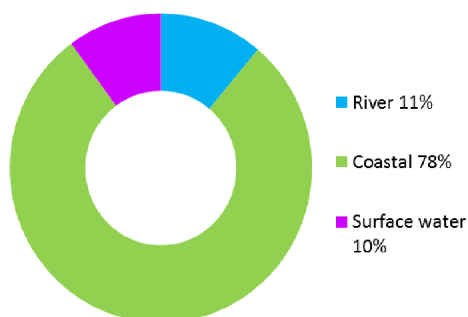


Helensburgh to Loch Long (Potentially Vulnerable Area 11/02)

Local Plan District	Local authority	Main catchment
Clyde and Loch Lomond	Argyll and Bute Council	Loch Long and Gare Loch

Summary of flooding impacts



At risk of flooding

- 70 residential properties
- 90 non-residential properties
- £390,000 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.

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

Actions

Helensburgh to Loch Long (Potentially Vulnerable Area 11/02)

Local Plan District	Local authority	Main catchment
Clyde and Loch Lomond	Argyll and Bute Council	Loch Long and Gare Loch

Background

This Potentially Vulnerable Area is located to the north of the Firth of Clyde. It incorporates Helensburgh and Garelochhead and is approximately 100km² (shown below). It includes part of the Loch Lomond and Trossachs National Park.

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

There are approximately 70 residential properties and 90 non-residential properties at risk of flooding. The Annual Average Damages are approximately £390,000.

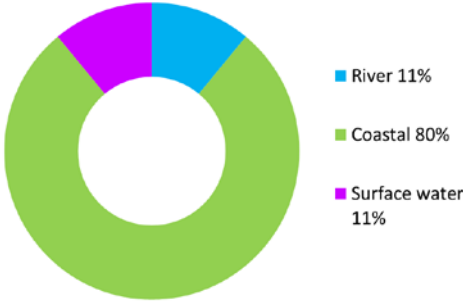


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

Coastal flooding affects the shoreline within Loch Long and Gare Loch. The coastal modelling does not take into account the impact of wave overtopping and as a result coastal flood risk may be underestimated.

Areas where residential properties are at risk include Coulport, Kilcreggan, Rosneath, Clynder, Garelochhead, Shandon and Helensburgh. It is also recognised that passenger ferry piers at Helensburgh and Kilcreggan lie within an area of coastal flood risk. A number of other transport routes are also at risk (notably the A83 and A814).

River flooding within the area is primarily attributed to the Mcaulay Burn, which flows into the northern end of Gare Loch at Garelochhead where residential properties are at risk. To the south there is a risk of flooding to residential properties from the Red Burn in Craigendoran, in the vicinity of the A814.

Surface water flooding is identified as a risk near Garelochhead and Craigendoran, with impacts to utilities and transport routes. The methodology for the national surface water flood maps is known to underestimate the risk in Kilcreggan and Helensburgh. The areas at highest risk from surface water flooding will require the preparation of surface water management plans.

The risk of flooding to people and 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. Residential and non-residential properties affected by coastal flooding experience the highest economic impact, contributing to approximately 50% of the overall damages.

Within this Potentially Vulnerable Area it is estimated that climate change will increase the number of residential properties at risk of flooding from approximately 70 to 230 and the number of non-residential properties from approximately 90 to 200.

The location of the impacts is shown in Figure 3. Most of impacts are along the A814 at Helensburgh and the B872 at Garelochhead. This includes flooding to people, properties, utilities and the A814 itself which floods at Helensburgh.

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.

