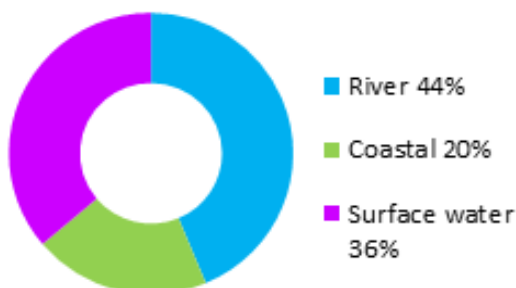


Carnoustie and Barry (Potentially Vulnerable Area 07/09)

Local Plan District	Local authority	Main catchment
Tay Estuary and Montrose Basin	Angus Council	Dundee coastal

Summary of flooding impacts



At risk of flooding

- 180 residential properties
- 30 non-residential properties
- £470,000 Annual Average Damages

(damages by flood source shown left)

Summary of flooding impacts

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Objectives

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

<i>Flood protection scheme/works</i>	<i>Natural flood management works</i>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
Flood protection study	Natural flood management study	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

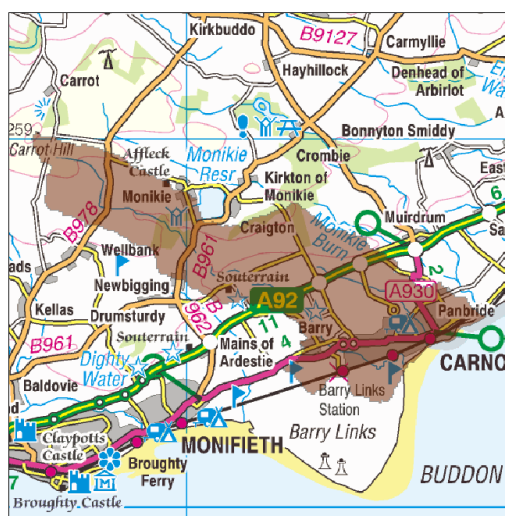
Actions

Carnoustie and Barry (Potentially Vulnerable Area 07/09)

Local Plan District	Local authority	Main catchment
Tay Estuary and Montrose Basin	Angus Council	Dundee coastal

Background

This Potentially Vulnerable Area is 31km² and part of the Firth of Tay catchment. It contains the Lochty Burn and Barry Burn and includes the town of Carnoustie.



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The area has a risk of river, coastal and surface water flooding with the majority of damages caused by river flooding.

There are approximately 180 residential properties and 30 non-residential properties at risk of flooding. The Annual Average Damages are approximately £470,000.

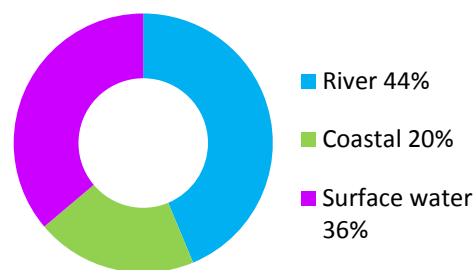


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding is in Carnoustie from the Barry Burn and Lochty Burn. Carnoustie also has a risk of surface water flooding.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to non-residential properties. The Dundee to Aberdeen railway line is also notably impacted. The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

The risk of flooding to utilities in Table 1 does not include Scottish Water data. Scottish Water undertook a national assessment of above ground assets at medium likelihood of flooding (including water treatment works, wastewater treatment works

and pumping stations). Within this Potentially Vulnerable Area there are five assets identified as being at risk of flooding.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 5,600)	40	180	420
Non-residential properties (total 330)	10	30	50
People	80	400	930
Community facilities	0	0	0
Utilities assets	<10	10	10
Transport links (excluding minor roads)	2 A roads, 2 B roads at 25 locations 1 Railway route at 11 locations: Dundee to Aberdeen	2 A roads, 2 B roads at 54 locations 1 Railway route at 18 locations: Dundee to Aberdeen	2 A roads, 2 B roads at 60 locations 1 Railway route at 21 locations: Dundee to Aberdeen
Environmental designated areas (km ²)	0	0	0
Designated cultural heritage sites	2	3	3
Agricultural land (km ²)	0.5	1.6	1.9

