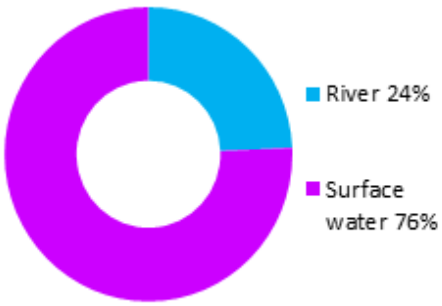
Braid Burn catchment (Potentially Vulnerable Area 10/19)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council	Braid Burn

Summary of flooding impacts



At risk of flooding

- 750 residential properties
- 210 non-residential properties
- £1.2 million 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.

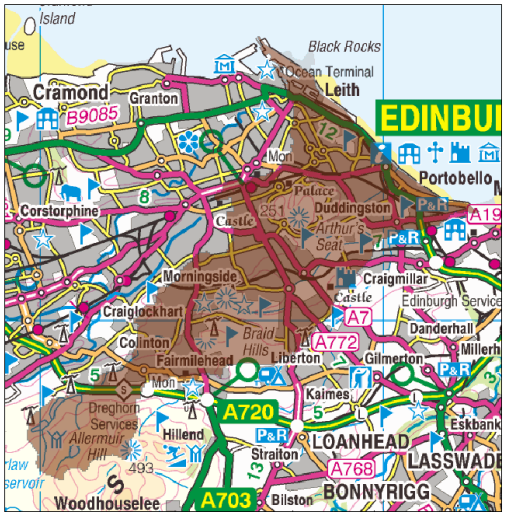
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency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

Braid Burn Catchment (Potentially Vulnerable Area 10/19)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council	Braid Burn

Background

This Potentially Vulnerable Area is 43km^2 and includes the whole of the Braid Burn catchment (shown below). It covers central Edinburgh and its suburbs to the south including Oxgangs, Prestonfield and Craigmillar.



The main watercourse is the Braid Burn flowing through Colinton Mains, Oxgangs, Duddingston and Durham before discharging into the Firth of Forth at Portobello. However, the main source of flooding is from surface water.

There are approximately 750 residential properties and 210 non-residential properties at risk of flooding. The Annual Average Damages are approximately £1.2 million.

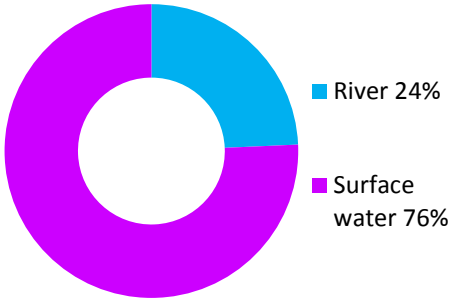


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The risk of surface water flooding is spread out across the greater Edinburgh urban area. The risk of flooding from the Braid Burn is reduced by the Braid Burn Flood Protection Scheme.

The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, protected 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 location of the impacts from 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 is one asset 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 66,000)	140	750	1,900
Non-residential properties (total 5,100)	60	210	450
People	310	1,700	4,200
Community facilities	0	<10 Includes: educational buildings and healthcare facilities	<10 Includes: educational buildings and healthcare facilities
Utilities	<10	20	20
Transport links (excluding minor roads)	10 A roads, 1 B road at 53 locations 2 Railway routes at 26 locations: Berwick-upon-Tweed to Edinburgh Edinburgh Waverley to Glasgow Queen Street	12 A roads, 2 B roads at 132 locations 2 Railway routes at 36 locations: Berwick-upon-Tweed to Edinburgh Edinburgh Waverley to Glasgow Queen Street	12 A roads, 2 B roads at 173 locations 2 Railway routes at 38 locations: Berwick-upon-Tweed to Edinburgh Edinburgh Waverley to Glasgow Queen Street
Environmental designated areas (km^2)	0.5	0.6	0.6
Designated cultural heritage sites	14	30	43
Agricultural land (km^2)	0.5	0.6	0.7