History of flooding

The seafront at Helensburgh along East/West Clyde Street is susceptible to coastal flooding, with records dating back to 1922. A report compiled by Halcrow in 2001 stated that the highest sea level recorded at Helensburgh was experienced on the 5 January 1991. On the 8 December 2011 storms on the west coast of Scotland caused damages in Helensburgh. On the 18 November 2010, storms and high tides submerged the car park at Helensburgh pier and stranded vehicles. Historical flood records show that coastal flooding has taken place in this Potentially Vulnerable Area in 1922, 1961, 2002 and 2004.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 10,000)	30	70	140
Non-residential properties (total 2,300)	50	90	150
People	60	150	310
Community facilities	<10 Emergency services	<10 Includes: emergency services and healthcare facilities	<10 Includes: emergency services, educational buildings and healthcare facilities
Utilities assets	<10	<10	10
Transport links - roads (km)	4.4 (of which 0.1 is A road)	7.1 (of which 0.2 is A road)	8.9 (of which 0.2 is A road)
Transport links - rail (km)	0.5	0.6	0.5
Environmental designated areas (km ²)	0.3	0.3	0.3
Designated cultural heritage sites	5	6	6
Agricultural land (km ²)	0.2	0.3	0.4

Table 1: Summary of flooding impacts¹

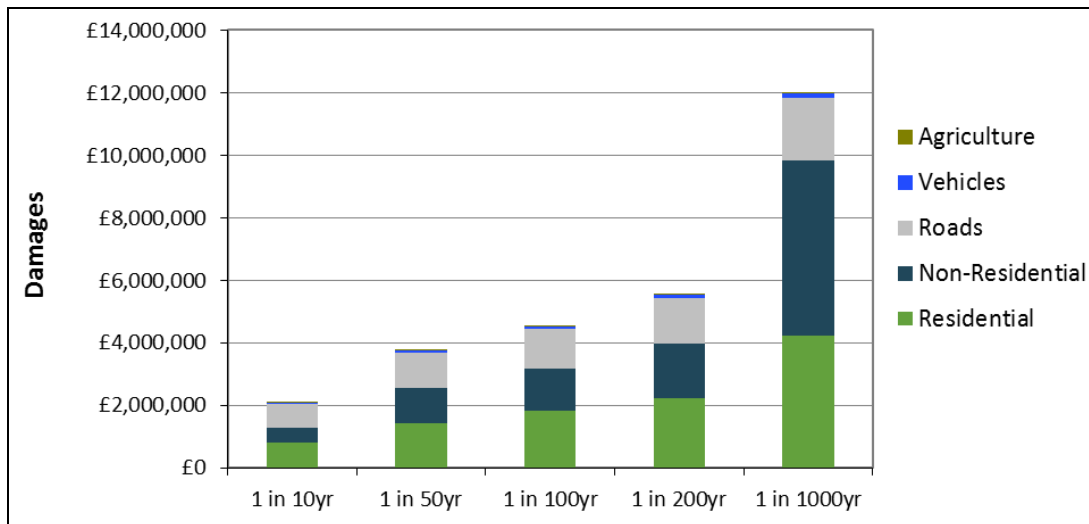


Figure 2: Damages by flood likelihood

¹ Some receptors are counted more than once if flooded from multiple sources

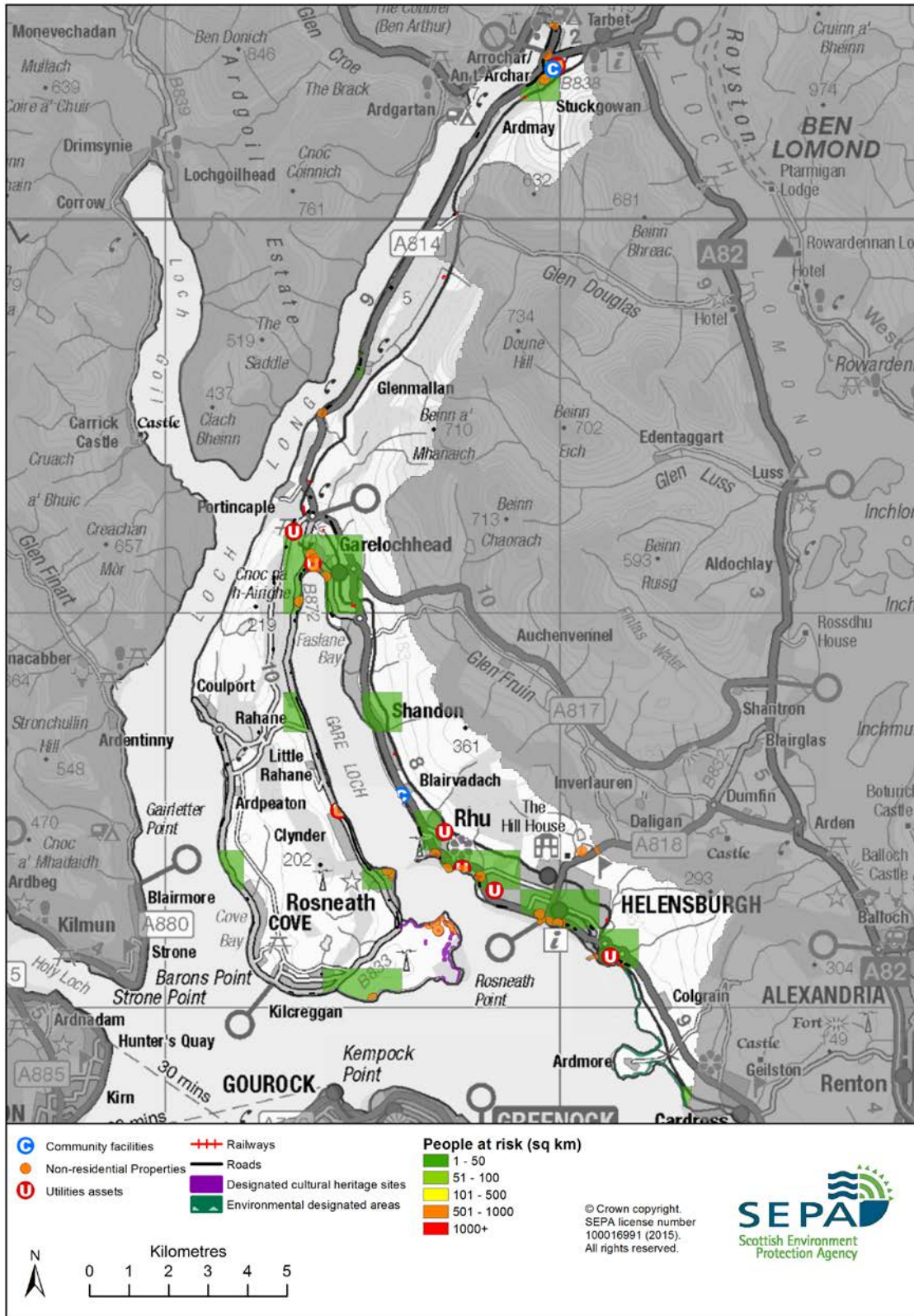


Figure 3: Impacts of flooding

Objectives to manage flooding in Potentially Vulnerable Area 11/02

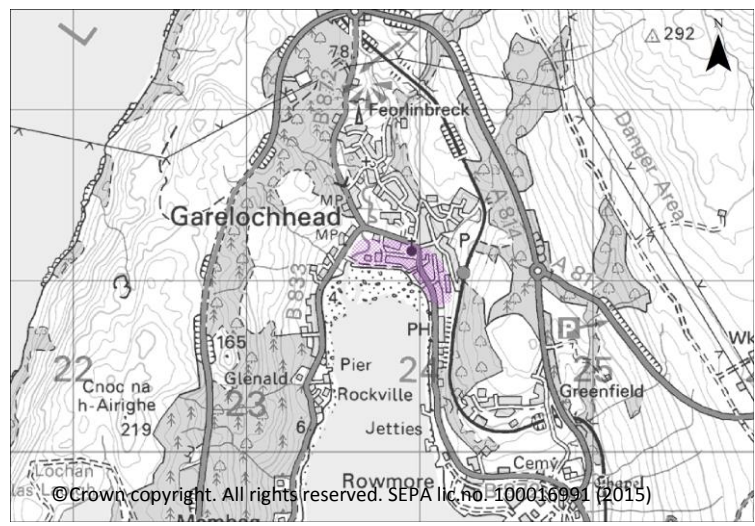
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

Reduce the risk of coastal flooding to residential properties and non-residential properties in Garelochhead

Indicators:

- 10 residential properties
- <10 non-residential properties
- £47,000 Annual Average Damages

Target area:



