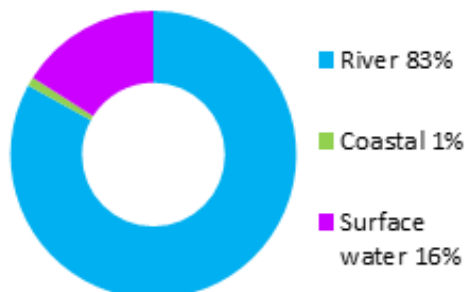


## Cambus, Alloa and Sauchie (Potentially Vulnerable Area 09/10)

Local Plan District	Local authority	Main catchment
Forth	Clackmannanshire Council	Stirling coastal

### Summary of flooding impacts



#### At risk of flooding

- 350 residential properties
- 50 non-residential properties
- £1.4 million 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>	<b>New flood warning</b>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<b>Surface water plan/study</b>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<b>Strategic mapping and modelling</b>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

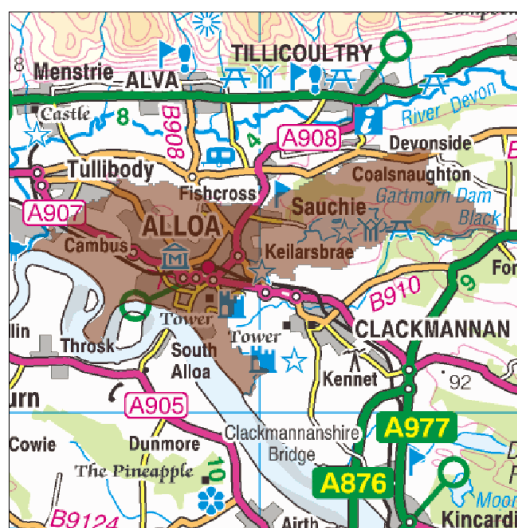
Actions

# Cambus, Alloa and Sauchie (Potentially Vulnerable Area 09/10)

Local Plan District	Local authority	Main catchment
Forth	Clackmannanshire Council	Stirling coastal

## Background

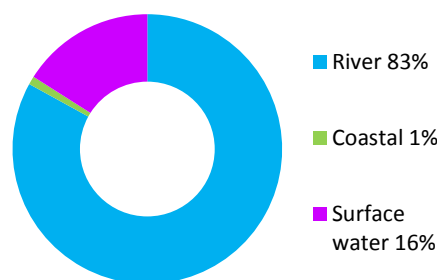
This Potentially Vulnerable Area is 20km<sup>2</sup> and is part of the Stirling catchment (shown below). This is a small, partially urbanised area which lies along the north bank of the River Forth. It contains the town of Alloa, extending eastward into the Gartmornhill area.



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The main sources of river flooding are to Alloa from the Brothie Burn, Fairy Burn and Sauchie Burn. The highest risk of surface water flooding is in Inglewood, Sauchie and Alloa. The majority of flood damages are caused by river flooding.

There are approximately 350 residential properties and 50 non-residential properties at risk of flooding. The Annual Average Damages are approximately £1.4 million.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

The greatest risk of flooding is to Alloa from river flooding. This area has a number of culverted watercourses within the town.

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 non-residential properties followed by damages to residential properties. The location of the impacts of flooding is shown in Figure 3.

