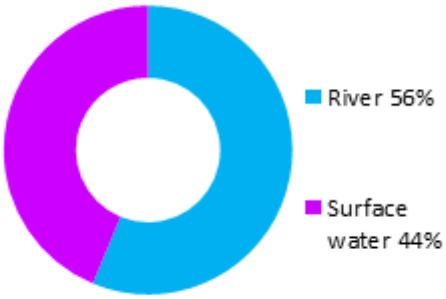
Kirriemuir and Forfar (Potentially Vulnerable Area 08/05)

Local Plan District	Local authority	Main catchment
Tay	Angus Council	River Tay

Summary of flooding impacts



At risk of flooding

- 150 residential properties
- 80 non-residential properties
- £950,000 Annual Average Damages

(damages by flood source shown left)

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.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
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

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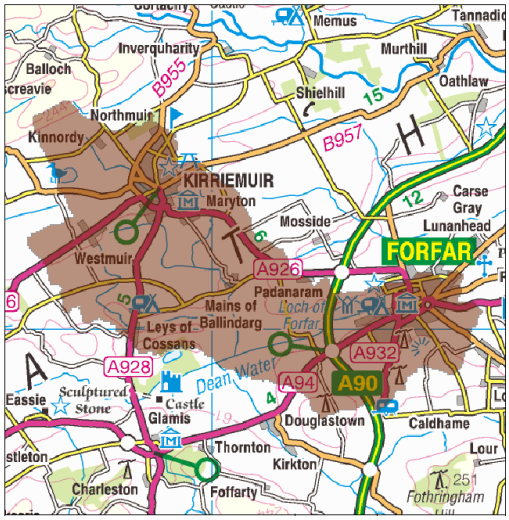
Background

This Potentially Vulnerable Area is 53km^2 (shown below). It is situated in the upper reaches of the River Tay catchment and includes Forfar and Kirriemuir. The main watercourses are Dean Water and its tributary the Ballindarg Burn (Gairie Burn).



The area has a risk of river and surface water flooding. The majority of flood damages are caused by river flooding.

There are approximately 150 residential properties and 80 non-residential properties at risk of flooding. The Annual Average Damages are approximately £950,000.

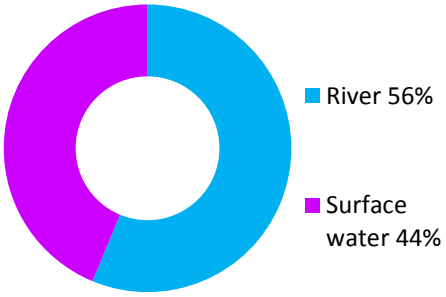


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding is to Forfar from the Dean Water and from surface water. Kirriemuir has a risk of flooding from the Gairie Burn.

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 roads, notably the A90 and A932, and residential and non-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.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 10,000)	70	150	160
Non-residential properties (total 960)	50	80	90
People	140	320	350
Community facilities	0	0	<10 Includes: educational buildings and emergency services
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	5 A roads, 6 B roads at 75 locations	5 A roads, 7 B roads at 101 locations	5 A roads, 7 B roads at 125 locations
Environmental designated areas (km^2)	0.1	0.1	0.1
Designated cultural heritage sites	3	5	6
Agricultural land (km^2)	3.7	4.1	4.3