Table 1: Summary of flooding impacts

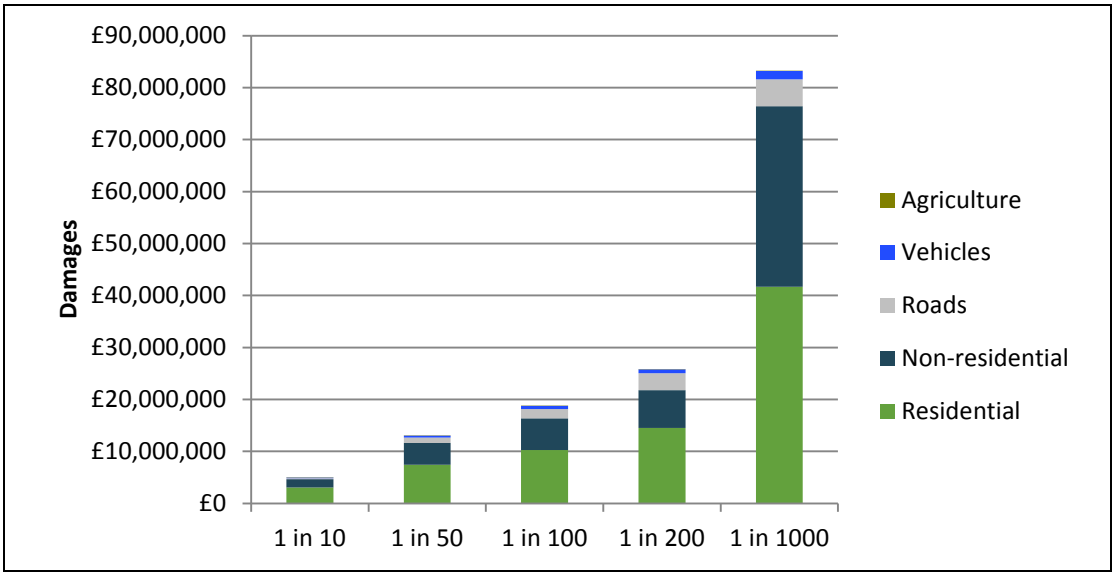


Figure 2: Damages by flood likelihood

History of flooding

This area has a long history of flooding from Braid Burn, the sea and surface water. The following significant floods have been recorded in this area:

- 8 July 2011: Surface water flooding of homes and businesses in Edinburgh. Balcarres Street in Morningside was identified as the worst affected area with around 20 residential properties and 3 commercial properties flooded.
- 30 March 2010: A tidal surge coinciding with the highest mean tides of the year caused extensive coastal flooding along the east coast of Scotland, with the Firth of Forth being one of the worst affected areas. Locations within this coastal area affected included Leith, Musselburgh, Prestonpans, Port Seton, Dunbar and North Berwick. Impacts included flooding of properties, damage to harbours, seawalls and roads with Edinburgh City Council estimating the costs to repair damages in the region of £650,000.
- 26 April 2000: Flooding from the Braid Burn. Areas from Colinton to Portobello flooded to an estimated depth of greater than 2m in some areas.
- 4 April 1958: Portobello Promenade and nearby houses were flooded during a coastal flood event.
- 1877: Sea wall washed away between Portobello and Joppa due to flooding from the sea.