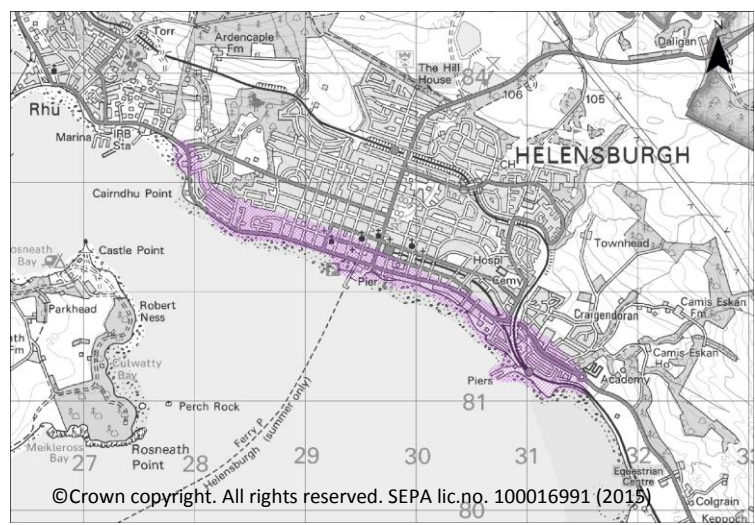
Objective ID: 11002

Reduce the risk of coastal flooding to residential properties and non-residential properties in Helensburgh

Indicators:

- 30 residential properties
- 10 non-residential properties
- £48,000 Annual Average Damages

Target area:



Objective ID: 11003

Target area	Objective	ID	Indicators within PVA
Craigendoran	Reduce the physical or disruption risk related to the transport network for rail.	11301	<ul style="list-style-type: none"> • 0.3km of rail track at 1 location
Kilcreggan	Reduce the economic damages and risk to people from surface water flooding in Kilcreggan	11084	* See note below
Applies across Clyde and Loch Lomond Local Plan District	Avoid an overall increase in flood risk	11127	<ul style="list-style-type: none"> • 70 residential properties • £390,000 Annual Average Damages
Applies across Clyde and Loch Lomond Local Plan District	Reduce overall flood risk	11132	<ul style="list-style-type: none"> • 70 residential properties • £390,000 Annual Average Damages
Applies across Clyde and Loch Lomond 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 11/02 there are 10 residential properties at risk and Annual Average Damages of £43,000.

Actions to manage flooding in Potentially Vulnerable Area 11/02

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 Helensburgh to Loch Long Potentially Vulnerable Area.

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

Action (ID):	FLOOD PROTECTION SCHEME/WORKS (110840005)		
Objective (ID):	Reduce the economic damages and risk to people from surface water flooding in Kilcreggan (11084)		
Delivery lead:	Argyll and Bute Council		
Status:	Under development	Indicative delivery:	2016-2021
Description:	<p>Argyll and Bute Council have completed a study of surface water flooding in Kilcreggan, which identified frequent surface water flooding due to runoff from the surrounding area. It is recommended that mitigation options are further refined to produce an economic appraisal of benefits from flood protection works. The preparation work should also examine the use of property level protection as a single action and in combination with other actions and the potential benefits of natural flood management for runoff control. This work is linked to the surface water management plan.</p> <p>The work has not been prioritised as further investigation is required to develop the work that will be carried out and to establish the benefits of the work.</p>		
Potential impacts			
Economic:	The economic impacts will be established during the study, however frequent flooding to roads has been experienced.		
Social:	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community.		
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment.		

Action (ID):	FLOOD PROTECTION SCHEME/WORKS (113010021)		
Objective (ID):	Reduce the physical or disruption risk related to the transport network for rail. (11301)		
Delivery lead:	Network Rail		
Status:	Under development	Indicative delivery:	2016-2021
Description:	Network Rail will carry out civil engineering work which will reduce flood risk to identified sections of the rail network within this Potentially Vulnerable Area.		