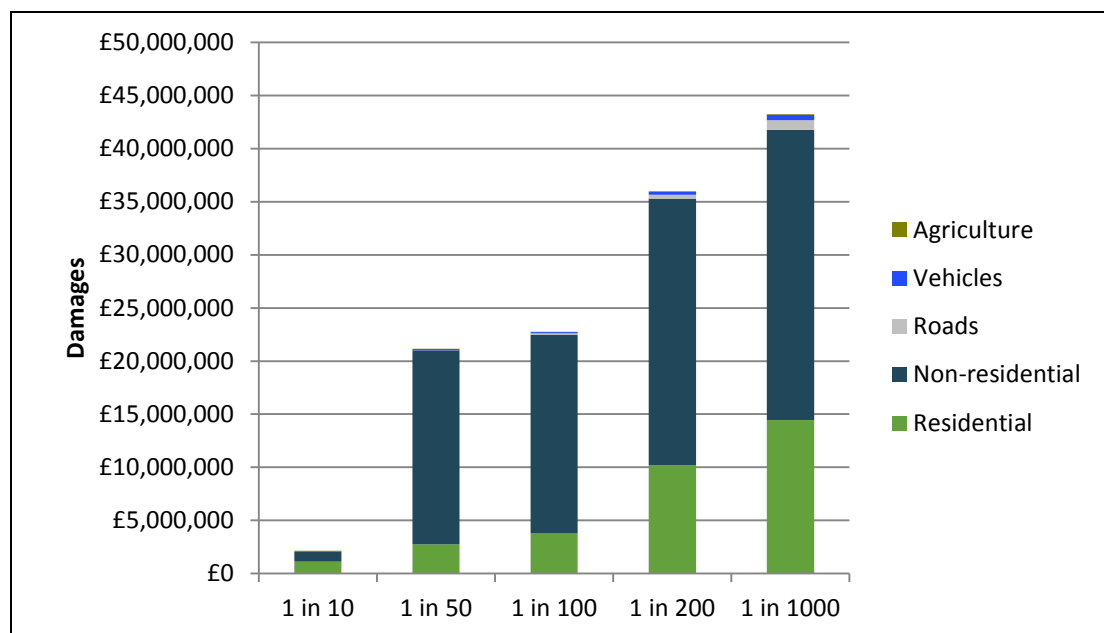
The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

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 two assets identified as being at risk of flooding.

In Alloa there is a lower level of confidence in the flood maps produced by SEPA. SEPA and Clackmannanshire Council are working together to improve the understanding of flooding in this area.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 9,500)	40	350	480
Non-residential properties (total 1,000)	<10	50	80
People	90	760	1,100
Community facilities	0	0	0
Utilities	<10	20	20
Transport links (excluding minor roads)	2 A roads, 3 B roads at 23 locations	2 A roads, 3 B roads at 73 locations	2 A roads, 3 B roads at 109 locations
Environmental designated areas (km <sup>2</sup> )	0.9	0.9	0.9
Designated cultural heritage sites	3	5	5
Agricultural land (km <sup>2</sup> )	1.0	1.3	1.3