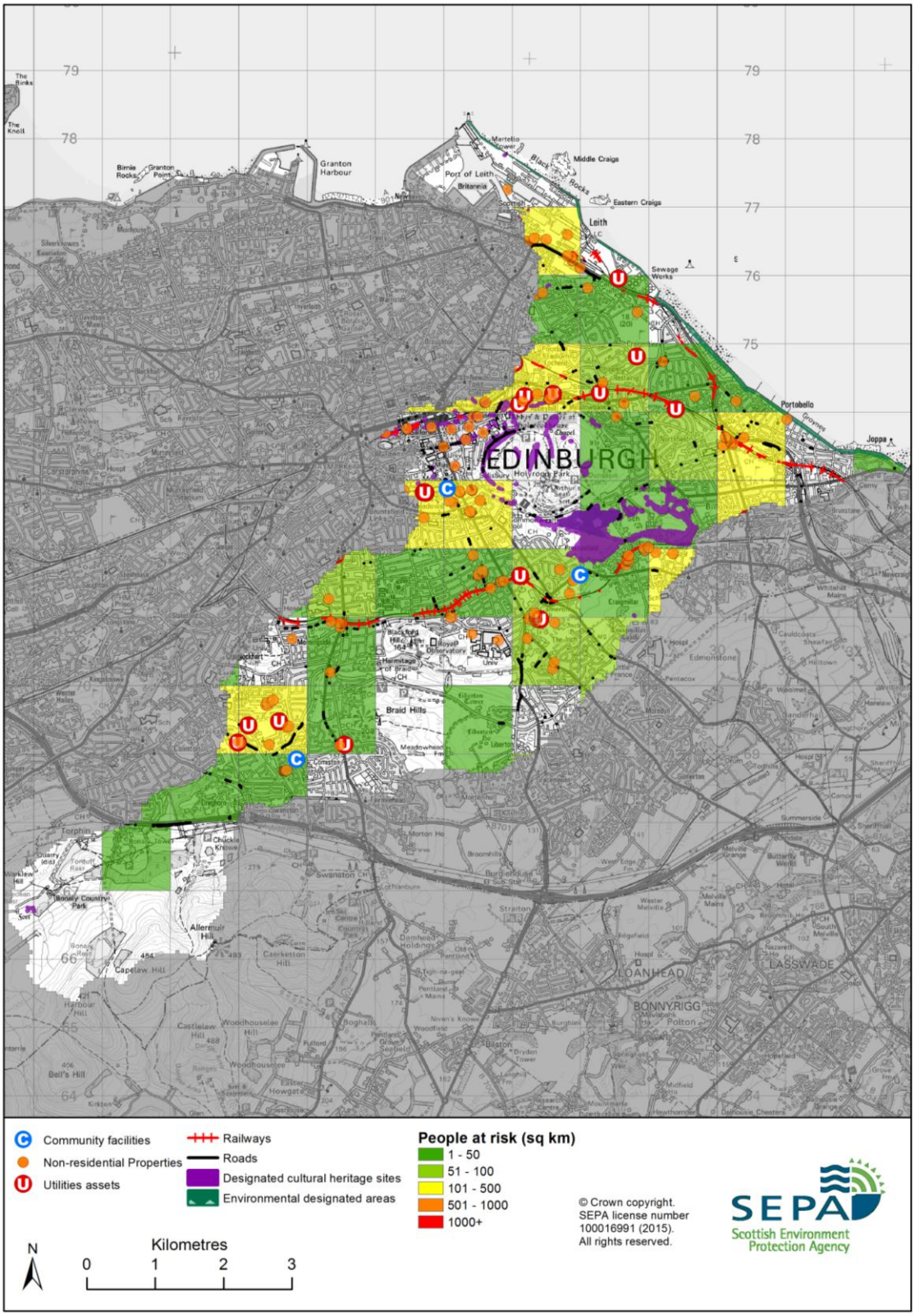
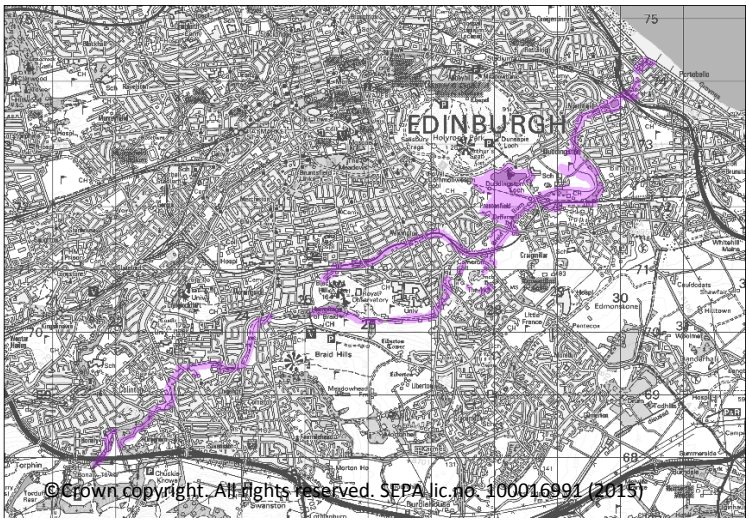


