City and County of Swansea

Local Flood Risk Management Strategy

Final Version 1.0

Document Control Sheet

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Revision History

Date	Version No.	Summary of Changes
Nov 12	LFRMS Draft	
Feb 13	1.0	Final Version

Approvals

Approved by	Signature	Date	Version
Chris Vinestock		26/2/13	1.0

Distribution

Name	Title	Date	Version

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1.0 Introduction

The Flood and Water Management Act 2010 implemented recommendations from Sir Michael Pitt's Review of the 2007 floods in the UK. Under the Act the City and County of Swansea became a 'Lead Local Flood Authority' (LLFA) and was given a series of new responsibilities to coordinate the management of local flood risk from surface water, ground water and ordinary watercourses.

This has involved close working with partners who have similar responsibilities for managing flood risk from other forms of flooding. The Environment Agency has responsibility for managing flood risk from main rivers, reservoirs (and the sea).

As LLFA the City and County of Swansea needs to 'develop, maintain, apply and monitor' a Local Flood Risk Management Strategy. The Strategy will focus on local flood risk due to flooding from surface water, groundwater and ordinary watercourses. However, it has to consider significant interactions with main rivers, sea and main sewer systems.

The Strategy will be the primary method through which the LLFA discharges its role to provide leadership and co-ordinate flood risk management on a day to day basis. It will act as a focal point for integrating a range of flood risk related outcomes across the county. The council's strategy must be consistent with the Environment Agency's National Flood Risk Management Strategy.

This strategy is the first of its kind covering the whole of City and County of Swansea. With ever improving knowledge, additional legislation and budgetary constraints it will be necessary to update and review the strategy and its associated action plan on a six yearly cycle. This review will be overseen by the City and County Flood Risk Management Partnership and will be available for scrutiny by City and County of Swansea Councillors.

The minimum statutory content of Local Strategies is set out in Section 10 of the Flood and Water Management Act 2010. Local Strategies must set out the objectives and measures for managing local flood risks along with the timescales and costs of implementation.

The main aim of the strategy is to reduce the risk of flooding within the City and County of Swansea and to comply with the National Objectives as set out by Welsh Government. The Strategy outlines the legislation concerning flood risk, the nature of flood risk, the objectives of managing flood risk and the range of actions that can be undertaken. It also provides information on available funding streams and recognises the need to apply flood risk management approaches to manage existing and future flood risks within the administrative boundary.
There has been a shift from the traditional approach of constructing defences to a risk based management of flood risk. Simply constructing bigger and

better defences is not always a sustainable option; the location of defences can have a detrimental affect on the wider environment and they are becoming more expensive to construct and maintain, restricting the number of interventions that are possible.

Although, this Strategy does not identify specific projects to commence in the future, it sets strategic actions and principles to aid decision making for flood alleviation schemes in the future. In the coming years there will be significant changes to the planning system and the flood insurance sector and there will be developments in funding and design of flood alleviation schemes. LLFAs will become responsible for both approving the design of the Sustainable Drainage Systems (SuDS) and adopting and maintaining the finished systems. The consenting of works in ordinary watercourses has also transferred to LLFAs from the Environment Agency. In addition to this, it is likely that there will be improvements in flood warning, prediction and knowledge of areas most at risk. Revisions or supplements to this Strategy may be required prior to the next scheduled as a result.

In summary, this Strategy adopts a holistic approach to flood risk management, taking into account the geographical, socio-economic and political factors. It enables effective management of local flooding by improving collaboration and co-operation between key stakeholders. It will improve communication and present information to the public in regards to the risk of flooding and what can be done, regardless of its cause (from main rivers or local flooding).

In combination with the National Strategy, the Local Strategies will encourage more effective risk management by enabling people, communities, business and the public sector to work together to:

- ensure a clear understanding of the risks of flooding and erosion, nationally and locally, so that investment in risk management can be prioritised more effectively;
- set out clear and consistent plans for risk management so that communities and businesses can make informed decisions about the management of residual risk;
- encourage innovative land management of flood and coastal erosion risks, taking account of the needs of communities and the environment;
- for links between the local flood risk management strategy and local spatial planning;
- ensure that emergency plans and responses to flood incidents are effective and that communities are able to respond properly to flood warnings; and
- to help communities to recover more quickly and effectively after incidents.

2.0 Legislation

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

The Flood Risk Regulations (2009) came into force in December 2009 and transpose the EU Floods Directive into law for England and Wales. The Flood Risk Regulations required a Preliminary Flood Risk Assessment to be produced which identifies areas where significant numbers of people are at risk of surface, ground and ordinary water course flooding. Where such areas exist the regulations also require the production of hazard and risk maps and flood management plans. Within the City and County of Swansea, there was one indicative flood risk area identified which requires further flood mapping assessment by 2013 in order to comply with the second stage of regulations. The Preliminary Flood Risk Assessment for City and County of Swansea was completed in June 2011 and will be reviewed in 2016.

Under the Flood Risk Regulations 2009, the City and County of Swansea is required: to identify and assess the risk of flooding in the county borough; to prepare flood hazard and flood risk maps; to prepare flood risk management plans for each flood risk area, and to ensure these are all regularly updated to take into account climate change. The following table sets out the required timetable for the respective delivery. The first two elements of the work are covered by the completed Preliminary Flood Risk Assessment.

TARGET	**ACTIVITY**	**OBJECTIVE**
22nd June 2011	Prepare Preliminary Assessment Report.	The emphasis in the PFRA is on local flood risk from surface water, groundwater, and ordinary watercourses
22nd June 2011	On the basis of the PFRA, identify Flood Risk Areas.	Flood Risk Areas are areas of significant risk identified on the basis of the findings of the PFRA, national criteria set by the UK Government Secretary of State and guidance provided by the Environment Agency

22nd June 2013	Prepare **Flood Hazard Maps** and **Flood Risk Maps** for each Flood Risk Area	Used to identify the level of hazard and risk of flooding within each Flood Risk Area to inform Flood Risk Management Plans.
22nd June 2015	Prepare **Flood Risk Management Plans** for each Flood Risk Area.	Plans setting out risk management objectives and strategies for each Flood Risk Area.

The Preliminary Flood Risk Assessment is a high level screening exercise that brings together, from a number of sources, easily available information on past and potential flooding to enable judgments to be made about local flood risk. The assessment of potential flood risk was derived from national datasets produced by Defra but also with the benefit of additional information from other Flood Risk Management Authorities. The details of past flooding were obtained from a number of sources, but the process of analysing past flooding revealed some inadequacies in the collection of data on flooding incidents which will be addressed through this strategy. Only a small number of locations were identified in the Preliminary Assessment Report as having 'significant harmful consequences'.

The Flood and Water Management Act 2010 gained royal assent in April 2010 and provides legislation for the management of risks associated with flooding and coastal erosion. The Act reinforces the need to manage flooding holistically and in a sustainable manner. It places a number of new roles and responsibilities on City and County of Swansea, as 'Lead Local Flood Authority' (LLFA). The preparation of this Local Flood Risk Management Strategy is just one of the duties placed upon the Council.. Other responsibilities of the Council include:-

- Highways Authority
- Emergency Planning Authority
- SuDS Approval Body, when the appropriate legislation comes into force (expected April 2013)
- Planning Authority
- Historical and Natural environment responsibilities

As LLFA the City and County of Swansea was given a set of new responsibilities for coordinating the management of local flood risk including: -

- The preparation of local flood risk management strategies;
- A duty to comply with the National Strategy;
- To co-operate with other authorities, including sharing data;
- A duty to investigate all flooding within its area, insofar as a LLFA consider it necessary or appropriate;
- A duty to issue consents for works on ordinary watercourses in accordance with new legislation from 6th April 2012

- A duty to maintain a register of structures and features likely to affect flood risk; and
- A duty to contribute to sustainable development.

Along with these duties, each LLFA has a number of permissive powers, including: -

- Powers to request information;
- Powers to designate certain structures or features that affect flood or coastal erosion risk;
- Increased powers to undertake works to include broader risk management actions; and
- The ability to cause flooding or coastal erosion under certain conditions.

Flood Risk Management is affected by a range of guidance and legislation. Some of these include:

- The Climate Change Act (2008)
- The Conservation of Habitats and Species Regulations (2010)
- The Civil Contingencies Act (2004)
- Strategic Environmental Assessment (SEA) Directive (2001/42/EC)
- The Land Drainage Act (1991)
- The Water Framework Directive (2007)
- The Wildlife and Countryside Act (1981)
- Countryside and Rights of Way (CROW) Act (2000)
- The Public Health Act (1936)

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

3.0 Flood Risk Management Authorities

The Act states that the LFRMS must specify risk management authorities. 'Risk Management Authorities' are certain organisations which have responsibilities around flooding, both new ones from the Flood and Water Management Act and longstanding ones from previous legislation.

City and County of Swansea, as the Lead Local Flood Authority (LLFA), is responsible for leading the management of flood risk from local sources. This includes ordinary watercourses, surface water, ground water and situations where there is an interaction between these sources and main rivers or the sea. This is important in City and County of Swansea's case as it is a coastal authority. The Council also has a role in emergency planning and road drainage

There are a number of key organisations which are classified as Flood Risk Authorities and have an active role in managing flood and coastal erosion risks in Swansea.

The **Environment Agency Wales (EAW)** is responsible for managing flood risk from main rivers, reservoirs and the sea. The EAW also has a strategic overview role over all flood and coastal erosion risk management. It also has a key role in providing flood warnings to the public, protecting and improving the environment and promoting sustainable development.

Dŵr Cymru/Welsh Water is a water and sewerage company, responsible for the provision of foul and surface water sewerage across the County.

As **Highways Authority** the City and County of Swansea is responsible for managing flood risk on roads and highways within the County. Trunk roads including motorways however are maintained by the Trunk Roads Agency

Other Key stakeholders

Network Rail are riparian landowners of culverts crossing and serving the rail network and information relating to flood risk from these assets need to be shared with the Lead Local Flood Authority

The Rivers and Canal Trust are now responsible for the canal network located in the Authority's area and for protecting its own structures, some of which are flood defences.

The South Wales Trunk Road Agent (SWTRA) is an Agency working on behalf of the Transport and Strategic Regeneration division of the Welsh Government (WAG). It is responsible for Managing, Maintaining and Improving the strategic road network in South Wales

The City and County of Swansea, in conjunction with Neath Port Talbot County Borough Council, has formed the Joint Resilience Unit (JRU) to help discharge its responsibilities in respect of emergency planning. This includes ensuring that there is adequate preparation for flooding emergencies. In addition, as a Planning Authority, the Council must consider the effects of new developments, particularly on flood plains and where there may be issues in respect of flooding to highways.

3.1 Responsibility for flooding

As mentioned previously, flooding can come from various sources and under recent legislation the responsibility for managing the risk from these different sources falls to different Risk Management Authorities.

Overview of responsibility for flood risk management within Swansea

City and County of Swansea

- Surface water
- Groundwater
- Ordinary watercourse
- Highway Flooding

Environment Agency

- Main Rivers
- Sea
- Reservoirs

DCWW – Welsh Water

- Sewer Flooding
- Burst water mains

Other Key Stakeholders Network Rail/ British Waterways/Trunk Road Agency

- Culverts
- Canals
- Motorways

3.2 Responsibilities for Flood Risk Management

The Flood and Water Management Act 2010 identified certain organisations as ‘risk management authorities’ which have responsibilities relating to flooding under the Act and those responsibilities from earlier legislation

These organisations have all the following duties and powers:-

1. Duty to co-operate with other risk management authorities in the exercise of their flood and coastal erosion risk management functions, including sharing flood risk management data

2. Power to take on flood and coastal erosion functions from other risk management authorities when agreed by both sides.

3. Duty to comply with environmental legislation.

Co-operation between flood risk management authorities will take place through the City and County of Swansea Risk Management Partnership. Collaboration will be necessary on recording flood assets, assisting with flood investigations, and providing local knowledge to Sustainable Drainage System [SuDS] approval officers, regarding drainage applications for new development in the area, and sharing data and information to ensure public enquiries are answered quickly by the appropriate organisation.

3.3 Powers and Duties of City and County of Swansea as Lead Local Flood Authority

Under the terms of the Flood and Water Management Act 2010, the City and County of Swansea is responsible for what are termed 'local flood risks'. These include the risks of flooding from ordinary watercourses, surface runoff and ground water.

Local Authorities have always had certain responsibilities in relation to ordinary watercourses, and in practice most Local Authorities took the lead in dealing with surface water flooding incidents prior to the changes contained within the Flood and Water Management Act 2010. This is, however, the first time responsibility for the risks of flooding from surface runoff has been allocated to any body in law.

The Flood and Water Management Act 2010 places a number of statutory duties on The City and County of Swansea in their new role as LLFA including:

- the preparation of local flood risk management strategies
- a duty to comply with the National Strategy;
- to co-operate with other authorities, including sharing data;
- a duty to investigate all flooding within its area, insofar as a LLFA consider it necessary or appropriate
- a duty to maintain a register of structures and features likely to affect flood risk; and
- a duty to contribute to sustainable development.

In addition to these each LLFA 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;
- 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.

LLFA in Wales will also take on the role of the SuDS Adopting and Approving Body 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.