**Table 1:** Summary of flooding impacts



**Figure 2:** Damages by flood likelihood

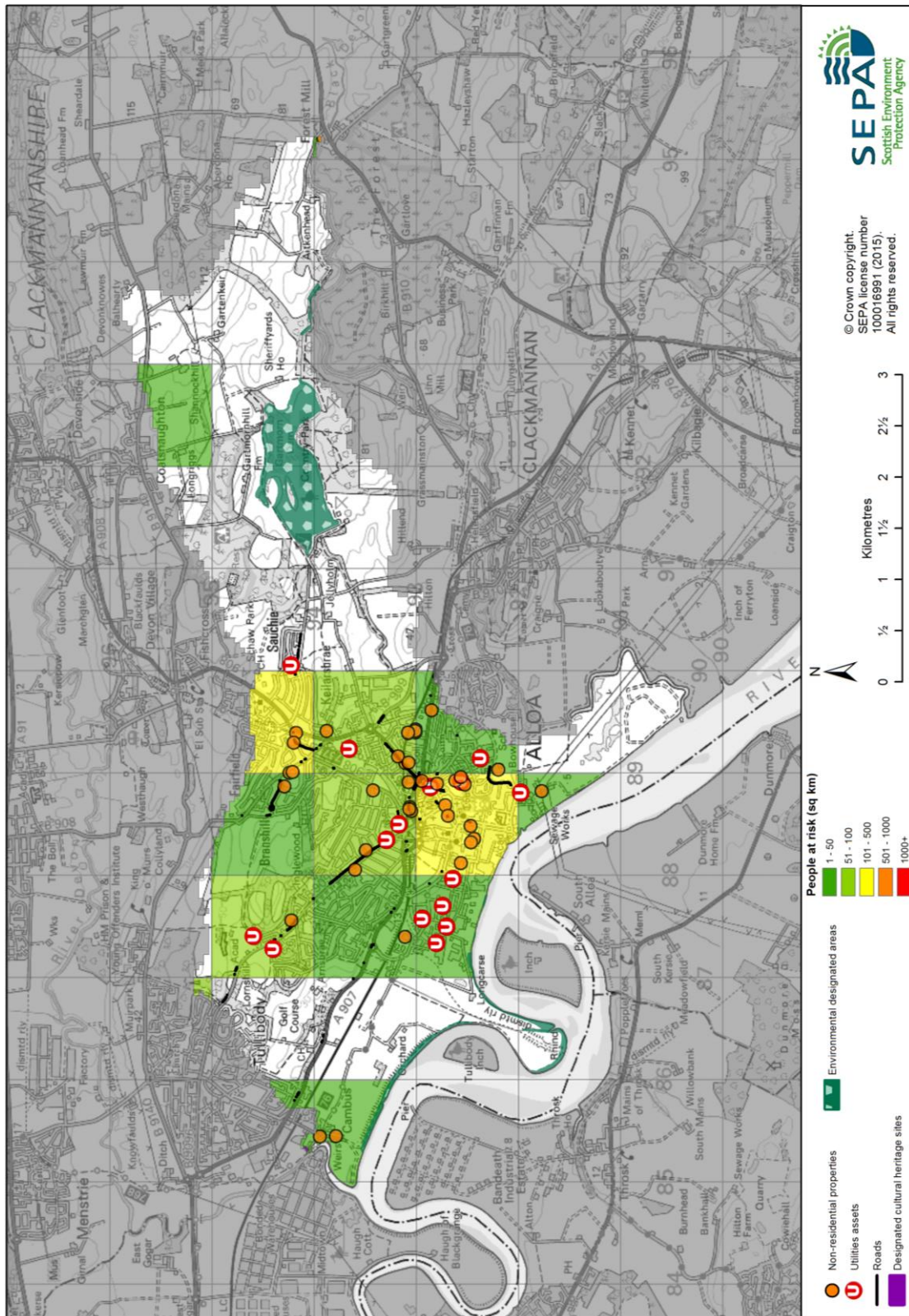


Figure 3: Impacts of flooding

## History of flooding

A number of floods have been recorded in this area. These include:

- 18 July 2012: Gartmorn Road in Sauchie was closed due to heavy rainfall in the area resulting in surface water flooding.
- December 2006: Flooding of the River Forth resulted in large areas of the carse being affected including a number of residential properties.
- 14 December 1907: Fairy Burn culvert in Alloa was overwhelmed resulting in the loss of gas supply to the town. Roads and paths were flooded up to 0.9m in Tullibody and homes throughout the district flooded.
- 18 December 1921: Coastal flooding resulting in Tullibody Island being submerged, minor damage to shipyards with timber washed off the quay and damage to agriculture.
- 25 January 1890: Alloa Harbour submerged due to highest tide in 17 years.
- 1 October 1849: Alloa Harbour flooded due to a high tide event.