Table 1: Summary of flooding impacts

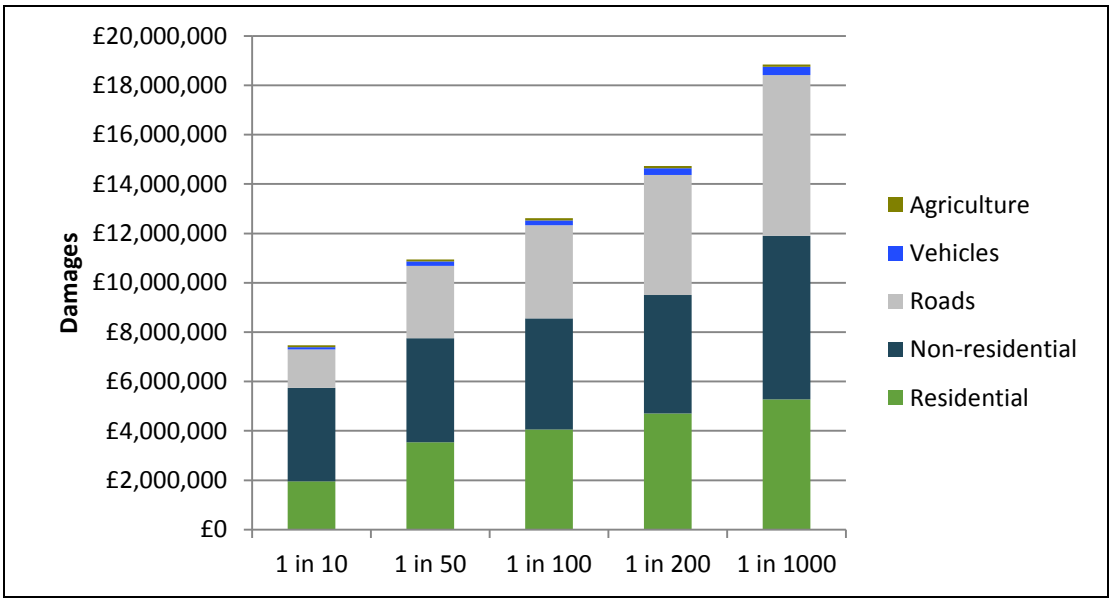


Figure 2: Damages by flood likelihood

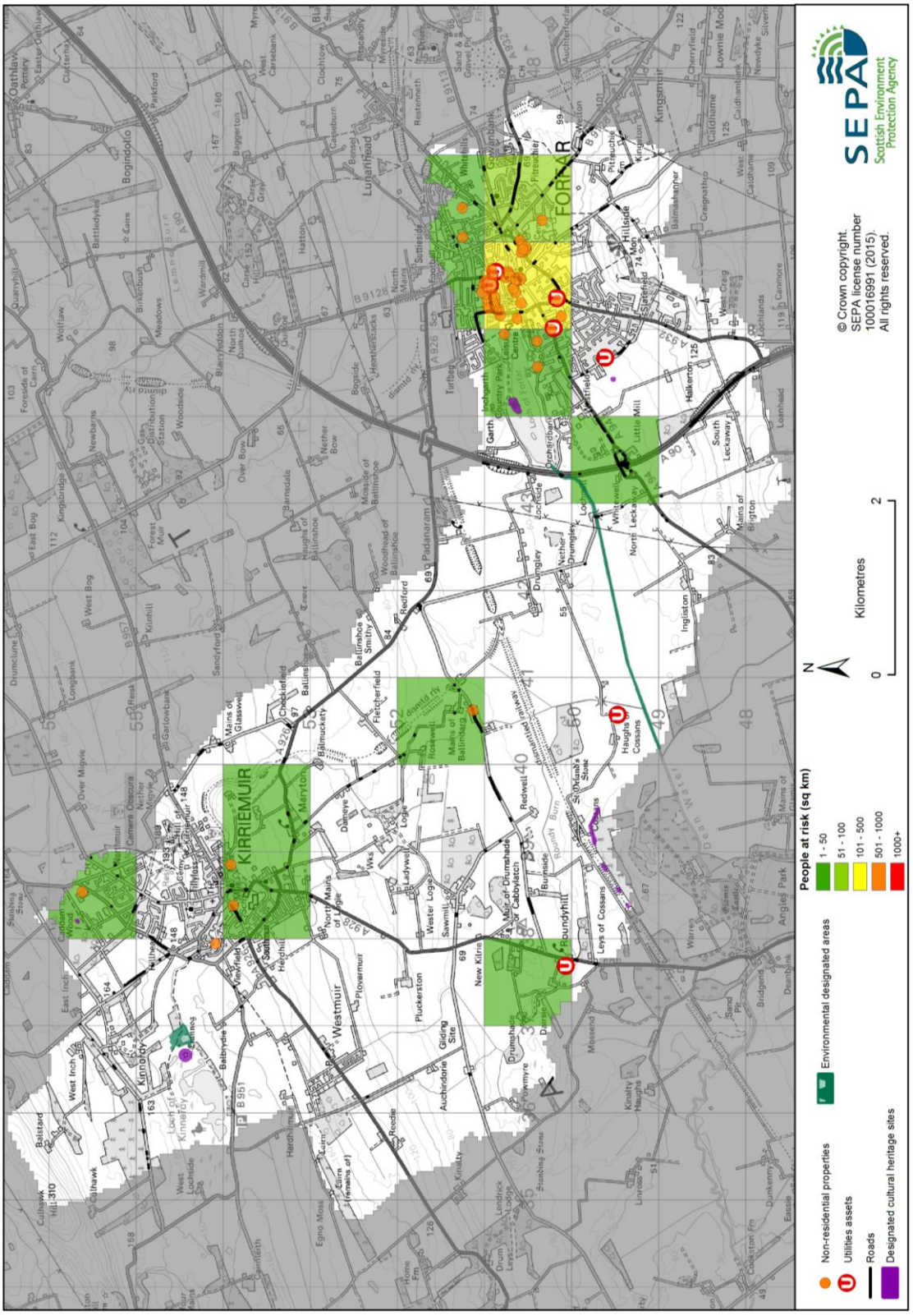


Figure 3: Impacts of flooding

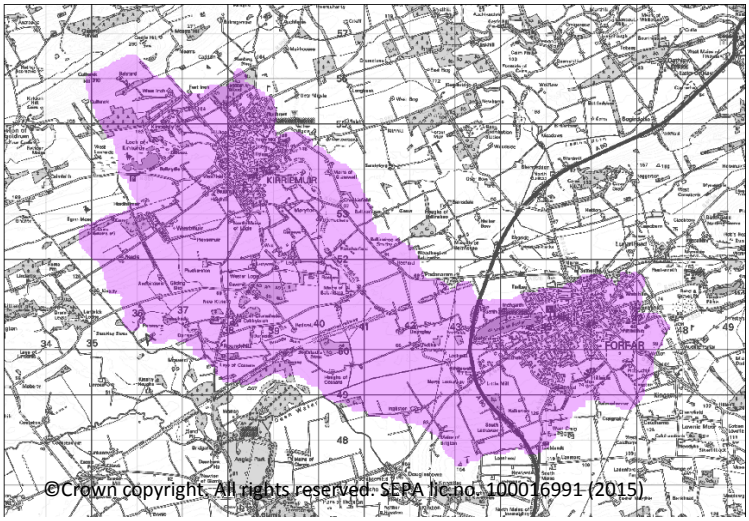
History of flooding

In August 1887, it was recorded that properties were flooded in Forfar. Localised