To enable the City and County of Swansea to implement its new roles and responsibilities in respect of local flood risk, certain functions previously held by the Environment Agency have been transferred. This included taking on the responsibility for consenting works on ordinary watercourses in April 2012. The table below outlines the Council's key new duties to comply with the Flood and Water Management Act.

Outlined below are the flood risk management roles and responsibilities of Lead Local Flood Authorities. The key areas where they have responsibilities can be identified as follows:

- Responsibilities under the Flood and Water Management Act 2010
- Responsibilities under the Land Drainage Act 1991
- Responsibilities as a Planning Authority
- Responsibilities for maintenance of public spaces
- Responsibilities as a coastal erosion risk management authority
- Responsibilities for emergency planning

3.4 Responsibilities under the Flood and Water Management Act 2010 are summarised in the Table below:-

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

3.4.1 Responsibilities for the preparation of Asset Register

The City and County of Swansea has a duty to maintain an Asset Register which identifies those assets which are important to Flood Risk Management and are considered to have an effect on flood risk.

Examples are a headwall on a watercourse which needs regular maintenance to prevent debris on the protection grids from blocking the watercourse, or an undersized culvert in a residential area, which may increase flood risk during high rainfall.

The Authority is required to ensure there are records of all significant assets available for use by risk management authorities and for inspection by the public at all reasonable times. It will take many years before this register is sufficiently comprehensive to be of real value in flood risk management. Progress is however being made to develop the Asset register initially by including all council owned assets.

The process will be developed over a number of years as more information is gathered and as the Authority investigates floods and the sources of flooding.

The Asset Register will identify responsibility of flood risk structures, which will assist in providing readily available information to the residents of the City and County of Swansea and will enable the Authority to contact the assets' owners when there are problems.

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

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

3.4.2 Power to designate flood risk management structures

The City and County of Swansea may designate features or structures that are privately owned and maintained but which make a contribution to the flood and coastal risk management of people and property at particular locations. There are four conditions that must be satisfied to enable a structure or feature (natural or manmade) to be designated. These are:

Condition 1 that the designating authority thinks the existence of the structure or feature affects a flood or coastal erosion (or both) risk

Condition 2 that the designating authority has flood or coastal erosion risk management functions in respect of the risk being affected

Condition 3 that the structure or feature is not already designated by another designating authority.

Condition 4 that the owner of the structure or feature is not a designating authority .

If an asset becomes 'designated' the owner cannot alter or remove it without first consulting and obtain an agreement from the Lead Local Flood Authority. The designation of structures will depend upon the critical importance of such structure with regard to flood risk management and will be undertaken at the discretion of this Authority.

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3.4.3 Responsibility to investigate and record flood incidents

The City and County of Swansea will record flooding incidents which will provide an overall assessment on the areas prone to flooding. The decision to investigate flooding incidents will depend on the seriousness of the consequences of such flooding with the understanding that not all flooding incidents will be investigated. The criteria for investigation:-

- Risk to life as a result of flooding
- Internal flooding to property and business
- Where critical infrastructure (schools, hospitals, power stations etc) is affected
- When Major transport routes are flooded which could affect local communities

The aim of the flood investigation report is to provide essential information on the source of the flooding, ownership details on the assets which have caused the flooding and will lead into the development of solutions for future planning. The investigation will not guarantee that the flooding can be solved and cannot force the provision of a solution.

However the process will inform flood plans by 2015, so that clear objectives and targets can be set for the delivery of flood risk management schemes in a transparent way.

3.4.4 Responsibility to prepare a Local Strategy for Flood Risk Management

The Local Flood Risk Management Strategy will be a statutory document; which will affect the activities of all flood risk management authorities – i.e. local authorities, the Environmental Agency, highways authorities and Welsh Water and other risk management authorities.

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

The City and County of Swansea Flood Risk Management Partnership is made up of key management authorities, is fundamental to the delivery of a

co-ordinated and consistent approach to local flood risk management and aims to work alongside communities to make a real difference.

3.4.5 In performing the SuDS Approval Body (SAB) role

The Flood and Water Management Act 2010 assigns City and County of Swansea the role of a SuDS Approval Body (SAB) which must approve all Sustainable Drainage Schemes for developments prior to granting of planning permission. The Authority will effectively be required to adopt all SuDS Schemes which serve more than one property.

The implementation of Sustainable Drainage Systems (SuDS) will be an effective tool in limiting surface water from developed areas and will ensure that drainage discharge rates will be similar to 'greenfield run-off' rates for post development sites. This will be a fundamental mechanism in controlling flows so that downstream areas are not affected by increased flood risk as the result of those new developments. They also provide an opportunity to ensure that water quality and amenity are considered with the same importance as managing volumes of water. In this respect, sustainability and consideration of biodiversity and natural habitat issues can become an integral part of the design and development process.

The anticipated commencement date for this part of the Act is April 2013 at which time Lead Local Flood Authorities will commence the SAB role. LLFAs will use national guidelines and processes to approve and to adopt sustainable drainage systems and will be an integrated part of the Planning Process.

3.4.6 Responsibility under the Land Drainage Act

The City and County of Swansea have discretionary powers under the Land Drainage Act. These powers are permissive powers, which can be employed if considered necessary, though there is no obligation to use them. These powers include:

- Permissive powers to maintain or improve existing works or to construct new works in order to help mitigate the effects of flooding.

- Permissive powers to serve notice requiring the undertaking of necessary works. Failure to comply with such a notice may result in the Council undertaking the work and recharging the owner the costs of so doing

- Power to require works to maintain flow of watercourses. Under section 26, before exercising this power, the local authority shall, according to whether or not the watercourse or part of it is in an internal drainage district, notify the Environment Agency.

3.4.7 Consenting and Enforcement of works undertaken on Ordinary Watercourses

From 6 April 2012 the City and County became responsible for the issuing of Ordinary Watercourse consents for works to ordinary watercourses (streams and ditches both natural and man made and culverts etc) or taking enforcement action for any breaches. Any works which are deemed to affect the natural flow will need to be consented by the Authority.

City and County of Swansea will take a risk-based approach to enforcement where unconsented works have been carried out on ordinary watercourses. The purpose of ordinary watercourse regulation is to control certain activities that might have an adverse flooding impact

3.4.8 Responsibility to Emergency Planning

Emergency planning in City and County of Swansea is undertaken by the Joint Resilience Unit (JRU), involving the City & County of Swansea and Neath Port Talbot County Borough Council. The JRU works closely with the emergency services and other relevant bodies in the event of flood emergencies, assisting as appropriate in evacuation, rescue and recovery after a flood.

It supports the efficient delivery of civil preparedness and business continuity services. The unit, with staff based in the Quays, Neath Port Talbot County Borough Council, provides subject matter expertise to enable both councils to meet their statutory responsibilities:

- Assess risks in each administrative boundary 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.
- Maintain system for warning, informing and advising public in event of an emergency.
- Share information with other responders.
- Co-operate with other emergency responders to enhance co-operation and efficiency.
- Provide advice and assistance to businesses and voluntary organisations about business continuity management.

The Joint Resilience Unit will co-ordinate the cross-cutting Local Authority response in the first instance and liaise with partner agencies. Responsibilities will be implemented as described in City & County of Swansea's Major Incident Plan and controlled and co-ordinated through the Emergency Control Centre Arrangements, The City and County of Swansea will provide:-

- Representatives to support Police arrangements for control and co-ordination of the response, ie, to multi-agency Bronze, Silver & Gold controls.
- Rest centres and emergency care for those who have been evacuated from their homes, including provision of temporary accommodation their feeding and welfare.
- Traffic management – closure of roads affected by flooding or damaged by flooding. Erection of warning and diversion signs as appropriate.
- Information services for liaison with the media regarding the local authority response and for information to the public and relatives/friends of evacuees.
- Control and co-ordination of the various elements of Local Authority services response to the flood incident, including offers of assistance from the voluntary sector, through the Joint Resilience Unit or activation of CCS's Emergency Control Centre at the Civic Centre, if required.
- In the event that roads not managed by the South Wales Trunk Roads Agency are flooded, arrange to release the floodwater if it is possible and safe to do so. Where this is not possible warning signs will be erected.

3.4.9 Responsibility as Highways Authority

Under the Highways Act 1980, the Highways Authority has a duty to maintain the highway. This includes ensuring that highway drainage systems are clear and that blockages on the highway are cleared, where reasonably practicable. As part of this duty, roads are regularly inspected and maintained.

Highway Authorities have certain powers to deliver works

- Highways Authorities are able to adopt SuDS that serve the highways.
- The highway authority can deliver works that they consider necessary to protect the highway from flooding. These can be on the highway or on land which has been acquired by the highway authority in the exercise of highway land acquisition powers for that purpose.
- Highway Authorities may divert parts of a watercourse or carry out any other works on any form of watercourse if it is necessary for the construction, improvement or alteration of the highway or provides a new means of access to any premises from a highway.

In the event of an emergency or major flooding incident the City and County of Swansea will aim to provide assistance in management of the transportation network to restore the flow of traffic in the event of an evacuation or away from the area of an incident. This includes providing equipment such as barriers, cones and signs and setting up and marking route diversions (service provided by Contractors in conjunction with the Police) and changing traffic signal controls to improve the flow of traffic

The City and County of Swansea will use established media contacts to keep staff and the public across the County informed on travel related matters.

The City and County of Swansea will inspect, repair or clear the highway network through the provision of staff, materials and equipment sourced through contractors.

3.4.10 Responsibilities as Planning Authority

The Authority's Planning function affects Flood Risk Management in three key ways:

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

The Planning and Compulsory Purchase Act 2004 requires Local Planning Authorities (LPAs) to produce a Local Development Plan (LDPs) that will replace the Unitary Development Plan. The Act requires all LDPs to undergo a Sustainability Appraisal, which assists LPAs in ensuring that their policies fulfil the principles of sustainability. Strategic Flood Consequence Assessments should be used to inform the Sustainability Appraisal and the LDP process, to ensure that proposed developments are steered towards the lowest flood risk zones and will not create a legacy of problems for future generations.

LDPs must consider flood and coastal erosion risks. Planning Policy Wales (PPW) provides national planning guidance , including on minimising and managing flood risk.PPW is supplemented with Technical Advice Notes(Tans), of which TAN15: Development and Flood Risk provides guidance in relation to flooding.LPAs should take into account the guidance provided in PPW and TAN15 when preparing their LDPs and when assessing individual planning applications. A precautionary approach is advocated. TAN15 utilises Development Advice Maps (DAMS) to identify where and when flood risk issues should be taken into account within the development planning process. The DAMS take into account of fluvial and tidal flooding within the City and County of Swansea.

Local Planning Authorities should develop a Local Development Plan that carefully considers flood and coastal erosion risks. This is a statutory planning document which planners can then use to identify inappropriate development in the floodplain. Consequently the LDP should embed the Strategic Flood Consequence Assessment (SFCA), the Preliminary Flood Risk Assessment and Surface Water Management Plan (where applicable). This should allow the LDF to assess and record the flood risks for new developments and steer development to areas of lowest flood risk. Equally in maritime districts, there is

requirement to assess risks from coastal erosion and permanent tidal inundation and where appropriate designate coastal risk management zones where permanent development will not be permitted.

The Planning Authority has a key role in encouraging the use of Sustainable Drainage Systems, such as rainwater harvesting systems, and will be required to work closely with the SuDS Approving Body to ensure that planning applications and drainage application are received, processed and approved in accordance with the new regulations.

3.4.11 Responsibility with Public Open Spaces

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

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

3.4.12 Responsibility as Coastal Erosion Risk Management Authority

The City and County of Swansea are one of the coastal erosion risk management authorities. Responsibilities include:-
:-

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

3.4.13 Contribution to Sustainable Development

In exercising a flood or coastal erosion risk management function, the Authority will aim to make a contribution towards the achievement of sustainable development. Sustainable development is about making the best

use of resources to improve our quality of life without damaging the resources or quality of life for future generations.

This requirement is provided under Section 27 of the Act, which also provides that Welsh Ministers must issue guidance providing a definition of what 'sustainable development' means and how LLFA should discharge this duty.

This guidance will be issued directly to LLFA within Wales and is also available from the Welsh Government website. The Welsh Government is one of only a few governments to have a legal duty to secure sustainable development and so have made this their central organising principle.
The Welsh Government aims to move towards sustainable development by:

- improving the economy, and social and environmental wellbeing of people and communities - achieving a better quality of life now and for future generations;
- promoting fair and safe communities and equal opportunities; and
- supporting natural and cultural environments and respecting their limits - by using only a fair share of resources and sustaining the cultural legacy.

3.5 Responsibilities of other Flood Risk Management Authorities

Powers and Responsibilities of the Environment Agency

Historically the Environment Agency has led on the management of the risks of flooding from main rivers and the sea. However, as a consequence of the Flood and Water Management Act 2010 certain changes have been made to the role and remit of the Environment Agency. In addition to flooding from rivers, sea and reservoirs, the Environment Agency has new operational responsibilities in relation to coastal erosion and a wider oversight role for all flood and coastal erosion risk management in Wales.