## Objectives to manage flooding in Potentially Vulnerable Area 09/10

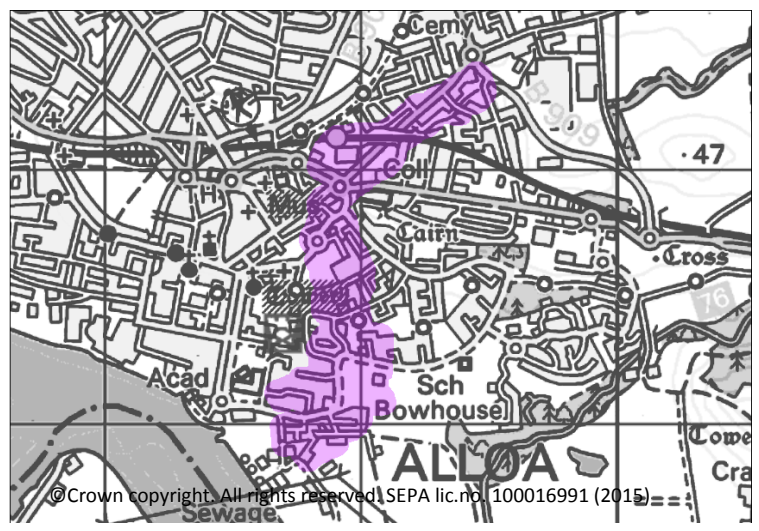
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target 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 Cambus, Alloa and Sauchie Potentially Vulnerable Area.

### Reduce economic damages to residential and non-residential properties and risk to people in Alloa caused by flooding from the Brothie Burn

Indicators:

- 430 people
- £75,000 Annual Average Damages from residential properties
- £1.0 million Annual Average Damages from non-residential properties

Target area:



Objective ID: 9028, 9029

Target area	Objective	ID	Indicators within PVA
Alloa, Alva, Menstrie, Tillicoultry, Coalsnaughton and Devonside	Reduce economic damages and number of residential properties at risk of surface water flooding in Alloa, Alva, Menstrie, Tillicoultry, Coalsnaughton and Devonside where practical	9026	* See note below
Applies across Forth Local Plan District	Avoid an overall increase in flood risk	9001	<ul style="list-style-type: none"> <li>• 350 residential properties</li> <li>• £1.4 million Annual Average Damages</li> </ul>
Applies across Forth Local Plan District	Reduce overall flood risk	9032	<ul style="list-style-type: none"> <li>• 350 residential properties</li> <li>• £1.4 million Annual Average Damages</li> </ul>
Applies across Forth 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 09/10 there are 150 residential properties at risk and Annual Average Damages of £230,000.

## Actions to manage flooding in Potentially Vulnerable Area 09/10

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 Cambus, Alloa and Sauchie Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>NEW FLOOD WARNING (90320010)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (9032)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Flood warning is required for properties at risk of coastal flooding in the Alloa Harbour area for public safety reasons. Delivery of new warnings in this area can potentially be undertaken through an extension to the existing Firth of Forth and Tay flood forecasting system and warning scheme.		

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (90260018)</b>		
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Alloa, Alva, Menstrie, Tillicoultry, Coalsnaughton and Devonside where practical (9026)		
<b>Delivery lead:</b>	Clackmannanshire Council		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2027</b>
<b>Description:</b>	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.		



<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (90260019)</b>		
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Alloa, Alva, Menstrie, Tillicoultry, Coalsnaughton and Devonside where practical (9026)		
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities		
<b>Status:</b>	<b>Ongoing</b>	Indicative delivery:	<b>2016-2027</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (90290016)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Alloa caused by flooding from the Brothie Burn (9028, 9029)		
<b>Delivery lead:</b>	Clackmannanshire Council		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Further survey work is required on the Brothie Burn to establish the level of flood risk in this area. The local authority will work collaboratively with SEPA to improve understanding of flood risk.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (90320016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (9032)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (90320019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (9032)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (90320009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (9032)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>SELF HELP (90320011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (9032)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (90320013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (9032)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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 through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

<b>Action (ID):</b>	<b>MAINTENANCE (90320007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (9032)		
<b>Delivery lead:</b>	Clackmannanshire Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (90320014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (9032)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (90010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (9001) Reduce overall flood risk (9032)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		