surface water flooding has since been recorded in summer 2007, September 2009, December 2012 and January 2013.

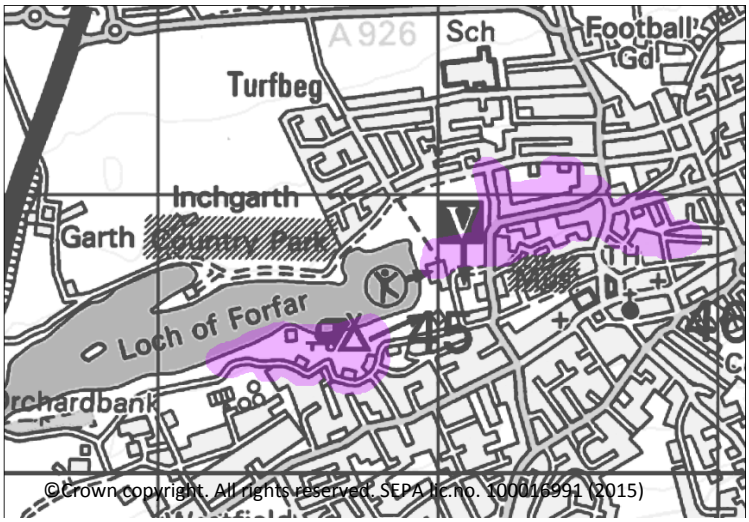
Objectives to manage flooding in Potentially Vulnerable Area 08/05

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 Kirriemuir and Forfar Potentially Vulnerable Area.

