this is not possible, good status should be achieved by 2021 or 2027;
- Promote sustainable use of water as a natural resource;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out releases of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Contribute to mitigating the effects of floods and droughts.

The Water Framework Directive establishes new and better ways of protecting and improving rivers, lakes, groundwater, transitional (where freshwater and sea water mix) and coastal waters. In order to achieve this, in 2009 the Environment Agency, Wales produced three River Basin Management Plans in Wales setting out measures to protect and improve the water environment. These are currently being implemented and will be revisited in 2015, 2021 and 2027, to ensure that the water body status does not deteriorate from standards set in 2009 as part of the initial River Basin Management Plans. It is important that measures to manage local flood risk do not cause deterioration of water bodies and should consider opportunities to improve water bodies in conjunction with local flood risk management.

10.3 Habitats Regulations Assessments

Due to the potential of this strategy to have a significant effect on sites of international nature conservation, a Strategic Habitats Regulations Assessment[29] (HRA) will also need to be undertaken in parallel with the SEA.

HRA is the assessment of the impacts of implementing a plan or policy on a Natura 2000 Site. Its purpose is to consider the impacts of a land-use plan against conservation objectives of the site and to ascertain whether it would adversely affect the integrity of the site. Where significant negative effects are identified, alternative options should be examined to avoid any potential damaging effects.

The HRA will be integrated with the SEA process and the conclusions of the HRA will be provided as a summary to the SEA Environmental Report.

[29] The Conservation of Habitats and Species Regulations 2010

10.4 Sustainable Development

10.4.1 One Wales: One Planet

The Welsh Government has a duty to have a 'Scheme for Sustainable Development', setting out how it will promote sustainable development. The current Scheme, One Wales: One Planet[30] was launched in May 2009 and defines sustainable development as:

"Enhancing the economic, social and environmental wellbeing of people and communities, achieving a better quality of life for our own and future generations in ways which:

1. *Promote social justice and equality of opportunity; and*
2. *Enhance the natural and cultural environment and respect its limits - using only our fair share of the earth's resources and sustaining our cultural legacy."*

'One Wales One Planet' says that if every country in the world used as much resources as our own small country, we would need three planets worth of trees, of crops, of oil and so on to survive, and this is increasing. Obviously we can't go on like this and although we are making progress in Flintshire, there is still more to do. FCC has always been committed to leading the way in protecting our environment. Providing weekly recycling collections and reducing landfill; cleaning our streets to a high standard. Improving the quality of our parks, green spaces, beaches and shoreline are just some of the things we are doing to improve the quality of our environment and make life better for the people that live in and visit Flintshire.

10.4.2 Guidance to Risk Management Authorities

As required under the Flood and Water Management Act, Welsh Government has published guidance to explain how sustainable development should be applied to flood risk management; *'Sustainable Development: Guidance to Risk Management Authorities Section 27 – Sustainable Development'.*

The guidance states that sustainable development is highly applicable to the Flood and Coastal Erosion Risk Management and requires an approach which delivers four objectives:

- Maximises the long-term economic, social and environmental wellbeing of people and communities in Wales, whilst living within environmental limits;
- Safeguards the continued provision of ecosystem services from our natural environment;
- Avoids exposing current and future generation to increasing risk; and
- Improves the resilience of communities, the economy and the natural, historic, and social environment to current and future risk.

[30] One Wales : One Planet. The Sustainable Development Scheme of the Welsh Assembly Government, May 2009, http://wales.gov.uk/topics/sustainabledevelopment/publications/onewalesoneplanet/?lang=en

11. Reviewing the Strategy

The Strategy will provide the framework for Flintshire's delivery of its flood risk management responsibilities and aspirations. A project board will be set up consisting of relevant heads of service and councillors who will monitor and approve the strategy and it will be adopted as a Council wide strategy. The Environment Directorate will report to the project board on a regular basis to inform them of progress on the implementation of the measures.

It is a "living document" which will develop as new information, expertise and resources influence the delivery of the measures outlined in the strategy. There will also be substantial changes in the next few years, with changes to the planning system and the requirements for sustainable drainage; in the provision of flood insurance; in the funding and design of flood prevention schemes; and with improvements in our knowledge of where the greatest flood risk is. FCC will take account of these changes and consider the implications in respect to the strategy and make annual on-going adjustments to the strategy as necessary.

The Strategy has been developed to deliver a short to medium term improvement plan to establish a sound evidence and knowledge base to develop a longer-term investment programme for FRM measures across the region. It is anticipated that the Strategy will become more focussed on the delivery of an affordable and funded capital programme of FRM works in the longer term.

It is proposed that a formal review of the local strategy should take place in 2017 following the review of the National Strategy in 2016, and to coincide with the review of the preliminary flood risk assessment as required by the Flood Risk Regulations. The strategy should then continue to be reviewed every six years in conjunction with the review of the PFRA, unless circumstances dictate a more frequent review.

Stages in Flood Risk Management	Date
Complete first Annual Action Plan to implement the strategy	Spring 2013 & each year thereafter
Publication of the second National Flood Risk Management Strategy by the Welsh Government	2016
Review and update of the Flintshire Flood Risk Assessment (PFRA)	Spring 2017 & each six years thereafter
Complete first formal review of the Flintshire LFRMS	Spring / summer 2017 & each six years thereafter (or where appropriate)
Publication of Flood Hazard and Risk Maps	Should the 2017 PFRA review identify a Flood Risk Area: 22nd December 2019 & each six years thereafter
Publication of Flood Risk Management Plans and completion of the first cycle of the Flood Risk Regulations	If a Flood Risk Area is identified: 22nd December 2021 & each six years thereafter

Table11.1: Timetable for FCC for implementing the LFRMS review

Appendix A

Risk Management Authorities in Flintshire County

Dee Valley	
Address	Packsaddle Wrexham Road Rhostyllen Wrexham LL14 4EH
Telephone	Leak Line 0800 298 7112 / Emergency 01978 846946
Website	contact@deevalleygroup.com

Dŵr Cymru-Welsh Water	
Address	Pentwyn Road Nelson Treharris CF46 6LY
Telephone	01443 452300
Website	www.dwrcymru.co.uk

Environment Agency, Wales	
Address	Head Office Tŷ Cambria House 29 Newport Road Cardiff CF24 0TP
	Northern Area Office Ffordd Penlan Parc Menai Bangor Gwynedd LL57 4DE
Telephone	08708 506 506
e-mail	enquiries@environment-agency.gov.uk
Website	www.environment-agency.gov.uk
Floodline - Phone Number	0845 988 1188 (24 hour service) **Type Talk:** 0845 602 6340

Flintshire County Council	
Address	Flintshire County Council County Hall Mold CH7 6NB
Telephone	01352 703020
Website	www.flintshire.gov.uk

North and Mid Wales Trunk Road Agency	
Address	Unit 7 Llys Onnen Ffordd y Llyn Parc Menai Bangor Gwynedd LL57 4DF
Telephone	01286 685186 or 01286 685180
Fax	01248 674975

Welsh Government	
Address	Sustainable Places Welsh Government Cathay's Park Cardiff CF10 3NQ
Telephone	(Welsh) 0300 0604400 or 0845 010 4400 (English) 0300 0603300 or 0845 010 3300 (International Enquiries) (+44) 1443 845500
e-mail	FloodCoastalRisk@wales.gsi.gov.uk
Website	www.wales.gov.uk