Action (ID):	FLOOD PROTECTION STUDY (110030005)		
Objective (ID):	Reduce the risk of coastal flooding to residential properties and non-residential properties in Helensburgh (11003)		
Delivery lead:	Argyll and Bute Council		
Priority:	National:	Within local authority:	
	127 of 168	4 of 9	
Status:	Not started	Indicative delivery:	2016-2021
Description:	A study is recommended to further investigate the feasibility of new and or enhanced sections of defences along the seafront of Helensburgh. This study should look to complement and enhance the proposed development along the seafront including a new swimming pool and raised car park in Helensburgh. The study should also consider the potential for natural flood management actions to help reduce coastal flooding and the maintenance of defences. Other actions may also be considered to select the most sustainable combination of actions.		

Potential impacts	
Economic:	The flood protection study should consider how to reduce flooding to 26 residential properties and 13 non-residential properties. The potential damages avoided are estimated to be up to £1.2 million. A reduction of flooding in the area could have a positive economic benefit to the local economy.
Social:	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. There may be changes in visual amenity and land use as a result of this action.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Within the study area the Outer Clyde Estuary (water body ID 200320) is identified by river basin management planning to be at less than good status for its physical condition. Future works could improve the condition of the estuary or degrade it. Opportunities to improve the condition of the estuary should be considered by coordinating with river basin management planning. The study should seek to ensure that actions will not have an adverse effect on the integrity of the Inner Clyde Special Protection

Environmental: Area and Ramsar sites in the area.

Action (ID):	FLOOD PROTECTION STUDY (110020005)		
Objective (ID):	Reduce the risk of coastal flooding to residential properties and non-residential properties in Garelochhead (11002)		
Delivery lead:	Argyll and Bute Council		
Priority:	National:	Within local authority:	
	132 of 168	5 of 9	
Status:	Not started	Indicative delivery:	2022-2027
Description:	A study is recommended to further investigate the feasibility of an increased level of protection against coastal flooding in Garelochhead, focusing on the tidal sections of the McAuley Burn and the potential to enhance the existing retaining wall. The study should also investigate the benefits of a property level protection scheme. Other actions may also be considered to select the most sustainable combination of actions.		
Potential impacts			
Economic:	The flood protection study should consider how to reduce flooding to 12 residential properties and five non-residential properties. The potential damages avoided are estimated to be up to £1.3 million.		
Social:	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. There may be changes in visual amenity and land use as a result of this action.		
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. There are no international or national level environmental designations that are likely to be impacted by this action. Depending on the potential to enhance the current wall, there may be a direct loss of natural and semi-natural habitat, including intertidal areas, in the direct footprint and vicinity of the defences. There is the potential for direct defences to have direct negative impacts on the setting of listed buildings on Shore Walk.		

Action (ID):	SURFACE WATER PLAN/STUDY (110840018)		
Objective (ID):	Reduce the economic damages and risk to people from surface water flooding in Kilcreggan (11084)		
Delivery lead:	Argyll and Bute 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):	STRATEGIC MAPPING AND MODELLING (111320016)		
Objective (ID):	Reduce overall flood risk (11132)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,200km ² of improved surface water data is currently available within this Local Plan District. The inclusion of additional surface water hazard data resulting from the completion of local authority surface water management plans and Scottish Water integrated catchment studies will be considered as these projects are completed.		

Action (ID):	STRATEGIC MAPPING AND MODELLING (111320019)		
Objective (ID):	Reduce overall flood risk (11132)		
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 WARNING (111320030)		
Objective (ID):	Reduce overall flood risk (11132)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the Helensburgh A814 flood warning area which is part of the Firth of Clyde coastal flood warning scheme.		

Action (ID):	FLOOD FORECASTING (111320009)		
Objective (ID):	Reduce overall flood risk (11132)		
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 (111320011)		
Objective (ID):	Reduce overall flood risk (11132)		
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 (111320013)		
Objective (ID):	Reduce overall flood risk (11132)		
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 (111320007)		
Objective (ID):	Reduce overall flood risk (11132)		
Delivery lead:	Argyll & Bute 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 (111320014)		
Objective (ID):	Reduce overall flood risk (11132)		
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.		

Action (ID):	PLANNING POLICIES (111270001)		
Objective (ID):	Avoid an overall increase in flood risk (11127) Reduce overall flood risk (11132)		
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.		