This change means that the Environment Agency has a dual role:

- operational responsibilities for flooding from main rivers, the sea and coastal erosion;
- oversight responsibilities in relation to all flood and coastal erosion risk management in Wales.
-

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

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

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

Local Operational Role

The Environment Agency's Local Operational Role includes having a role in incident planning and managing flooding from main rivers, reservoirs and the sea.

Main Rivers

Main Rivers are watercourses shown on the Environment Agency's statutory Main River map. The Environment Agency has permissive powers to carry out works of maintenance and improvement on Main Rivers. This can include any structure or appliance for controlling or regulating flow of water into or out of the channel. The overall responsibility for maintenance of Main Rivers, however, lies with the riparian owner.
The Environment Agency can also bring forward flood defence schemes through the Regional Flood and Coastal Committees, and it will work with lead local flood authorities and local communities to shape schemes which respond to local priorities.

Coastal Flooding

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

Reservoirs

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

Coastal Erosion Risk Management Authority

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

Emergency Planning

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

Planning process

The Environment Agency has an active role in being a statutory consultee throughout the planning process to ensure new developments have due regard to flood risk and do not cause unnecessary environmental damage.

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

Natural Resources Wales

The Welsh Government is currently reviewing the role of the environmental public bodies operating in Wales; primarily the **Environment Agency**, the Countryside Council for Wales and the Forestry Commission. It is proposed that these bodies, insofar as they operate in Wales, are merged and that a Natural Resources for Wales is established.

This Single Body would take on the functions of these three organisations, including all of the responsibilities of the Environment Agency in relation to flood and coastal erosion risk management in Wales, and it would undertake all of the functions described within the National Strategy.

Responsibilities of Water and Sewerage Companies

Dwr Cymru / Welsh Water are responsible not only for the provision of water, 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 and sewerage systems, which can include sewer flooding, burst pipes or water mains or floods caused by system failures.

No changes have been made to the operational arrangements for water and sewerage companies in respect of flood risk. The majority of flooding is reported into 24 hour operational call centre on 0800 0853968. The call centre agent will check that the flooding incident involves their asset.

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
- co-operation with other Authorities, including sharing data.

Water and sewerage companies often hold valuable information which could greatly aid the understanding of flood risks faced by communities across Wales. Water and sewerage companies will also need to contribute to the preparation of the Local Strategies prepared by LLFAs.

All water and sewerage companies maintain a register of properties at risk of flooding due to a hydraulic overload in the sewerage network, known as the (DG2 – DG9) used to monitor company performance.

As part of their obligation to Ofwat, water and sewage companies are required to undertake capacity improvements to alleviate sewer flooding problems on the DG5 register during the current Asset Management Period (2010-15) with priority being given to more frequent internal flooding problems. It is important to identify solutions that are robust and cost beneficial.

Under current legislation, foul and surface water drainage from new developments can be connected to public sewers and a water company has no powers to prevent new connections to its network, even if it could cause flooding to customers. Welsh Water does comment on planning applications but they are not considered a statutory consultee.

This will change once the relevant section of the Flood and Water Management Act is commenced, when a 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 Welsh Water will be a Statutory Consultee. This will only apply to surface water connections to their

assets, with the right to connect foul discharge still applying.

Other Key Stakeholders

Responsibilities of Mid Wales Fire and Rescue Service

The primary response:-

- Life saving through search and rescue.
- Rendering humanitarian services.
- Safety management within the inner cordon (rescue zone).

May also assist with:-

- Salvage and damage control.
- The provision and use of specialist equipment and personnel, e.g. high velocity pumps, rescue equipment, inshore boats and lighting

Responsibility of Riparian Ownership

Landowners, householders and businesses whose property is adjacent to a river or stream or ditch are likely to be **riparian owners** with responsibilities. If a property backs out onto a river or stream then the property owner is likely to be a riparian owner, owning the land up to the centre of the watercourse. The Land Registry details should confirm this.

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

Responsibilities of Communities

Flooding events can affect whole communities, with households not suffering from internal flooding still potentially being trapped as roads are blocked. They may also offer support or provide shelter to neighbours who have suffered from flooding.

Communities know better than anyone the level of flood risk that they face and can make important contributions to helping manage the levels of flood risk. Local Councillors and Community Councillors have a key role in helping the community councils and communities understand their role and ensuring affected communities are properly represented in discussions about local activities

Property Owners and Residents

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

- checking whether their household is at risk from flooding from the river, coast or local flood sources
- ensuring that preparations have been made in the event of a flood
- taking 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 flood guards
- taking measures to make sure the house is resilient to flooding so that if it does occur it does not cause too much damage
- where possible, taking out flood insurance.

Information on whether households are at risk is provided by the Environment Agency.

4.0 Assessment of Local Flood Risk

Unlike areas of the United Kingdom which have experienced significant flooding events such as the Gloucestershire 2007 Summer Floods, there have been few recent major flooding events caused by fluvial or surface water. This does not mean severe incidents will never occur. Localised floods will continue to occur in many areas of the county under severe weather conditions and climate change is likely to make them more frequent and more severe. The aim is to try to predict and reduce the risks where possible and have emergency plans in place to deal with the exceptionally severe event. Unlike a tidal surge, flooding caused by localised rainfall is much harder to predict.

An early task will be to review the historic flooding information held to identify locations where flood mitigation measures could be implemented. Property flood protection such as flood doors and air brick covers can, in appropriate situations, provide very effective resistance to flooding at minimal cost

4.1 Historical Flooding

The history of flooding in the City and County of Swansea indicates the following sources:-

a) Surface water flooding
b) Groundwater Flooding
c) Sewer Flooding
d) Ordinary Watercourse flooding
e) Interaction with Main Rivers and Sea

While there is good data on past river and sea floods, the information on historical surface water is limited. Available information was collected as part the Authority's Preliminary Flood Risk Assessment process. Records of flooding from these sources provide the following:-

a) Surface Water Flooding

Surface water flooding (also known as pluvial flooding), occurs when heavy rainfall exceeds the capacity of local drainage networks and water flows across the ground. It is usually associated with flash flooding when high intensity rainfall causes insufficient capacity in the local drainage networks and cannot cope with the resultant high flows. This can be exacerbated if ground conditions are worsened by continuous rainfall and resulting in saturated ground conditions. Information on surface water flooding was captured through the day to day recording system held by the Streetscene service.

b) Groundwater Flooding

Groundwater flooding occurs when the level of groundwater increases and rises above the level of the ground causing flooding. It is dependant on the underlying geology of an area and occurs following heavy rainfall.

c) Sewer Flooding

Modern sewer systems are typically designed to accommodate storm events with a 3.3% annual probability (1 in 30 year return period) and are normally separated into foul and surface water systems. Older sewer systems were designed to convey both foul and surface water flows in combination and these systems were generally designed to a lesser standard. Consequently, it is expected that sewer flooding will occur in some areas of the City and County of Swansea during a storm event which is less severe than a 1 in 30 year event.

Excess surface water entering the drainage network can result in significant harmful consequences and DCWW, the managing operator for the public sewers in the area, was approached in order to provide information on significant flooding events. Registers which record internal flooding to properties (DG5 registers) and details of sewers which have contributed to serious external flooding have been provided and assessed accordingly. There were a total 317 of sewer flooding events which have been recorded by DCWW over the past decade.

Much of Swansea is serviced by a combined foul/storm drainage system except rural areas of Gower and Mawr, which are serviced in the main by septic tanks.

DCWW has declined to accept storm water from new developments and redevelopment areas in the recent past because the combined sewer networks are close to capacity. The Council, following national planning guidance and technical advice, wishes to encourage the use of Sustainable Drainage Systems (SuDs) in all new developments where suitable.

Interaction with Main Rivers and the Sea

There is insufficient historical flooding data available to draw definitive conclusions at this stage. The main areas where there is possibility of interaction with ordinary watercourses are on the low lying areas around the Swansea Bay area on the Southern Boundary, and Crofty to Pontardulais on the Northern boundary.

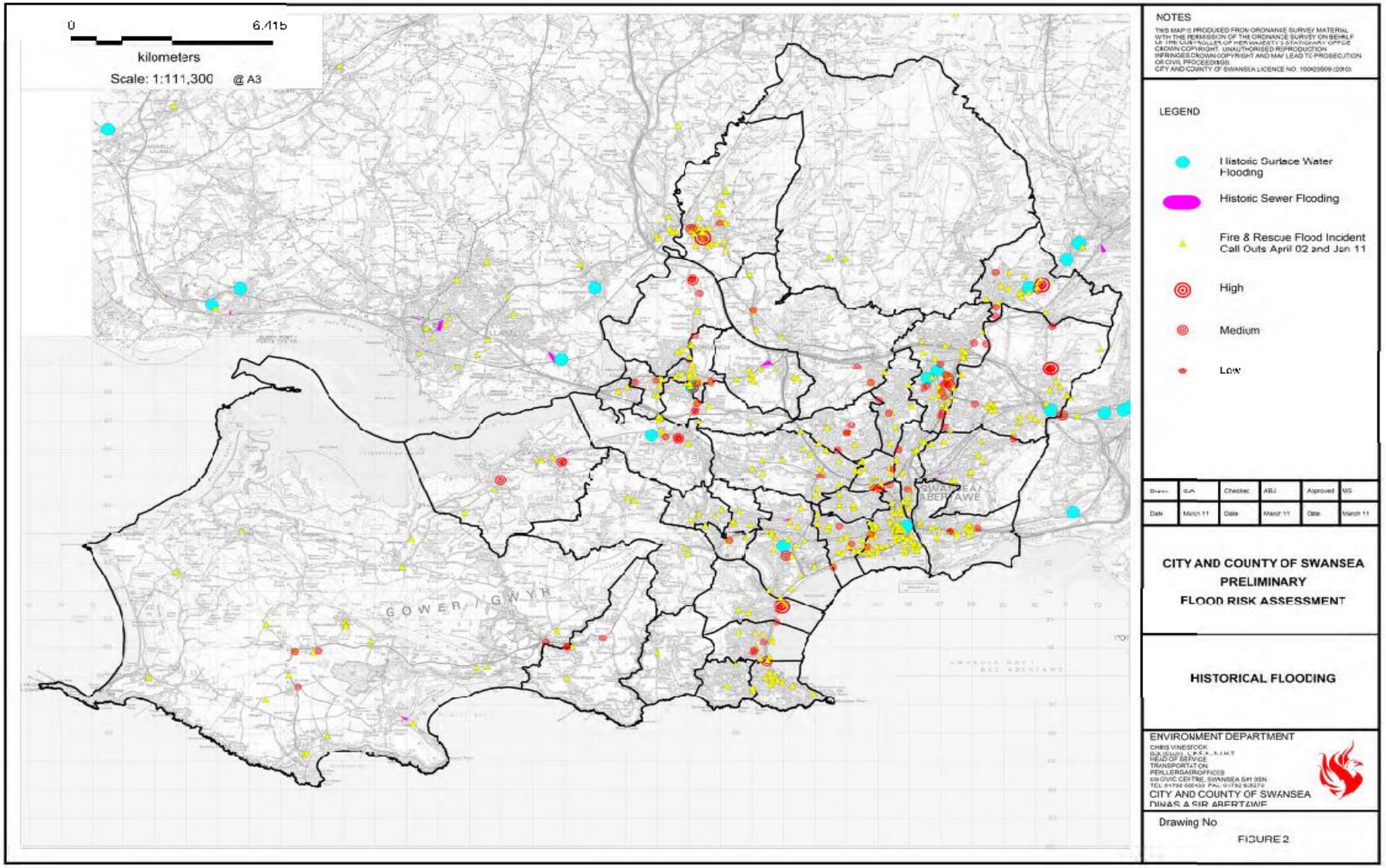
Relevant information on past flooding within the County has been obtained from the following:-

- Environment Agency
- Mid Wales and Fire Rescue Services
- Police
- Joint Resilience Unit
- Community Councils
- Welsh Government
- Preliminary Flood Risk assessment

Flood records for the whole City and County of Swansea area were collected from the data sources detailed above. The Environment Agency provided information showing locations of historic flooding across the study area. This data, combined with that from highway drainage records of historical flood events and flooding ‘hotspots’, was collated and a summary map produced. The locations of the past flood events is illustrated on the map provided as Figure 1.

The flooding events have been categorised into high, medium or low depending on the level of impact to the local community and frequency of events. The flood incidents can be attributed to a range of sources, and in many cases the source of flooding was unknown or not recorded.

Figure 1 – Map to show Past Flooding Events



4.2 Potential Flood Risk

The objectives of this local strategy are to predict and reduce the risks where possible and to have emergency plans in place to deal with exceptionally severe flooding events. Unlike a tidal surge, flooding caused by localised rainfall is much harder to predict and as yet there are no adequate warnings available to allow evacuation of an area at risk from this sort of event.

It will be important to be able to consider the relative significance of incidents of flooding on a county-wide basis and, alongside this strategy, a flood incident reporting process is being set up. This should permit a better understanding of the main problems and influence the focus of future interventions.

The Preliminary Flood Risk Assessment (PFRA) was carried out by City and County of Swansea Council in accordance with its duties and obligations under the Flood Risk Regulations 2009. The PFRA identified key areas in Swansea where the potential risk of surface water flooding is thought to be greatest.