Figure 3: Impacts of flooding

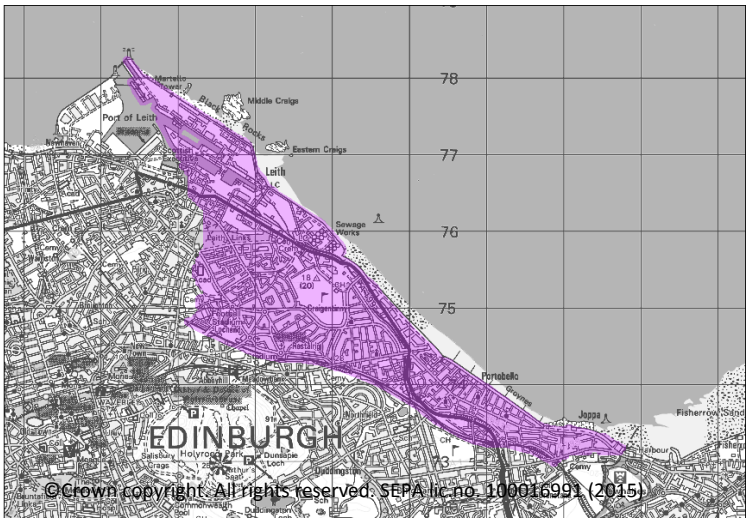
Objectives to manage flooding in Potentially Vulnerable Area 10/19

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 the Braid Burn catchment Potentially Vulnerable Area.

Accept that flood risk in Edinburgh is managed appropriately. Maintain existing flood protection scheme that reduces risk to residential and non-residential properties and community facilities in Edinburgh caused by flooding from the Braid Burn.

Indicators:	Target area:
• 950 residential properties protected • 30 non-residential properties protected • 10 community facilities	
Objective ID: 10067	

Accept coastal flooding in Leith and Portobello is managed appropriately. Maintain existing actions that protect residential and non-residential properties from coastal flooding.

Indicators:	Target area:
No indicators available	
Objective ID: 10068	

Target area	Objective	ID	Indicators within PVA
Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical	10052	* See note below
Applies across Forth Estuary Local Plan District	Avoid an overall increase in flood risk	10001	• 750 residential properties • £1.2 million Annual Average Damages
Applies across Forth Estuary Local Plan District	Reduce overall flood risk	10099	• 750 residential properties • £1.2 million Annual Average Damages
Applies across Forth Estuary 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 10/19 there are 720 residential properties at risk and Annual Average Damages of £890,000.

Actions to manage flooding in Potentially Vulnerable Area 10/19

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 the Braid Burn catchment 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):	**SURFACE WATER PLAN/STUDY** (100520018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)		
Delivery lead:	The City of Edinburgh Council, Midlothian Council, East Lothian 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** (100520019)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)		
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** (100990016)		
Objective (ID):	Reduce overall flood risk (10099)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	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.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (100990019)		
Objective (ID):	Reduce overall flood risk (10099)		
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** (100670017)		
Objective (ID):	Accept that flood risk in Edinburgh is managed appropriately. Maintain existing flood protection scheme that reduces risk to residential and non-residential properties and community facilities in Edinburgh caused by flooding from the Braid Burn. (10067)		
Delivery lead:	The City of Edinburgh Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the existing Braid Burn Flood Protection Scheme in Edinburgh. The scheme reduces the risk of flooding to homes and businesses along the Braid Burn between Redford Road and Portobello.		

Action (ID):	**MAINTAIN FLOOD PROTECTION SCHEME** (100680017)		
Objective (ID):	Accept coastal flooding in Leith and Portobello is managed appropriately. Maintain existing actions that protect residential and non-residential properties from coastal flooding. (10068)		
Delivery lead:	The City of Edinburgh Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the existing flood defences along the coast.		

Action (ID):	**MAINTAIN FLOOD WARNING** (100990030)		
Objective (ID):	Reduce overall flood risk (10099)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Colinton Mains, Mid Liberton and Cameron Toll, Inch Park and Peffermill and the Portobello flood warning areas which are part of the Braid Burn river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (100990009)		
Objective (ID):	Reduce overall flood risk (10099)		
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** (100990011)		
Objective (ID):	Reduce overall flood risk (10099)		
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. The City of Edinburgh Council has issued properties on Balcarres Street with door and vent flood guards.		

Action (ID):	**AWARENESS RAISING** (100990013)		
Objective (ID):	Reduce overall flood risk (10099)		
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** (100990007)		
Objective (ID):	Reduce overall flood risk (10099)		
Delivery lead:	The City of Edinburgh 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** (100990014)		
Objective (ID):	Reduce overall flood risk (10099)		
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. The City of Edinburgh Council operates Emergency Action Packs to determine where people should be deployed during flood events. The City of Edinburgh Council also owns temporary pallet barriers and sandbags that can be used to protect properties from river flooding.		

Action (ID):	**PLANNING POLICIES** (100010001)		
Objective (ID):	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)		
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.		