Table 1: Summary of flooding impacts

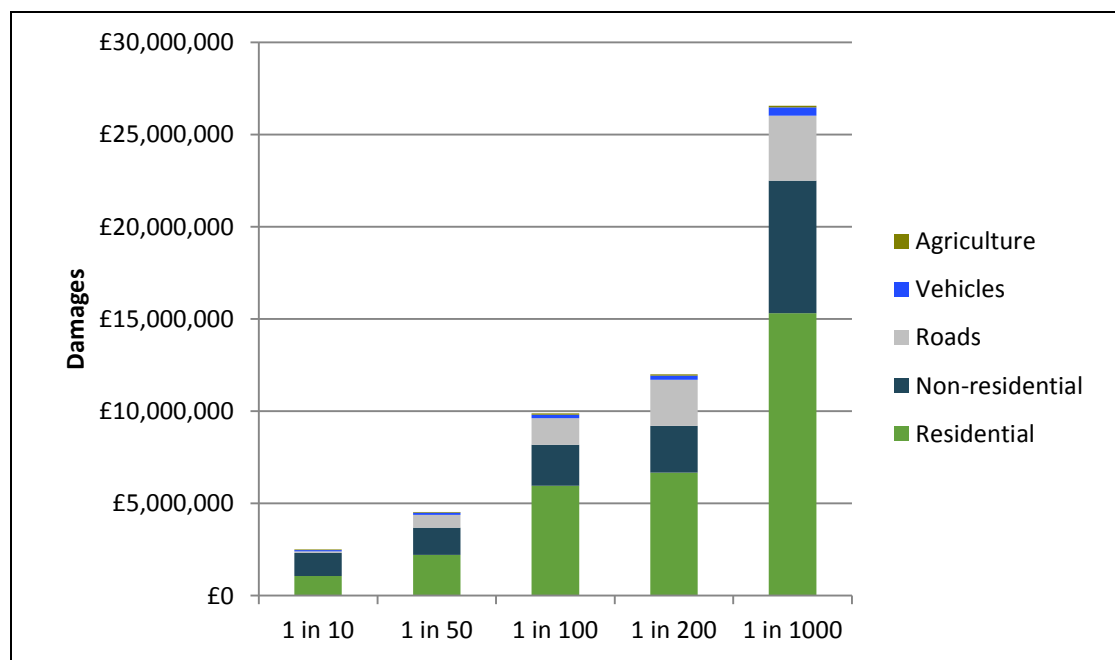


Figure 2: Damages by flood likelihood

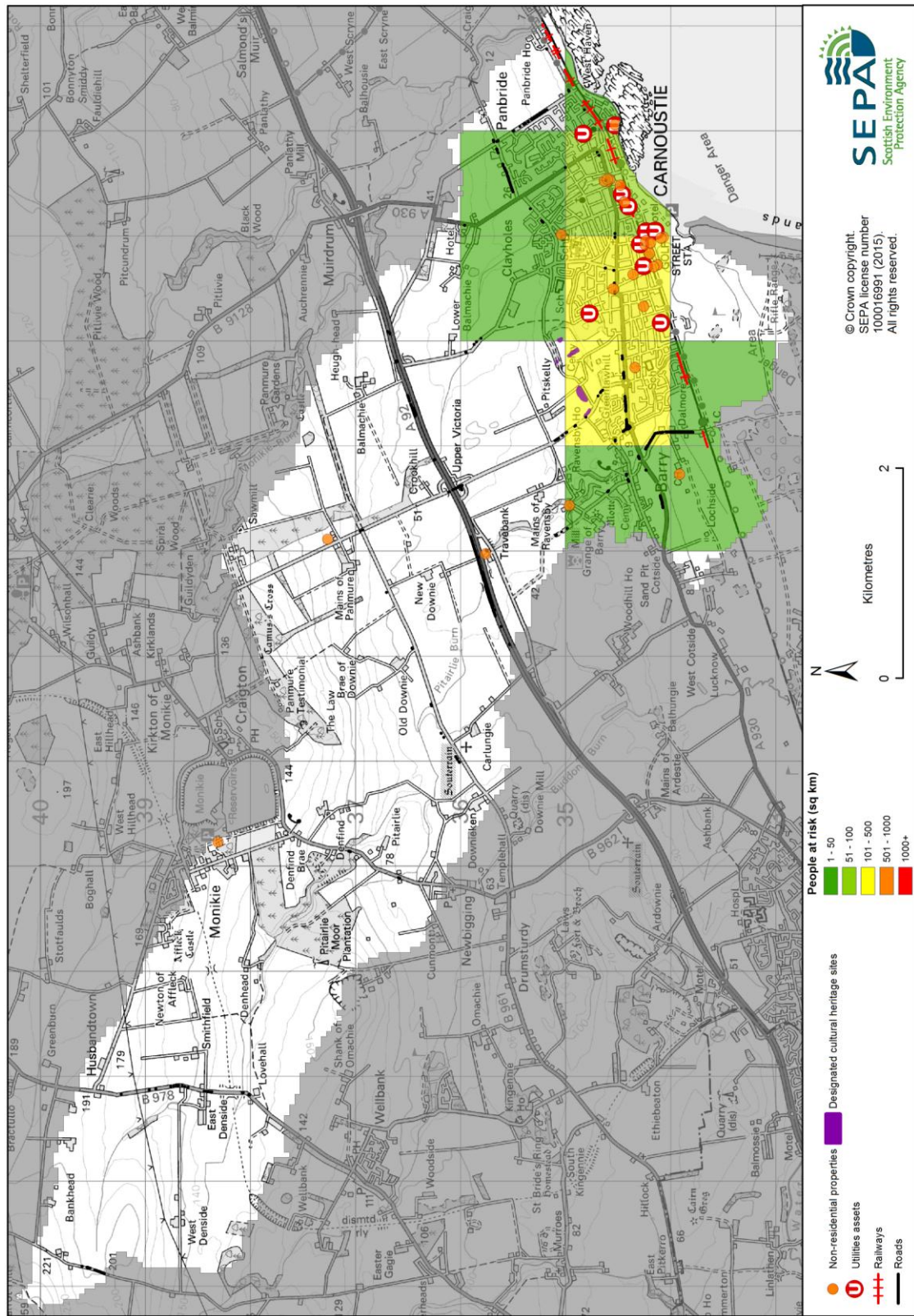


Figure 3: Impacts of flooding

History of flooding

One coastal flood has been recorded in this Potentially Vulnerable Area. It occurred on 12 January 2005 when Carnoustie Golf Course flooded and sandbags were deployed to protect Links Parade from flooding.

Objectives to manage flooding in Potentially Vulnerable Area 07/09

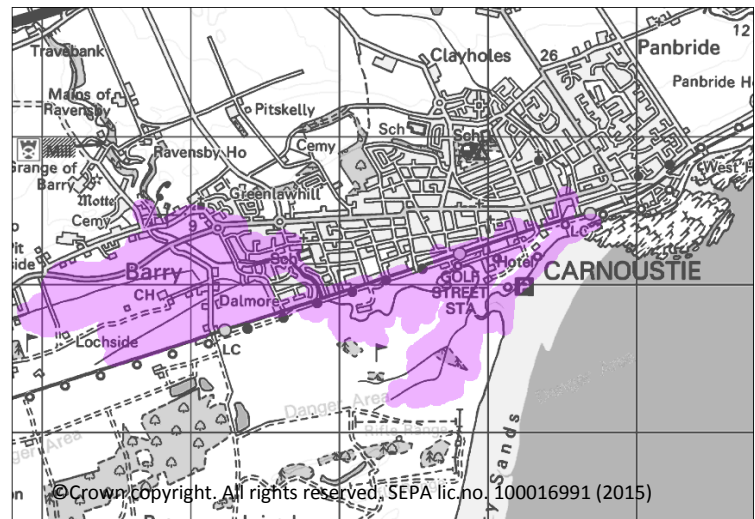
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Carnoustie and Barry Potentially Vulnerable Area.

Reduce economic damages to residential and non-residential properties in Carnoustie caused by flooding from the Barry Burn and coastal flooding

Indicators:

- £140,000 Annual Average Damages from residential properties
- £120,000 Annual Average Damages from non-residential properties

Target area:



Objective ID: 7022

Target area	Objective	ID	Indicators within PVA
Carnoustie, Barry, Panbride and Westhaven	Reduce economic damages and number of residential properties at risk of surface water flooding in Carnoustie, Barry, Panbride and Westhaven where practical	7020	* See note below
Applies across Tay Estuary and Montrose Basin Local Plan District	Avoid an overall increase in flood risk	7001	<ul style="list-style-type: none"> • 180 residential properties • £470,000 Annual Average Damages
Applies across Tay Estuary and Montrose Basin Local Plan District	Reduce overall flood risk	7054	<ul style="list-style-type: none"> • 180 residential properties • £470,000 Annual Average Damages
Applies across Tay Estuary and Montrose Basin Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

* This objective will be monitored using surface water flood risk across the Potentially Vulnerable Area. For 07/09 there are 60 residential properties at risk and Annual Average Damages of £170,000.