In terms of predicted flooding, the Authority has accepted the National Surface Water Datasets provided by Environment Agency Wales (EAW) to be the most representative surface water information available to the Authority. The Flood Maps for Surface Water correlate well with local information, indicating that it is suitable to use.

The EAW published a map indicating the Areas Susceptible to Surface Water Flooding (ASTSWF) in 2009, showing flooding typically associated with areas of lower ground, which coincides in many areas with the larger watercourses. There are significant areas potentially susceptible to surface water flooding in the Tawe corridor, such as Morriston and Llansamlet.

Other areas susceptible to flooding are the areas adjacent to the River Loughor and the River Lliw/Llan in and around Pontarddulais, Gowerton and Gorseinon, areas in the southern part of Swansea, such as Blackpill, Sketty, Brynmill, St Helens and the dock areas as well the Crymlyn Bog nature reserve to the north of the docks.

The perceived flood risk is defined as any flood that could potentially occur in the future, which includes predicted floods extrapolated from current conditions, in addition to those with an allowance from climatic change where appropriate. The assessment takes into account the following factors:-

- Topography
- Location of Ordinary Watercourse
- Location of Flood Plains
- Characteristics of Watercourse

- Effectiveness of previous Flood Alleviation schemes
- Location of population areas
- Areas where economic activity exists
- The current and predicted impact of long term developments that might affect the occurrence or significance of flooding such as proposals for future development.

Future Flooding

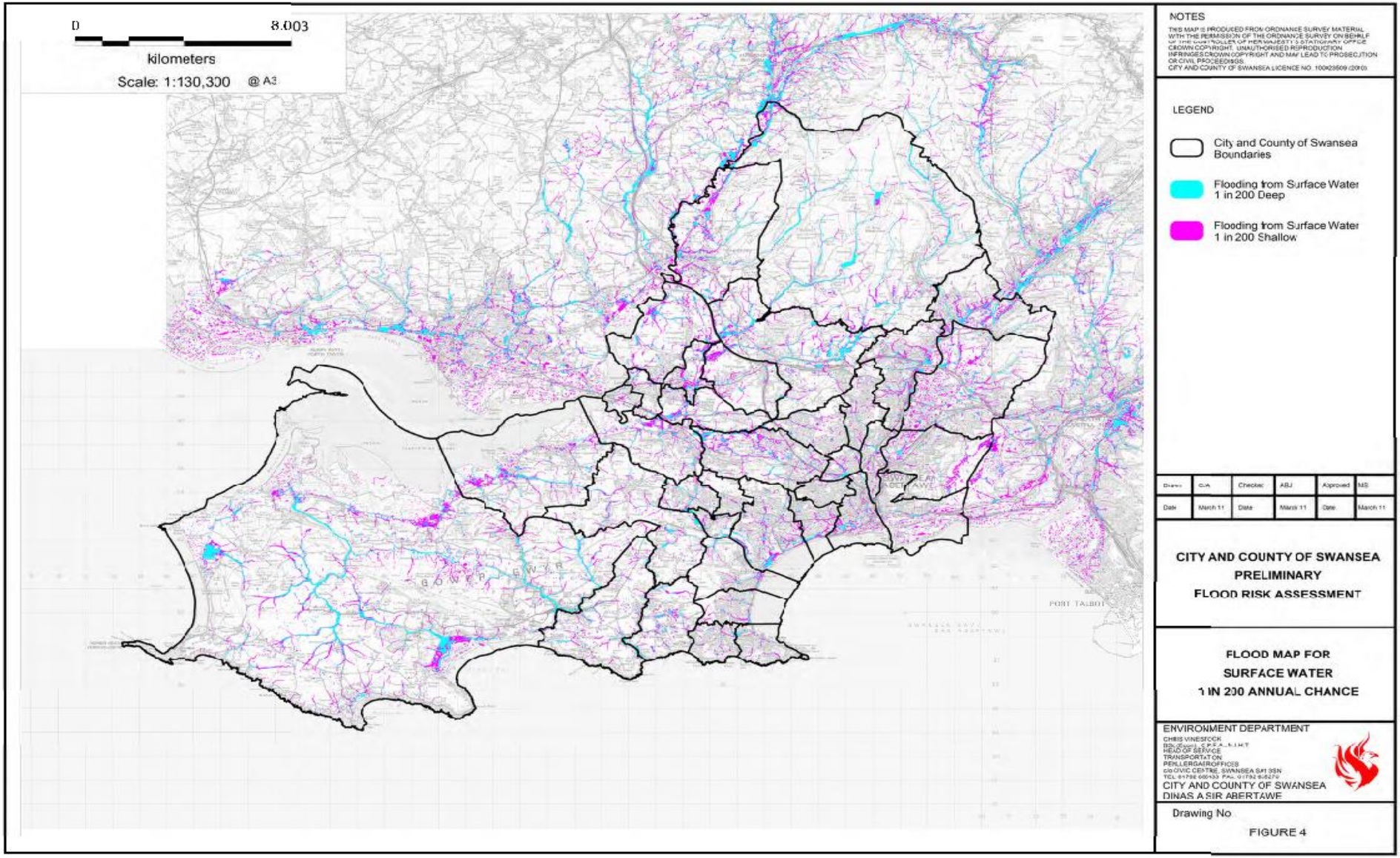
Based on current information which was supplied from national datasets the Authority has nearly 4589 properties predicted to be affected from surface water flooding during extreme rainfall events matching a 1 in 200 year rainfall event or a rainfall event with a 0.5percent chance of happening in any given year. This risk is spread across the City and County of Swansea (see Figure 2 below).

The Preliminary Flood Risk Assessment (PFRA) was prepared to satisfy obligations under the Flood Risk Regulations 2009. This work identified key areas in Swansea where the potential risk of surface water flooding.

Extract from the City and County of Swansea PFRA :-

'Potential flood risk has been identified primarily from national sources. The national sources include a number of different datasets which have been used in the past but the most up to date information to hand is contained in the Flood Map for Surface Water, the second generation in national surface water flood mapping. The Flood Map for Surface Water ***Fig.2*** *gives an indication of the areas where surface water would be expected to flow or pond during two different rainfall events 1 in 200 annual chance of occurring and includes a national allowance for drainage capacity in urban areas. The urban underground drainage system would be expected to be removing a proportion of rain falling thus reducing flood volumes apparent on the ground surface. This dataset has been used as the 'locally agreed surface water information' defined in the PFRA guidance document.*

Figure 2 Surface water Flood Map for Swansea



In order to help prioritise areas where the consequences of flooding are greatest the Environment Agency provided a Flood Map for Surface Water Flooding, which identified individual 1km squares where there is a risk of flooding and where flooding would affect:

- More than 200 people; or
- More than 1 Critical Service; or
- More than 20 Non-Residential Properties

This exercise identifies 1km squares where there is a risk of flooding (30cm deep water at a 1 in 200 annual probability rainfall) and where the criteria above are met. This provides data which can be used to determine priority and guide resource allocation. Within Swansea where a cluster of the blue grid squares forms an area where flood risk is most concentrated and over 5000 people are affected the area is defined as an Indicative Flood Risk Area Effectively, the City and County of Swansea is one of the eight Authorities in Wales which has been designated has having a Flood Risk Area which requires further assessment.

It is intended that flood risk and hazards maps will be produced for these areas by 2013. These will inform local actions and plans to mitigate the consequences of flooding in these areas.

Potential for Groundwater Flooding

The risk of groundwater flooding within much of South Wales is greatest in areas with significant coal mining. However, the majority of the former coal mining areas within the City and County of Swansea are understood to be fully recovered and therefore are not considered to present a significant risk of flooding.

Fig 3 City and County of Swansea Surface Water Risk Map

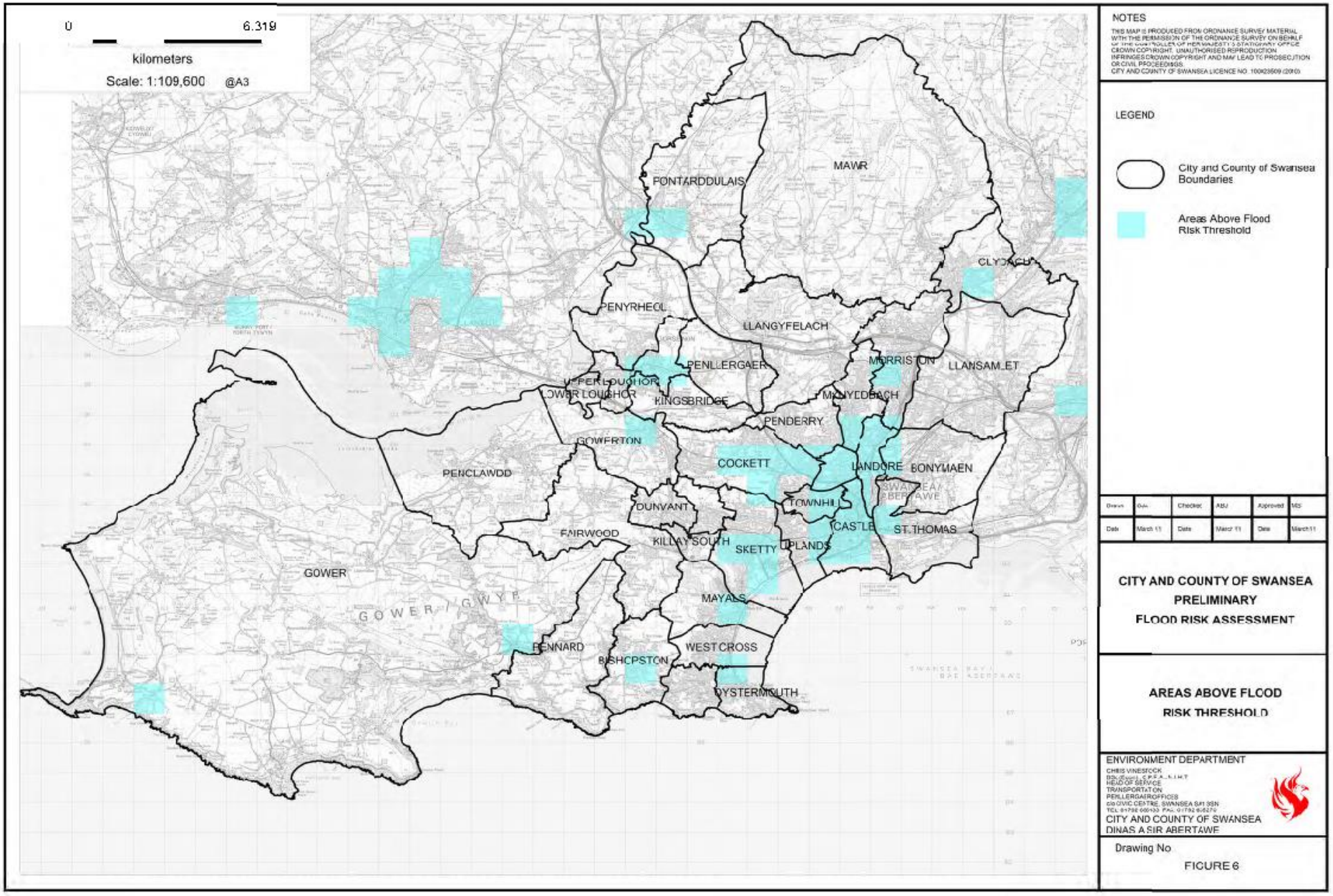
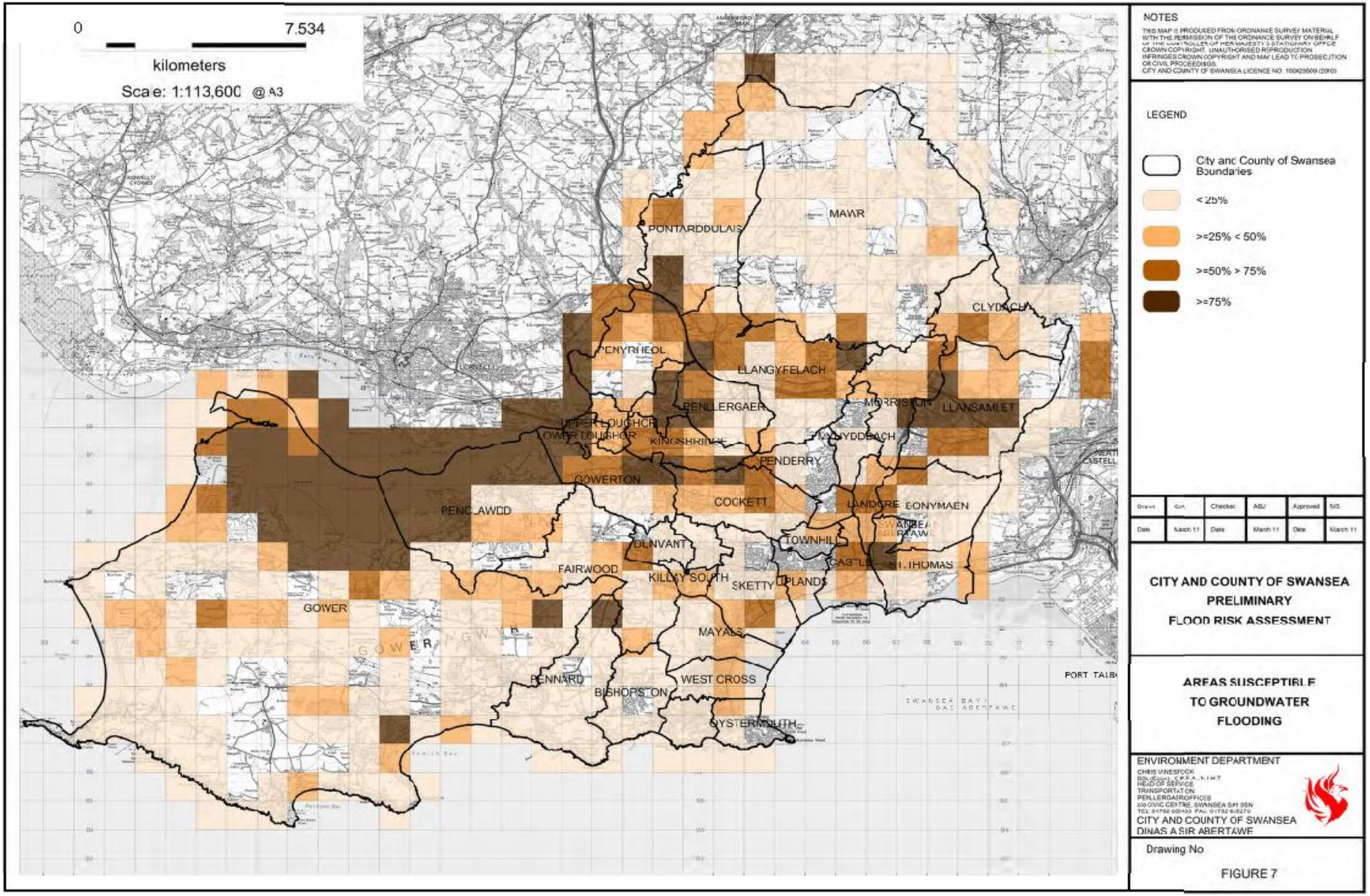