Reduce economic damages to residential and non-residential properties in the Kirriemuir and Forfar Potentially Vulnerable Area caused by river flooding

Indicators:	Target area:
• £160,000 Annual Average Damages from residential properties • £330,000 Annual Average Damages from non-residential properties	
Objective ID: 8010	

Reduce risk to people in Forfar from river flooding

Indicators:	Target area:
• 130 people	
Objective ID: 8011	

Target area	Objective	ID	Indicators within PVA
Forfar	Reduce economic damages and number of residential properties at risk of surface water flooding in Forfar where practical	8008	* See note below
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 150 residential properties • £950,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 150 residential properties • £950,000 Annual Average Damages
Applies across Tay 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 08/05 there are 90 residential properties at risk and Annual Average Damages of £410,000.

Actions to manage flooding in Potentially Vulnerable Area 08/05

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 Kirriemuir and Forfar Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
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** (80110005)		
Objective (ID):	Reduce risk to people in Forfar from river flooding (8011) Reduce economic damages and number of residential properties at risk of surface water flooding in Forfar where practical (8008)		
Delivery lead:	Angus Council		
Priority:	National:	Within local authority:	
	21 of 168	**1 of 6**	
Status:	**Ongoing**	Indicative delivery:	**2016-2021**
Description:	The flood protection study to address flooding from combined sources (river and surface water) has been recommended for Forfar. The study should assess whether flood storage, modification of conveyance, direct flood defences, sediment management and natural flood management could reduce flood risk. Natural flood management options that should be considered include river/ floodplain restoration and sediment management. The study should also investigate the viability of property level protection. The study should include surface water investigations and should be taken forward in partnership with Scottish Water. It should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
Potential impacts			
Economic:	The study could benefit 45 residential properties and 28 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £13 million.		
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive		

Social:	benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection study area. In addition the study could benefit two utilities and one railway line located within the study area. Natural flood management actions can restore and enhance natural environments 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. Dean Water (water body ID 6556) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the 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 River Tay Special Area of Conservation. Conservation areas and scheduled monuments are also present in the study area and could be positively or negatively impacted.

Action (ID):	**FLOOD PROTECTION STUDY** (80100005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in the Kirriemuir and Forfar Potentially Vulnerable Area caused by river flooding (8010)		
Delivery lead:	Angus Council		
Priority:	National:		Within local authority:
	127 of 168		**6 of 6**
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	A flood protection study has been recommended for Kirriemuir to assess whether flood storage, sediment management, modification of conveyance, direct flood defences and natural flood management could reduce flood risk. Natural flood management options that should be considered include floodplain restoration and sediment management. The study should also consider the viability of property level protection and property relocation. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
Potential impacts			
Economic:	The study could benefit 15 residential properties at risk of flooding in this location, with potential damages avoided of up to £1.2 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 and socially vulnerable people located within the flood protection study area. In addition the study could benefit two utilities and one railway line located within the study area. Natural flood management actions can restore and enhance natural environments 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. Dean Water and Gairie Burn (water body IDs 6556 and 6563) are located within the study area and the physical condition of these rivers is identified by SEPA to be at less than good status. Opportunities to improve the condition of the 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 River Tay Special Area of Conservation and Loch of Kinnordy Special Protection Area. Conservation areas and scheduled monuments are also present in the study area and could be positively or negatively impacted.

Action (ID):	**SURFACE WATER PLAN/STUDY** (80080018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Forfar where practical (8008)		
Delivery lead:	Angus Council		
Status:	**Ongoing**	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. This surface water management plan will be delivered by the local authority as part of a flood protection study.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the Dean Water and Gairie Burn areas to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
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** (80100017)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in the Kirriemuir and Forfar Potentially Vulnerable Area caused by river flooding (8010)		
Delivery lead:	Angus Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the existing Kirriemuir Flood Protection Scheme that provides protection to Kirriemuir from the Gairie Burn.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
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** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
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** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
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 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.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
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** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	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. Angus Council operates an emergency response plan in areas of high flood risk.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	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.		