Actions to manage flooding in Potentially Vulnerable Area 07/09

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Carnoustie and Barry Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<i>Natural flood management works</i>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
Flood protection study	Natural flood management study	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	FLOOD PROTECTION STUDY (70220005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Carnoustie caused by flooding from the Barry Burn and coastal flooding (7022)		
Delivery lead:	Angus Council		
Priority:	National:		Within local authority:
	75 of 168		5 of 6
Status:	Ongoing	Indicative delivery:	2016-2021
Description:	A flood protection study for Carnoustie is being progressed as a local priority. The study is assessing a number of options to manage flood risk including flood storage, modification of conveyance, installation/modification of fluvial control structures, flood defences, sediment management and the viability of property level protection. The potential for natural flood management is also being assessed, including river/ floodplain restoration, sediment management and wave attenuation. The study is recognising that existing flood defences may not operate to the design standard. The study should take a sustainable approach and consider the interaction between actions upstream and downstream and potential effects on coastal processes along the shoreline.		
Potential impacts			
Economic:	The study could benefit 37 residential properties and eight non-residential properties at risk of flooding in this location, with potential damages avoided of up to £5.0 million.		
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. Natural flood management actions can restore and enhance natural environments		

Social:	and create opportunities for recreation and tourism.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The study includes the Barry Burn (water body ID 5953) and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of this river should be considered by coordinating with river basin management planning. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the Barry Links Special Area of Conservation, and Firth of Tay and Eden Estuary Special Area of Conservation and Special Protection Area. Listed buildings are also present within the study area and could be positively or negatively impacted.

Action (ID):	SURFACE WATER PLAN/STUDY (70200018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Carnoustie, Barry, Panbride and Westhaven where practical (7020)		
Delivery lead:	Angus Council		
Status:	Not started	Indicative delivery:	2016-2021
Description:	The area must be covered by a surface water management plan or plans that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives.		

Action (ID):	SURFACE WATER PLAN/STUDY (70200019)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Carnoustie, Barry, Panbride and Westhaven where practical (7020)		
Delivery lead:	Scottish Water in partnership with local authorities		
Status:	Ongoing	Indicative delivery:	2016-2021
Description:	An integrated catchment study will be carried out to support the surface water management plan process and improve knowledge and understanding of surface water flood risk and interactions with other sources of flooding e.g. with the sewer network, watercourses and the sea.		

Action (ID):	STRATEGIC MAPPING AND MODELLING (70540019)		
Objective (ID):	Reduce overall flood risk (7054)		
Delivery lead:	Scottish Water		
Status:	Not started	Indicative delivery:	2016-2021
Description:	Scottish Water will review the assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	MAINTAIN FLOOD PROTECTION SCHEME (70220017)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Carnoustie caused by flooding from the Barry Burn and coastal flooding (7022)		
Delivery lead:	Angus Council		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the existing flood defences along the Barry Burn and Pitairlie Burn and the Carnoustie Revetment coastal defences. Existing defences along the Barry Burn and Pitairlie Burn provide a standard of protection to Carnoustie of up to 1 in 100 years.		

Action (ID):	FLOOD FORECASTING (70540009)		
Objective (ID):	Reduce overall flood risk (7054)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	SELF HELP (70540011)		
Objective (ID):	Reduce overall flood risk (7054)		
Delivery lead:	—		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	AWARENESS RAISING (70540013)		
Objective (ID):	Reduce overall flood risk (7054)		
Delivery lead:	Responsible authorities		
Status:	Existing	Indicative delivery:	Ongoing
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community and promote Floodline. This will be achieved through SEPA led education events. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	MAINTENANCE (70540007)		
Objective (ID):	Reduce overall flood risk (7054)		
Delivery lead:	Angus Council, asset / land managers		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

Action (ID):	EMERGENCY PLANS/RESPONSE (70540014)		
Objective (ID):	Reduce overall flood risk (7054)		
Delivery lead:	Category 1 and 2 Responders		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.</p> <p>Angus Council operates an emergency response plan in areas of high flood risk.</p>		

Action (ID):	PLANNING POLICIES (70010001)		
Objective (ID):	Avoid an overall increase in flood risk (7001) Reduce overall flood risk (7054)		
Delivery lead:	Planning authority		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.</p>		