Fig. 4 Potential of Groundwater Flooding



4.3 Interaction actions between different sources of flooding

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

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

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

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

Potential flooding sources and responsible organisations

Flooding Type	Description	Responsible Authority
Coastal flooding	Coastal flooding – Tidal Waters	Environment Agency Wales
Ordinary watercourses e.g. streams and ditches	Local, generally smaller watercourses	Riparian owners
Main rivers	Principal watercourses and strategic smaller watercourses	Environment Agency Wales
Reservoirs	Large water pounds represent a potential flood risk	Environment Agency Wales
Surface water flooding (Also known as pluvial flooding)	High intensity rainfall gives rise to overland flow of surface water which can pond in low lying areas giving rise to flooding.	City and County of Swansea

Sewer flooding e.g. public and previously classified private sewer systems	The public sewer system has a finite capacity and at times of heavy rainfall surface water entering designated surface water sewers, combined sewers (ones which receive foul and surface water).	Dwr Cymru

4.4 Prioritisation of Areas across the Authority where Resources will be focused

Each flood risk management authority has resources to manage the flood risk. These resources are limited so it is essential that all possible resources and their locations are recorded and the availability monitored.

The knowledge of potential and known flood risk areas is essential in the prioritisation of resources, as well as the logistical difficulties afforded by flooded areas.

Planned responses have been developed for lesser flooding events. In the event of a major incident all resources will be managed by the Joint Resilience Unit.

Areas where flooding is life threatening will receive the greater priority. Taken into account will be the availability of resources from flood risk management partners who are aware of their responsibilities and the level of risk they face.

Each flooding incident is to be entered into the Incident Database based on the ECINSPIRE Directive 2007/2/EC. To ensure adherence to the principles contained in this Directive of a co-ordinated approach to sharing information, the LLFA will take the lead role with the flood risk management partners. The Directive sets out a common approach to recording and disseminating such information. The information will include listings on a geographical basis (this may be Community Council or Ward-based) and categorised against flooding sources together with all relevant information on the chronology, causes, consequences, costs, the existence of extenuating circumstances and options to resolve the problem together with associated costs.

As it is not feasible to look in detail at every potential flooding location straight away, a preliminary sift of information on each incident should be undertaken and those thought worthy of further consideration should be subject to a Preliminary Flood Study. In addition to the information required for flood incident reporting, an outline cost benefit analysis (COBA) on each likely solution would enable a list of priorities to be established and decisions made on projects to proceed to Project Appraisal Report Stage, or retention within a listing of non-priority projects.

A study of potential projects may reveal geographic clusters of projects, where interventions will derive the maximum benefit in terms of overall flood risk reduction. In this case, and in order to help prioritise areas where the consequences of flooding are greatest, the information from the Flood Map for Surface Water can be applied.

A programme of works can then be developed in line with available financial and manpower resources.

The resources to manage flood risk are limited and it is therefore necessary to prioritise. Locations exhibiting flooding clusters in the Surface Water Flood Risk Map (Figure 3) provide one indication of priority, though there are other key factors which will have influence resource allocation:-

Population concentration - the main aim of the strategy is to reduce flood risk for the greatest number of CCS residents and to also take into consideration the impacts it has to the most vulnerable.

Proposed development activity - this will give rise to the consideration of drainage arrangements/opportunities in particular areas which might offer a way of reducing existing flood risks.

Locations for capital investment - any capital project might offer opportunities for flood risk reduction through modification of construction proposals. Conversely, where specific flood defence investment is being made there maybe opportunities to modify the project to provide wider benefits to other stakeholders thus encouraging additional investment.

The location of static and touring caravan sites (because of their particular vulnerability).

Historic surface water flooding - whilst the current information is limited and doesn't provide much insight into significance this aspect will become increasingly relevant following the implementation of the flood incident reporting process.

Groundwater flooding.

Main River flooding - Information on Main River flooding is derived from the Environment Agency 'Flood Map' and is considered in detail in the Catchment Flood Management Plans covering City and County of Swansea.

Tidal flooding - Information on tidal flooding is derived from the Environment Agency 'Flood Map' and is considered in detail in the Shoreline Management Plans.

Ordinary watercourse flooding - There is currently limited data available on this and, like surface water flooding, will benefit from future records of local flooding incidents.

Dŵr Cymru Welsh Water records of sewer flooding – Water Companies provide information to Ofwat on flooding experienced on the public sewerage network, referred to as DG 5 information. Dŵr Cymru Welsh Water's investment in reducing flooding from the public sewerage network is focussed on historic flooding locations.

Environmentally protected sites, historic buildings and monuments - National datasets are available which provide the location of structures and sites which are vulnerable to flood damage. It is worth noting that flooding is not always detrimental to environmental sites.

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

Factors Increasing Flood Risk

Flood risk can be defined as a combination of probability and consequence: as there are a number of factors which lead to higher probability of flooding in the future and more serious potential consequences , this will result in an increase in flood risk across Swansea as stated below:-

- Climate Change – It is generally accepted that climate change will lead to more frequent and more extreme weather patterns, together with increases in sea levels which will increase the level of all types of flooding.
- Deterioration of existing assets in terms of condition and hydraulic performance will inevitably lead to increased flood risk.
- The need to control surface water run-off from new developments will need to be continued. However, there are instances where an increase in the amount of impermeable surfaces and increased run-off will be inevitable and this will result in an increase in peak flows during heavy rainfall events.

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

In Wales, Technical Advice Note 15 (TAN15) on development and flood risk sets out a precautionary framework to guide planning decisions. The overarching aim of the precautionary framework is “to direct new developments away from those areas which are at high risk of flooding”. Adherence to Government policy ensures that new development does not increase local flood risk. However, in exceptional circumstances the Local Planning Authority may accept that flood risk can be increased contrary to Government policy, usually because of the wider benefits of a new or proposed major development. Any exceptions would not be expected to increase risk to levels which are “significant” (using the Government’s criteria).

4.5 Local Plans

Catchment Flood Management Plans

There are a number of plans which contain useful information relating to local flood risk and were used in the production of the report. Catchment Flood Management Plans (CFMPs) are non statutory plans produced by the Environment Agency to provide an overview of flood risk across each river catchment. These also recommend ways of managing risk from all types of inland flooding now and over the next 50-100 years.

There are two catchments plans covering the river catchments across the City and County of Swansea :-

- Ogmore to Tawe
- Loughor to Taf

The plans identify flood risk from fluvial and tidal-influenced river flooding from past flooding events and potential risk in the future, although localised flooding problems from surface water flooding, sewer flooding etc have been identified albeit to a lesser degree. Full details of these risks can be found in the plans but a summary of collated data over both catchments which affect people is illustrated in the table below:-

Catchment Flood Management Plans covering Swansea showing probability of flooding - 1% Annual Equivalent Probability Fluvial Event or 0.5%AEP Tidal Event

Area at Risk	Number of People at Risk	Number of People at Risk - Predicted in 2100	CFMP Plan
Pontarddulais	49	129	Loughor to Taf
Gorseinon	2	93	Loughor to Taf
Gower	81	160	Loughor to Taf
Swansea Vale	465	768	Ogmore to Tawe
Swansea Central	5527	5693	Ogmore to Tawe

Catchment Flood Management Plans identify flood risk management policies to assist all key decision makers in the catchment, to ensure sustainable flood risk management for the long term.

Shoreline Management Plan 2 -– identifies policy areas affecting CCS

Shoreline Management Plans are strategic plans for the long term management of the coast. The City and County of Swansea section of shoreline forms part of the SMP2 that considers the South Wales shoreline from Penarth in The Vale of Glamorgan to St Anne's Head in Pembrokeshire.
This Plan identifies areas at risk of flooding directly from the sea.
The CCS coastline falls within Policy Scenario 9 of SMP2 and the following policies are proposed:-

- Hold the line of the shoreline through the maintenance and upgrading of existing defences.
- Allow the sand dune systems to continue to evolve naturally by managed realignment.

Some frontages are currently undefended and the coast will evolve and retreat through no active intervention

• 5.0 Objectives for managing flood risks and options to achieve them

This Chapter sets out the primary objectives and actions which will be taken forward to make progress in the reduction of risk associated with flooding.
The overarching aim is to work with the population of City and County of Swansea to reduce the risk to residents and businesses of suffering the misery and economic devastation that flooding can bring.

The ways of achieving this are summarised in the following table and developed in the following sections.

No	Objective	Actions to achieve the Objective
1	To commit to the understanding of Flood and Coastal risks and to ensure that all stakeholders understand their roles and responsibilities in relation to Flood and Coastal risk management	• To provide a clear explanation of the specific statutory duties of other flood risk management Authorities with the administrative area of the City and County of Swansea. • To involve property owners and communities who are affected by flooding incidents and allowing them to take on responsibilities which will assist in the protection of the affected community. • To increase flood risk awareness and provide a clear steer on roles and responsibilities by increasing access to public websites and production of flood leaflets and other available means. • To record flooding related incidents and to investigate flooding incidents if considered significant. • To develop a consistent approach to designation of structures important to flood risk management • Promote local resilience groups and provide support to ensure proper guidance. • To ensure joint working partnership with other flood risk management authorities and to share information for the benefit of all parties. • To work with Joint Resilience Unit
2	To work together with other flood risk management Authorities to reduce flood risk, using all available resources and funds in an integrated way and in so doing derive overall benefit.	• To continue with partnership working. • Develop investment plans for flood risk schemes which could be jointly funded. • Ensure that consideration is given to achieving short term flood risk improvements where local partners wish to contribute, alongside a commitment to understanding future risks • Promote cost effective flood protection measures such as individual property protection and local action groups. • Carry out a review of resources and skills available and tasks that are required by the different organisations to identify the best model for delivery of the new responsibilities alongside existing flood and

		coastal risk management activities.
3	Develop policies for effective land use and management and enhance development control procedures. Avoidance of development in flood risk areas. To prevent an increase in flood risk as a result of development by preventing additional flow entering existing drainage systems and watercourses whenever possible	• Ensure that the Planning process is properly informed by considering relevant plans and policies such as Catchment Flood Management Plans and Shoreline Management Plans. • To work closely with Suds Approval Body when formed and to encourage the use of Sustainable Drainage Systems • Planning Policy to take into account TAN15 which relates to flood risk areas. • To prepare and maintain a database of historic and predicted local flood risk to provide data for the Planning Authority. • Consult with Environment Agency(Natural Resources Wales), Welsh Water and other key stakeholders.
4	Established regular maintenance schedules for flood and coastal erosion risk management assets	• Develop and promote clear process for consenting of new structures to safeguard future maintenance of privately owned structures • To regulate ordinary watercourses and to enforce powers to maintain a free passage of flow. • Ensure riparian owners are aware of their duties for watercourse and culverts on privately owned land. • To improve the database on all assets which are important to flood risk management and to collect data on such assets when possible.
5	Raising awareness of and engaging people in response to flood and coastal erosion risk	• Implement a raising awareness action plan to flood affected communities • Actively engage communities • Actively communicate current and future risk to local communities
6	Enhance property and community level of resilience	• Increasing flood resilience will reduce damages caused by any water that gets into a property. This measure will attempt to raise awareness of the techniques that could be utilised when repairing properties subject to repeated flooding in order to reduce future damages. Initial awareness campaigns will be targeted at areas identified as being at high risk of surface water flooding from surface water flood modelling • Ensure that emergency plans are prepared at local levels as required and that response to and recovery from flooding incidents is effective
7	Take a sustainable and holistic approach to flood and coastal management, seeking to deliver wider environmental and social benefits.	• To consider the wider environmental benefits in the design and construction of projects • Reduce impacts on protected environments. • Promote the concept of water cycle management and blue corridors/green infrastructure. • Consideration to given relevant plans and policies e.g WFD, SMPs, SFRA and CFMPs • Maintain or where possible improve the status of SSSI's, SACs, SPAs, Ramsar sites and other sites of importance for nature and conservation • Maintain and enhance the natural heritage.
8	Prioritising investment in the most at risk communities	• To consider the balance of the frequency of flooding incidents and the extent of damage against the consequence of flooding looking at cost/benefit ratios for the promotion of flood alleviation schemes

		• To investigate and implement quick fix solutions if considered economically sound • To provide a transparent priority system which can inform allocation of funding • To build up community resilience if considered an appropriate alterative measure.

5.1 Understanding Local Flood Risk

One of the key findings of the Pitt Report into the causes of the 2007 floods was that there was insufficient understanding about the nature of flooding in most parts of the country. This broadly applies within the City and County of Swansea where there is sometimes uncertainty as to the causes of flooding and a lack of clarity in the responsibility for dealing with such incidents.

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

It is only through a better understanding of where the greatest local flood risks are, what their causes are and who will need to be involved in the solution that it will be possible to accurately identify and assess feasible measures that could be implemented to reduce the risk of flooding in locally important flood risk areas.

5.2 To Record Flooding Incidents

Historically, data collection of flooding incidents for recording local flood incidents within Swansea contained anecdotal information and lacked the detail required to assess the causes of a flooding incident. As a consequence of the new duties imposed on LLFAs to record flooding incidents, a new database has been created to collect data specifically about flood incidents. This will provide an overall picture of the extent and frequency of flooding incidents and will be used to inform the Flood Risk Management Plan. This approach will be effective only if all risk management authorities commit to reporting all incidents of local flooding.

5.3 To develop a Collaborative and integrated Approach to Flood Risk Management.

The City and County of Swansea, working with the Neath Port Talbot Flood Group, identifies and reacts to ‘significant’ flooding. At a local level collaborative work with other flood risk management authorities will identify relevant schemes which may, in some instances, identify possibilities of sharing funding.

5.4 To involve Community Engagement

The aims of this should tie in with the aims and objectives of City and County of Swansea Communications Strategy, but the overarching objective would be increasing knowledge and understanding of flooding and flood risk and informing residents how they can contribute to the effective management of flood risk. This follows one of the overall objectives of the local strategy of ensuring communities are aware of the level of risk that they face and the steps they need to take to manage the risk and also ties in with the objectives of the national strategy.

The allocation of responsibility for local flood risks is replicated in the Flood Risk Regulations 2009. These Regulations make the LLFA responsible for conducting assessments in relation to and mapping and planning (for flood risk areas identified in the assessment) for the risks of flooding from everything other than main rivers, the sea and reservoirs.
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 they retain their current permissive powers in relation to coastal erosion risk management.

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

It is necessary that the evidence base used to inform planning decisions is consistent and kept up-to-date. The LLFA is required to develop a system for reporting and recording local flood events and the asset register, and ensuring this is readily available to all who need to see it.

The Environment Agency continues to develop and publish flood and coastal erosion maps

http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

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

Owing to climate change, on occasion there is less water than is necessary for human consumption, food production and to maintain flow in rivers. However on occasion the opposite is true, with more water for watercourses can contain, leading to flooding.

The partnership with other Risk Management Authorities will consider issues associated with water supply, land irrigations and flooding.

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

5.7 Encourage ordinary watercourse maintenance and minimise unnecessary constrictions

It is likely that efficiency in maintenance of assets relating to ordinary watercourses will be variable over the City and County of Swansea area. Before embarking on plans for capital spending it will be necessary to undertake a review of how maintenance is being carried out, by whom, and what actions need to be taken to ensure that assets are capable of operating at their full capacity.

5.8 To obtain as much information as possible on the latest best practice initiatives with the industry as a whole

The Pitt Recommendations, and related strategies such as the implementation of the Flood and Water Management Act, have led to a profound change in the way that surface water management is carried out in England and Wales. County and Unitary Councils, which previously had no significant role, now have the main responsibility for reducing the local risk of flooding from surface water, ground water and ordinary watercourses. It is important that officers understand best practice initiatives and that they work closely with Welsh Government and other key stakeholders to ensure that this achieved. A consistent approach with other Lead Local Flood Authorities will also help with sharing of 'best practice'.

5.9 Encourage businesses and communities to take steps to prepare for flooding

Communities and businesses need a better understanding of flood management and what they can do to help to reduce risk to their properties,. For a significant reduction in flood risk to be achieved; each individual must contribute to the cause and help in the practical implementation of the strategy, including securing funding. Some flood protection/prevention measures can be subject to planning law and therefore communication between the relevant authorities and the community will be necessary. Information regarding water management should be made widely available and distributed throughout the affected community via websites and pamphlets. . Simply protecting property could give rise to increased flows in surface water systems.The main aim of communication is to inform individual property owners of opportunities to reduce flood risk by (for example) reducing impermeable surfaces in gardens.

This increased awareness will help involve communities in the reporting of flooding incidents, such as culverts overflowing and the blocking up of watercourse screens.

6.0 ACTIONS AND MEASURES TO IMPROVE FLOOD RISK MANAGEMENT

6.1 Overview

The detailed objectives outlined in 5.0 will be delivered through the implementation of a wide range of measures which will be considered in the short (0-20 years) medium (20-50 years) and long term (50-100 years). Both structural and non-structural measures are included.

6.2 Themes

Measures will be categorised under the following seven 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).

The following sections outline the proposed measures, categorising them according to the high level theme under which they sit.

6.3 Measures

Development Planning and Adaptation

MEASURE 1 Statutory Requirement	**Establish SuDS Approval Body** The Flood and Water Management Act 2010 assigns CCS the role of a Sustainable Drainage System (SuDS) Approval Body (SAB). A SAB will be responsible for: · assessing and approving the drainage design for all construction work which has drainage implications, and · adoption and maintenance of SuDS schemes which connect more than one property	**Timescale –Short Term** The legislation governing this measure has not yet been enacted, but is likely to be so during the lifetime of the LFRMS. **Financial implications** New function with some cost recovery through fees– potential revenue implication	**Delivery and Benefits** Surface water discharge rates from new developments to be restricted to best practice guidelines in order to mitigate flood risk post development Encourage Groundwater recharge by infiltration techniques Enhancement of amenity, water quality and environmental improvements
MEASURE 2 Statutory Requirement	**City and County of Swansea Local Development Plan with a Strategic Flood Consequences Assessment as part of evidence base** Strategic Flood Risk Assessment (SFCA) undertaken to support the LDP. The primary focus was to assess flood risk for key development sites at strategic level. The LDP plan includes specific policies which set out how development proposals should be considered in relation to flood risk	**Timescale – Short Term** Currently ongoing with no financial implication	**Delivery and Benefits** To allow allocated sites to be free of flooding constraints The LDP aims to ensure that existing development is protected from flooding that may be created from new development

MEASURE 3 Statutory Requirement	**Planning Policy Wales and TAN 15** Key policy objectives as identified in section 4.4 of PPW include the need *to minimise the risks posed by, or to, development on, or adjacent to, land liable to flooding.* Section 9 requires local planning authorities to promote sustainable residential environments, giving regard for biodiversity, nature conservation and flood risk. Chapter 13 sets out the broader objectives for planning and environmental management. This is to control where development can take place and what operations may be carried out, to ensure the avoidance of, or minimising, the adverse effects of any environmental risks associated with flooding on present or future land use. Land use planning policies are supplemented by a series of Technical Advice Notes (TANs). TAN 15 provides technical guidance which supplements the policy set out in Planning Policy Wales. It advises on development and flood risk and provides a framework within which risks arising from both river and coastal flooding, and from additional run-off from development in any location, can be assessed.	**Timescale –Short Term** Current Legislation and working practice. **Financial Implication** No implication	**Delivery and Benefits** To ensure that all new development is located away from land that is subject to flood risk; To provide an identification process of where further consideration and assessment is required before development can take place.
MEASURE 4 Best Practice	**Water Cycle Strategy** To support the preparation of Water Cycle Strategy which will form part of the evidence base for the LDP. This would include:- • water supply to meet current and future demands,· • water management within existing developments, • water management in new developments, • waste water treatment and disposal and the impact of all of these on the movement of water through the catchment (including flood risk), water quality, natural hydrological processes and ecology.	**Timescale –Short Term** Currently ongoing with no financial implication	**Delivery and Benefits** The Study is a partnership document involving the planning authority, water company, Environment Agency and Countryside Council for Wales The latter two will be part of the new single body from April 2013. Joint working ensures that the study provides benefits to all stakeholders. · For Welsh Water benefits include timely input to water infrastructure planning regarding future development, strategic needs,

MEASURE 4			environmental constraints, Water Framework Directive management requirements, reduced flood risk and enhanced water quality. For the EAW/CCW benefits include a framework for water and nature conservation policy compliance, for detailed development control observations and Local Development Plan consideration. Developers benefit from clear guidance regarding water efficiency targets, SuDS, infrastructure timescales and costs, and environmental constraints. The public will benefit from reliable infrastructure for supply and water treatment, good planning for climate change and flood risk management and potential savings from a strategic approach. For the Planning Authority evidence is provided for the Local Development Plan for site allocation and infrastructure planning and for implementation through development control, Community Infrastructure levy / S106 etc.

Flood Forecasting, Warning and Response

MEASURE 5 Statutory Requirement	**Flood Awareness** The Council has a duty under the Civil Contingencies Act 2004 to warn and inform its residents of the risks and implications of those risks before, during and after any incidents. As part of this the Council's web site holds information and links to further sources of information in relation to flooding incidents. On occasion, when significant flooding does occur staff from the Council attend areas / properties to provide advice to the affected residents. This can be extended further under the general requirements of the FWMA 2010.	**Timescale –Short Term** CCS Website is reviewed annually to provide information to residents on roles and responsibility of the Local Authority in flood related matters **Financial implications** Existing function with no new implications	**Delivery and Benefits** The Government believes a well-informed public is better able to respond to an emergency and to minimise the impact of flooding consequences on the community. Informing the public as best we can will build their trust and involve them in flood mitigation solutions. It will also help minimise disruption and improve / ease the response to any flooding incidents. Officers to inform affected communities with best practice measures for property resilience against flooding
MEASURE 6 Statutory Requirement	**Flood Warning** The Council has a duty under the Civil Contingencies Act 2004 to warn and inform its residents of the risks and implications of those risks including during and after significant flooding incidents	**Timescale – Short Term** As appropriate to scale of Flood Risk Flood warning to local sources of flooding to be developed.	**Delivery and Benefits** To allow and inform communities to access to warning systems i.e. EA flood alerts or other media means. Preparation against the consequences of flooding will reduce impact and costs.

MEASURE 7 Statutory Requirement	**Emergency Response Plans including Multi - Agency Plans** Emergency planning should aim where possible to prevent emergencies occurring and when they do occur, good planning should reduce, control or mitigate the effects of the emergency. It is a systematic and ongoing process which should evolve as lessons are learnt and circumstances change. Multi agency plans have been developed which concentrate on different agencies responsibilities as well as command and control. This has been produced by the Joint Resilence Unit of CCS/NPT .	**Timescale –Short Term** The legislation governing this measure has not yet been enacted, but is likely to be so during the lifetime of the LFRMS. This measure will be updated once the relevant legislation has been commenced. **Financial Implication** No implication	**Delivery and Benefits** Provides clear explanation on the roles and responsibilities of Key stakeholders in an event of an emergency. Preparation of flood evacuation procedures in the Multi Agency Plans provides for a planned response to act in a co-ordinated reactive manner
MEASURE 8 Best Practice	**Community Flood Plans** Community flood plan provide a Non- Structural solution to mitigate the effects of flooding. The Environment Agency have taken the lead on this to date. Lead Local Authorities to develop their own plans with the aim to develop resilient communities when faced with serious flooding incidents.	**Timescale –Short Term** This area needs to be developed to take into account local flooding issues. The Flood Hazard mapping to be produced by 2013 will provide further information on surface water flood risk throughout CCS when community flood plans can be developed further. **Financial Implication** Potential Revenue Costs	**Delivery and Benefits** Communities to take on some additional responsibility for flood related matters in their communties and enables them to become more resilent. Collaborative working between LLFA and Communities is essential in order to improve communication in the response to flooding.

Land Cultural and Environmental Management

MEASURE 9 Best Practice	**Land Management** Good Land Management Techniques can reduce the extent of surface water run-off and this will be explored whenever possible.	**Timescale –Short Term** The extent to which CCS can use land management techniques to develop flood risk management solutions will be considered as part of the requirements to completed Flood Risk Management Plans by 2015. **Financial Implication** Potential for higher revenue costs but a balanced approach will consider costs and benefits, Schemes with external funding may facilitate this approach.	**Delivery and Benefits** Through the provision of sustainable solutions for new schemes. Through consultation with developers as part of the new SAB role for approving surface water strategies for new sites Advising landowners of the advantages of land management techniques to mitigate against the risk of flooding To promote wider environmental benefits of using 'softer' engineering approaches to land management in order to reduce surface water run-off
MEASURE 10 Best Practice	**Environmental Enhancement** Measures contained with this strategy to support opportunities to develop enhancement to the environment whenever possible. • Protection to SACs,SPAs,Ramsar sites and SSSI'S through water level management • Enhancement and compensatory creation of Habitats	**Timescale- Short Term** (5year +) **Financial Implication** Potential higher capital and revenue costs	**Delivery and Benefits** Consultation with EAW/CCW to ensure compliance to the objectives and directives set out in the SEA which supports this strategy. Creation of habitats whether compensatory or enhancement of existing habitats to be considered for the wider benefit of the environment.

Asset Management and Maintenance

MEASURE 11 Statutory Function	**Asset Register and Records** CCS is required to keep both asset registers (for public use) and asset records (for use by risk management authorities) for structures and features which are considered to have a significant effect on flood risk. There is no formal definition of when an asset has a 'significant effect' but will largely be determined on the flood history of the site and the vulnerability of any infrastructure likely to be affected by a failure of the asset. CCS will continually update the asset register through the information received via the planning process and watercourse consenting duty.	**Timescale –Short Term** Ongoing scheme of work **Financial Implication** Revenue	**Delivery and Benefits** To update records following flood risk incident as part of the investigation process. To collect continually information on assets significant to flood risk and to record ownership and responsibility of those assets. To establish assets prone to flooding in order to inform future improvement works To ensure adequate maintenance regimes and proper condition of those structures.
MEASURE 12 Best Practice	**Power to request information** In certain circumstances the Authority will request information from other risk management Authorities or private landowners regarding their assets. The new powers contained within the FWMA 2010 provides CCS with the powers to request this information. Failure to do so can lead to legal action being served.	**Timescale Short Term** Ongoing scheme of work – on demand **Financial Implication** No implication	**Delivery** CCS has new powers to request information which will improve the availability of flood risk data held by Authority.

MEASURE 13 Statutory Function Discretionary powers	**Designation of Structures** The Flood and Water Management Act establishes CCS as the 'Designating Authority' with the power to designate a structure (whether man-made or a natural feature) if CCS believes that the structure or feature is significant to flood risk. A person can not make alteration to the structure unless permission is granted by the Authority	**Timescale –Short Term** Ongoing **Financial Implication** Potential revenue Implication	**Delivery and Benefits** To ensure no alterations are made to a designated structure without approval from the Authority. Ensures that a register of structures is maintained by the Authority. Designated Structures will be registered with the Land Registry
MEASURE 14 Best Practice	**Creation of SuDS Approving Body (SAB)** The Flood and Water Management Act places a duty on the City and County of Swansea to adopt sustainable drainage systems. This part of the Act has not been implemented yet, but is expected to be enacted April 2013. The process will involve application approval, inspection and adoption of sustainable drainage systems which will serve new developments which will comply to National Standards.	**Timescale –Short Term** April 2013 **Financial Implication** Cost recovery via the application process	**Delivery and Benefits** Ensures future maintenance of SuDS Schemes by the LLFA. Surface Water Strategies to be approved prior to Planning Consent, either through the Planning process or separate application.

Asset Management and Maintenance –cont'd

MEASURE 15 Statutory Requirement	**Consenting to Works on Ordinary Watercourses** From 6 April 2012 CCS became responsible for issuing Ordinary Watercourse consents for works to ordinary watercourses (streams and ditches both natural and man made and culverts etc) or taking enforcement action for any breaches. In future all land drainage consents for works within City and County of Swansea will be issued by Authority's Drainage and Coastal Management Section. City and County of Swansea will take a risk-based approach to enforcement where unconsented works have been carried out on ordinary watercourses. The purpose of ordinary watercourse regulation is to control certain activities that might have an adverse flooding impact**.**	**Timescale** Ongoing scheme of work **Financial Implication** Cost Recovery £50 per application	**Delivery** CCS will determine a consent application with the 2month standard period. Consultation with other stakeholders with applications which possibly could have an adverse affect on the Environment. Compliance to WFD Directive CCS to adopt EAW policies on non-culverting of watercourses. This is because :- • The ecology of the watercourse is likely to be degraded by culverting; • Culverting introduces an increased risk of blockage (with consequent increase in flood risk); Culverting can complicate maintenance because access into the culvert is restricted (in some cases being classified as a confined space and requiring trained operatives and specialist equipment)
MEASURE 16 Statutory Function	**Enforcement to maintain flow in watercourses** Acting as the Land Drainage body CCS has permissive powers to serve notice on riparian landowners in order to	**Timescale –Short Term** Ongoing scheme of work – on demand	**Delivery** CCS has new powers to reduce the likelihood of flood risk due to a restricted flow in a watercourse

	remove any obstruction which is impeding the flows in a watercourse.	**Financial Implication** Existing Duties – revenue based	caused by an obstruction.

Asset Management and Maintenance-cont'

MEASURE 17	**Construction of Flood Defences** Potential schemes will be developed through the Project Appraisal route where they will be scrutinised against technical and economic appraisal.	**Timescale –Short Term** Flood Risk Management Plans to be produced by June 2015 **Financial Implication** Revenue and Capital Expenditure Potential External Funding	**Delivery** The Authority is expected to deliver a Flood Risk Management Plan by 2015. The Flood Risk Management Plan will identify capital schemes, allowing potential funding streams to be explored. The Authority will use cost/benefit analysis for potential schemes through the Project Appraisal Route
Measure 18	**Cause incidental flooding for purposes of flood risk management** CCS has powers to manage flooding and water levels in the interest of wider flood risk management, nature conservation, the preservation of cultural heritage or people's enjoyment of the environment	**Timescale** Options to be explored in the production of the Flood Risk Management Plans 2015 **Financial Implication** Revenue and Capital costs	**Delivery and Benefits** To provide impounded water solutions for the benefits of both flood risk and the wider environmental objectives

Studies, Assessment and Plans

MEASURE 19 Statutory Function	**Duty to Investigate Flooding Incidents** The FWMA has placed a new duty of LLFAS to investigate and record significant flooding incidents. The investigation must identify ownership of the asset which has caused the flooding and the respective risk management Authority involved. Flood Investigations will be reported using the flowing criteria:- • Where there is internal flooding to one or more property on more than one occasion • When more than five properties have affected by flooding • When a commercial premises has been affected • Critical Services has been affected • Critical Infrastructure has been affected • When a community have been 'cut off' by a flooding event	**Timescale –Medium to long term** Ongoing function undertaken by the Authority **Financial Implication** Potential Revenue costs	**Delivery** To undertake investigative studies to areas which are subjected to 'significant flooding' in order to provide a clear understanding of ownership of the cause of flooding. To provide solutions for consideration To increase the level of flood data held by the Authority which will inform future flood risk management plans
MEASURE 20 Best Practice	**Resilience measures** Initial awareness campaigns will be developed to those communities with highest risk of flooding and those who have experienced flooding incidents. This measure will attempt to provide residents, businesses and other organisation affected by flooding with information to improve their awareness of good resilience techniques so that the consequences of	**Timescale –Short Term** To provide non-structural solutions to areas at greatest risk of flooding and timed to meet the requirements of Flood Risk Management Plans to be produced by June 2015	**Delivery** The Authority is expected to develop a transparent system to prioritise flood defence schemes by 2015. Non-Structural solutions to warn and inform communities affected flood risk will be promoted as a solution.

	flooding can be reduced.	**Financial Implication** Revenue and Capital costs	The proposed Flood Risk Management Plans for CCS will identify resilience schemes as an alternative to structure solution if considered appropriate

MEASURE 21 Statutory Requirement	**Flood Risk and Hazard Maps** The Flood Risk Regulations (2009) require all Local Lead Flood Authorities with indicative Flood Risk Areas to produce Flood Risk and Hazard Maps by 2013. These maps will be used to identify the level of hazard and risk of flooding within CCS. These maps will subsequently indicate in detail the areas which are most at risk from surface water flooding and will be used to inform the content of Flood Risk Management Plans.	**Timescale –Short Term** To be published by 2013 **Financial Implications** Flood Hazard Maps – Externally funded	**Delivery** Flood Hazards Maps will be produced by all Local Lead Flood Authorities by 2013 in order to provide a greater understanding of the probability and consequences of surface water flooding in the Flood Risk Areas;The benefits will include:- • Better understanding on the level of flood risk to affected communities • Help prepare and inform the Flood Risk Plans to be produced by the Authority by 2015

MEASURE 22 Statutory Requirement	**Flood Risk Management Plans** The Flood Risk Regulations (2009) require Lead Local Flood Authorities to prepare and publish Flood Risk Management Plans by June 2015 where the risk of flooding from local flood risk is significant as identified in the Preliminary Flood Risk Assessment (PFRA). The statutory requirement is only to produce a Flood Risk Management Plan for the flood risk area identified as part of the PFRA. However, the PFRA assessment identified other areas which had high risk of flooding and these areas will be included in plan also, so that all high risk areas within Swansea can be managed accordingly.	**Timescale –Medium to long term** Ongoing function undertaken by the Authority **Financial Implications** Potentially Externally funded	**Delivery** The Flood Risk Management plan will provide a clear steer on how CCS will deal with Flood Risk Areas and will recommend measures for managing flood risk within its area The plan will help raise awareness and improve knowledge of local flood risk. The Plan will be used to inform other Flood Risk Management Authorities with the Authority's intentions to manage flood risk and will help explore the possibilities of collaborative working for joint benefits.

High Level Awareness and Engagement

MEASURE 23 Best Practice	**Community Engagement** Raising community awareness and communicating effectively with local communities will enable CCS to set realistic expectations and achievable outcomes for local flood risk management. CCS proposes to inform those that are at risk of local flooding and advise them on what steps to take.	**Timescale – Short Term** Current ongoing **Financial Implications** **Potential**	**Delivery and benefits** Working with communities will help: • Understand the need of individuals, communities and businesses • Make better informed plans decisions and policies • Communities to understand what flood risk means to them • Meet goals • Increase local support

MEASURE 24 Best Practice	**Collaborative Working** The City and County Swansea will work collaboratively with other flood risk management Authorities and to share information to inform flood risk management aims and objectives.	**Timescale – Short Term** Current ongoing	**Delivery and benefits** Working with other flood risk management Authorities will help: • Understand collectively the range of Flood Risks within Swansea • To explore possibilities of joint funding

		Financial Implications Ongoing function	• To work in Partnership for common goals • To participate in working groups for the benefit of Flood Risk Management • To ensure best practice and a consistent approach with other Authorities

7.0 Funding and Delivery Plan

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

Costs and Benefits of Proposed Measures
One of the stated requirements of what should be included in a Local Flood Risk Management Strategy is the provision 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 as it is difficult to ascertain the precise cost of any measures without knowing the exact scope of any required works. Secondly, quantification of benefits is difficult without an accurate assessment of the extent to which measures are able to reduce flood risk. Costs and benefits of detailed measures will be included within the Flood Risk Management Plans and future LFRMS reviews.

7.1 Existing Funding Mechanisms

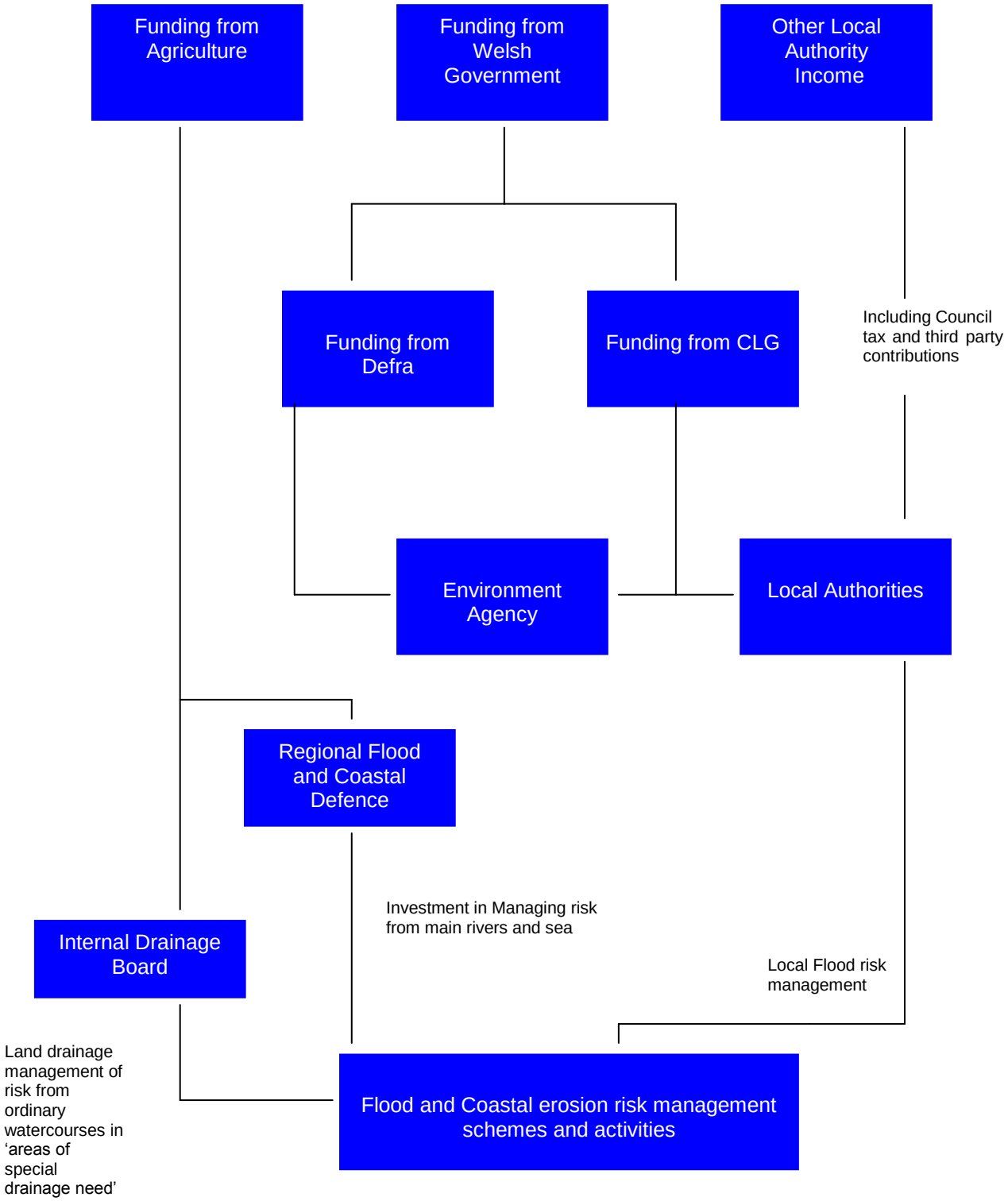
The majority of funding for flood and coastal erosion risk management in Wales comes from the Welsh Government.

As the level and nature of risk changes in the future, Welsh Risk Management Authorities will need to find other sources of funding to ensure that communities across Wales receive the levels of funding they need to manage the risks they face (Welsh Government, 2011).

Owing to increasing funding constraints the Welsh Government has proposed a
number of actions within its NFRMS to enable more efficient and effective spending on flood and coastal erosion risk management in Wales, namely:-

- Prioritisation of investment and the funding of projects set out in a long term investment plan;
- Joint funding for multiple benefits (particularly with regards to regeneration and transport investment) will be maximised;
- Beyond 2015, other sources of European funding will be sought;
- Contributions from the private sector will be expected to contribute to project costs where private assets are being protected;
- The levy raising powers of Flood Risk Management Wales (the Environment Agency Regional Flood and Coastal Committee for Wales) may need to be exercised; and
- When setting future budgets, Local Authorities may need to factor in additional expenditure on flood risk management within their area.

7.2 Summary of existing Funding Mechanisms



7.3 Public funding

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

- In 2011/2012 the Welsh Government committed £36.6 million to flood and coastal erosion risk management in Wales. That funding is a mixture of capital used mainly for the construction of existing defences, and revenue funding which is used for maintenance of existing defences and for a range of other flood awareness initiatives.

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- The Welsh Government allocates the majority of its budget to for flood and coastal erosion risk management to the Environment Agency, with some funding retained for grants to local Authorities.

- Indicative allocation of budgets in future years will be £35.7million and £37 million for the years 212/13 to 2013/14 respectively.

- In recognition of the increasing funding constraints Welsh Government will seek to maximise the effectiveness of its core funding for flood and coastal erosion risk management.

7.4 Other Possible Sources of Funding

Section 106 funding – Developer Contributions

The City and County of Swansea can enter into legal agreements with landowners or developers covering planning obligations associated with planning consent. These agreements can secure delivery of measures necessary to make a development acceptable in planning terms.

One of the recommendations of 'Making Space for Water' was that the local planning authorities should use section 106 agreements to help manage flood risk. Any flood risk which is caused by, new development should be resolved, and the resolution funded, by the developer.

Community Infrastructure Levy(CIL) Regulations came into force in April 2010 and set out a new system of regulations that allows the Council to raise contributions from developments to fund wide range of 'relevant infrastructure' which could include flood defences. The Levy is intended to work alongside the Planning Obligations process. From 2014 regulations will be introduced which will reduce the extent to which infrastructure can be funded through planning obligations.

European Funding

Funding from the European Union is designed to align the economic prosperity of the various regions of Europe. Of particular relevance to City and County of Swansea is the Development Fund (ERDF). This fund has/will, in the period 2007-2013 provide/d nearly £50m to support a flood and coastal erosion risk management programme of just over £100m. This includes funding of the Lower Swansea Valley flood alleviation scheme in City and County of Swansea. Wales may benefit from another round of funding from European funding. It is currently unclear whether there will be a mechanism for use of such funds for Flood Risk Management activities.

Private Fund Raising

Partnership funding between public and private sectors and local communities could be adopted as a means of funding projects which are mutually beneficial to all groups.

Partnership working/funding between Risk Management Authorities will also be considered as a way of achieving flood risk management objectives which are of mutual interest to parties. Opportunities to explore joint funding will be promoted to ascertain maximum benefits for future flood alleviation schemes.

7.5 Prioritisation of funding

The Welsh Government has indicated that, in future years, investment in flood risk management will need to be rigorously prioritised. A range of factors will need to be taken into consideration when determining the extent to which the Welsh Government is likely to invest in flood risk management schemes:-

- Risk to life;
- Longer term sustainability of the community, the approach taken and the wider environment;
- Economic impacts, costs and benefits;
- Impacts of flooding on the operational capacity of critical infrastructure;
- Social impacts, costs and benefits;
- Frequency of flooding;
- Environmental costs and benefits derived from the work;
- Availability of appropriate compensation sites where work impacts designated habitats;
- Impacts on the wider cultural heritage; and
- Multiple benefits in relation to human health and wellbeing.

The Welsh Government is currently in the process of establishing a clearer funding prioritisation methodology for Wales, which may lead to a single Welsh Government funding scheme for flood and coastal erosion risk management projects in Wales. It is intended that the prioritisation of flood risk

management projects within CCS will adhere to any guidance issued by the Welsh Government in the future. The Council intends to work with the Welsh Government to secure a fair prioritisation system which takes into account local factors.

8.0 The Environmental Benefits

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

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

The strategy will contribute to the achievement of wider environmental objectives by :-

- Ensuring that, as far as is reasonably practical, actions taken will maximise opportunities to ensure that CCS's countryside, coastline and towns become richer in biodiversity and waterways achieve good ecological status.

- Ensuring that in all decision making, adaption to mitigate the likely effects of climate change will be taken into account, community engagement will be encouraged and the ethos of 'making space for water' will be followed.

- Ensuring that in addition to Water Framework Directive and biodiversity improvements, other benefits will be sought as appropriate, such as changes to more sustainable water management practices like sustainable drainage systems, diverting floodwaters into areas where it can achieve positive environmental benefits, and improvements to public access.

8.1 Water Cycle Management Opportunities

Improvements to overall water management are likely to be enhanced by certain measures contained within the LFRMS. For instance, implementing *source control* measures (via, for example, the implementation of SuDS or land management techniques) will enhance the infiltration of rainwater into the ground.
This will have a positive effect by reducing the load placed on surface water sewers, enhance the recharging of groundwater aquifers and improve the retention of water in the catchment which will reduce flood peaks and provide secondary biodiversity and recreational enhancement.

8.2 Potential Enhancement of the Natural Environment

Water availability is a critical component in maintaining and enhancing certain water dependent habitats/biodiversity. Certain measures outlined within the LFRMS have the potential to incorporate habitat enhancement or work with other environmental strategies in order to create or improve the natural environment.

8.3 Reduction in Carbon Use

It is likely that the implementation of the LFRMS will bring about reductions in carbon footprint. This can be brought about in a number of ways:

- by implementing objectives that encourage schemes to be constructed in a sustainable manner, and indeed the possible promotion of non-structural schemes, there will be a reduction in embedded carbon in *soft engineered* flood risk reduction measures as opposed to more traditional measures which use reinforced concrete, quarried raw materials etc.
- the reduced energy requirement needed for water treatment by reducing the amount of surface water runoff entering foul/combined sewer systems;
- water storage areas and wetlands used for flood storage areas also act as natural areas of carbon capture;
- potential innovative land management techniques, such as the restoration of degraded peat bogs, will additionally create natural carbon sinks.

8.4 Water Framework Directive

The Western Wales Management Plan outlines the pressures facing the water environment in the wider south-west Wales region and the actions required to address them.

The objectives which are relevant to this strategy are:

- to prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- aim to achieve at least good status for all water bodies by 2015, where this is not possible and subject to criteria set out in the Directive, aim to achieve good status by 2021 or 2027;
- meet the requirements of Water Framework Protected Areas;
- promote sustainable use of water as a natural resource;
- conserve habitats and species that depend directly on water;
- progressively reduce or phase out the release 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;
- contribute to mitigating the effects of floods and droughts.

Certain flood risk management activities have the potential to assist in meeting the objectives listed above. For instance:

Pollution prevention – The use of SuDS and the correct regulation of water courses can assist in the prevention of contamination of watercourses from industrial and domestic pollution.
Reduction of sediment in water courses – this can be achieved via implementing best-practice land management techniques and the use of SuDS particularly where soils are prone to erosion.
Protection and enhancement of wildlife – measures to protect and enhance wildlife and their habitat can be embedded within potential flood risk management schemes. This is particularly the case where flood risk management measures are implemented in synergy with complimentary environmental strategies.
Preservation of water resources – by looking at flood risk management in a holistic manner, the whole water cycle will be considered as a key element of scheme appraisal.

8.5 The wider Environmental Benefits

CCS has undertaken a Strategic Environmental Assessment (SEA) in parallel with the development of this Local Flood Risk Management Strategy. The SEA appraisal identifies the key environmental issues and sets out how these provide opportunities/constraints in the context of the LFRMS.

9.0 Next steps

Under the LFRMS the City and County of Swansea will lead in directing a partnership response in: resolving flood problems in areas of known risk; dealing with potential flood risk sites, and the review of Indicative Flood Risk Areas.The Strategy has identified all risk areas and all the different sources of the flood problem. Any area may be at risk from not just one prime cause but a number of different sources of flooding.

Those organisations with a responsibility for managing flood risk are aware of their responsibilities, and are committed, as part of the Strategy, to participate in the joint ongoing management of risk. The City & County of Swansea is the Lead Local Authority.

The Authority will work with other Risk Management Authorities and other stakeholders, including local communities, to deliver the aims and objectives of this strategy. The most cost effective measures to improve local flood risk management can be delivered only through true partnership working. The City and County of Swansea will continue to work with partners to undertake the actions identified in this strategy and associated action plan, and will seek to ensure that the measures achieve maximum benefits for the community, the county and the environment.

10.0 How and when the strategy is to be reviewed

Reviews are planned to take place in 2013 to coincide with the 'Flood Hazard and Flood Risk Maps' and in 2015 to coincide with the 'Flood Risk Management Plans' required by the Flood Risk Regulations (2009).

In 2016 a further review will take place using new information from the updated Flood Risk Assessment. A formal review will take place in 2017 and every following six years to run alongside the production of the 'National Strategy for Flood and Coastal Erosion Risk Management in Wales', as recommended by the Welsh Government. The Strategy will also be reviewed whenever significant new information becomes available.

This LFRMS will be subject to continuous development will not be a one off exercise. The regular reviews described above will allow a robust approach to be adopted using all relevant data.

Glossary of Terms

ASTSWF	Areas Susceptible to Surface Water Flooding
CCS	City and County of Swansea
CCW	Countryside Council for Wales
CFMP	Catchment Flood Management Plan
DAMS	Development Advice Maps
DCWW	Dwr Cymru Welsh Water
EAW	Environment Agency Wales
FWMA	Flood and Water Management Act
JRU	Joint Resilience Unit
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
LDP	Local Development Plan
LFRMS	Local Flood Risk Management Strategy
NFRMS	National Flood Risk Management Strategy
PFRA	Preliminary Flood Risk Assessment
SAC	Special Areas of Conservation
SFCA	Strategic Flood Consequence Assessment
SINC	Sites of Importance for Nature Conservation
SMP	Shoreline Management Plan
SSSI	Special site of Scientific Interest
SuDS	Sustainable Urban Drainage Systems
TAN15	Technical Advice Note 15
WFD	Water Framework Directive

References

National Strategy for Flood and Coastal Erosion Risk Management in Wales(November 2011) Welsh Government

Local Flood Risk Management Strategies , Local Strategy (November 2011) Welsh Government

Preliminary Flood Risk Assessment, City and County of Swansea

Strategic Flood Consequence Assessment , City and County of Swansea

Lavernock Point to St.Ann's Head Shoreline Management Plan, Swansea and Carmarthen Bay Coastal Engineering Group

Loughor to Taf, Ogmore to Tawe, Catchment Flood Management Plans Environment Agency Wales