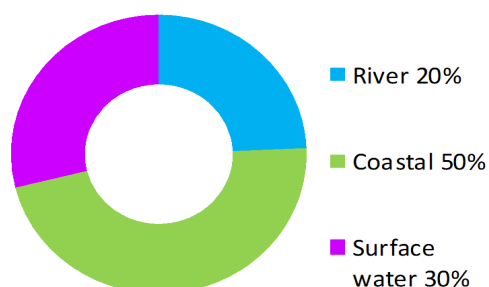


Prestwick and Ayr (Potentially Vulnerable Area 12/09)

Local Plan District	Local authority	Main catchment
Ayrshire	South Ayrshire Council	Doonfoot to Monkton coastal

Summary of flooding impacts



At risk of flooding

- 300 residential properties
- 160 non-residential properties
- £240,000 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>	Natural flood management works	<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
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

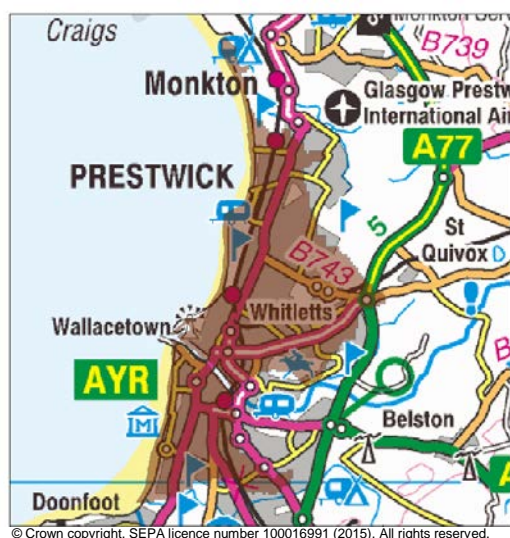
Actions

Prestwick and Ayr (Potentially Vulnerable Area 12/09)

Local Plan District	Local authority	Main catchment
Ayrshire	South Ayrshire Council	Doonfoot to Monkton coastal

Background

This Potentially Vulnerable Area is located on the west coast of the Ayrshire Local Plan District along the Prestwick and Ayr coastline. It is approximately 10km² (shown below).



© Crown copyright. SEPA licence number 100016991 (2015). All rights reserved.

There are approximately 300 residential properties and 160 non-residential properties at risk of flooding. The Annual Average Damages are approximately £240,000.

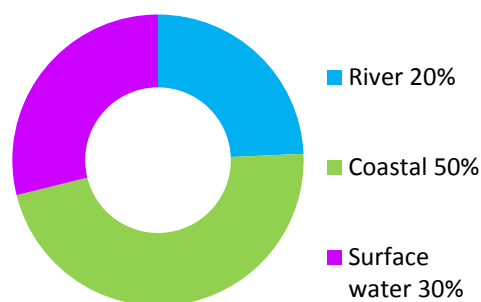


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

This area fronts onto the Firth of Clyde and has tidally influenced rivers, including the River Ayr which flows through the centre as far as the Nethermills weir at Victoria Bridge. The most notable area at risk of coastal flooding is Prestwick. This assessment does not include the impact of wave overtopping which is known to occur in Prestwick and Newton Shore, therefore the reported risk from coastal flooding may be underestimated. Cunning Park in Ayr is also predicted to flood, putting a large number of properties at risk.

River flooding is mainly attributed to the River Ayr, with properties along the course of the river impacted. River flooding is also attributed to a lesser extent to the Slaphouse Burn, which is located just outside the area and is predicted to impact properties in Cunning Park in Ayr.

In this area there are a large number of culverts and structures, plus the potential for interaction between river and surface water flooding. This complexity means that the strategic modelling used for this area carries more uncertainty than some other areas. A more detailed study of flooding and the interaction between different sources of flooding is currently underway, to improve the understanding of flooding in the area.

Interaction between coastal and river flooding is predicted to occur in the lower reaches of the River Ayr where it discharges to the Firth of Clyde.

Surface water flooding is shown to impact residential properties within the area of Whitletts, Heathfield, Lockside and Belmont, along with sections of main rail and road routes (notably the A77). 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 properties affected by coastal flooding experience the highest economic impact at approximately 40% of the damages. Non-residential properties also provide a notable proportion of the 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 300 to 1,200 and the number of non-residential properties from approximately 160 to 340.

The location of the impacts of flooding is shown in Figure 3. Most of the impacts are within Prestwick and Ayr and flooding to people, non-residential properties, utilities, roads and railways.

History of flooding

Previous coastal and river flooding generally had limited impact to people or property and occurred infrequently. However in December 2013 and January 2014 tidal surges flooded the town of Prestwick. Surface water flooding has also been reported in November 2006 in Belmont.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 18,500)	<10	300	960
Non-residential properties (total 2,900)	10	160	290
People	20	670	2,000
Community facilities	0	0	<10 Educational buildings
Utilities assets	0	20	30
Transport links - roads (km)	0.5 (of which <0.1 is A road)	2.1 (of which <0.1 is A road)	2.4 (of which <0.1 is A road)
Transport links - rail (km)	0.1	3.8	3.8
Environmental designated areas (km ²)	0	0	0
Designated cultural heritage sites	1	1	2
Agricultural land (km ²)	0.1	0.1	0.3

Table 1: Summary of flooding impacts¹

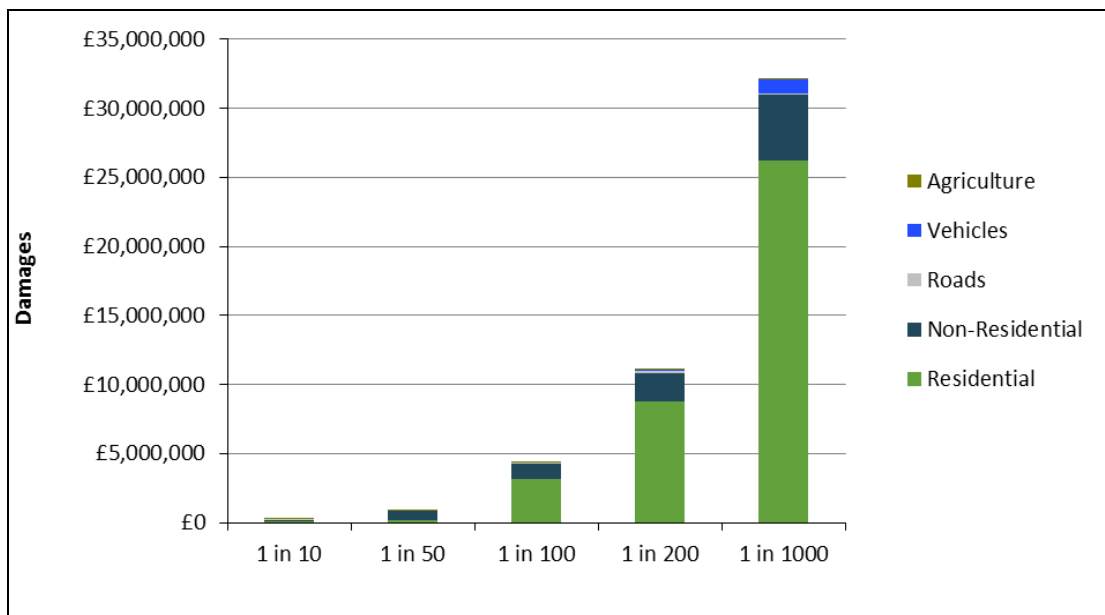


Figure 2: Damage by flood likelihood

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

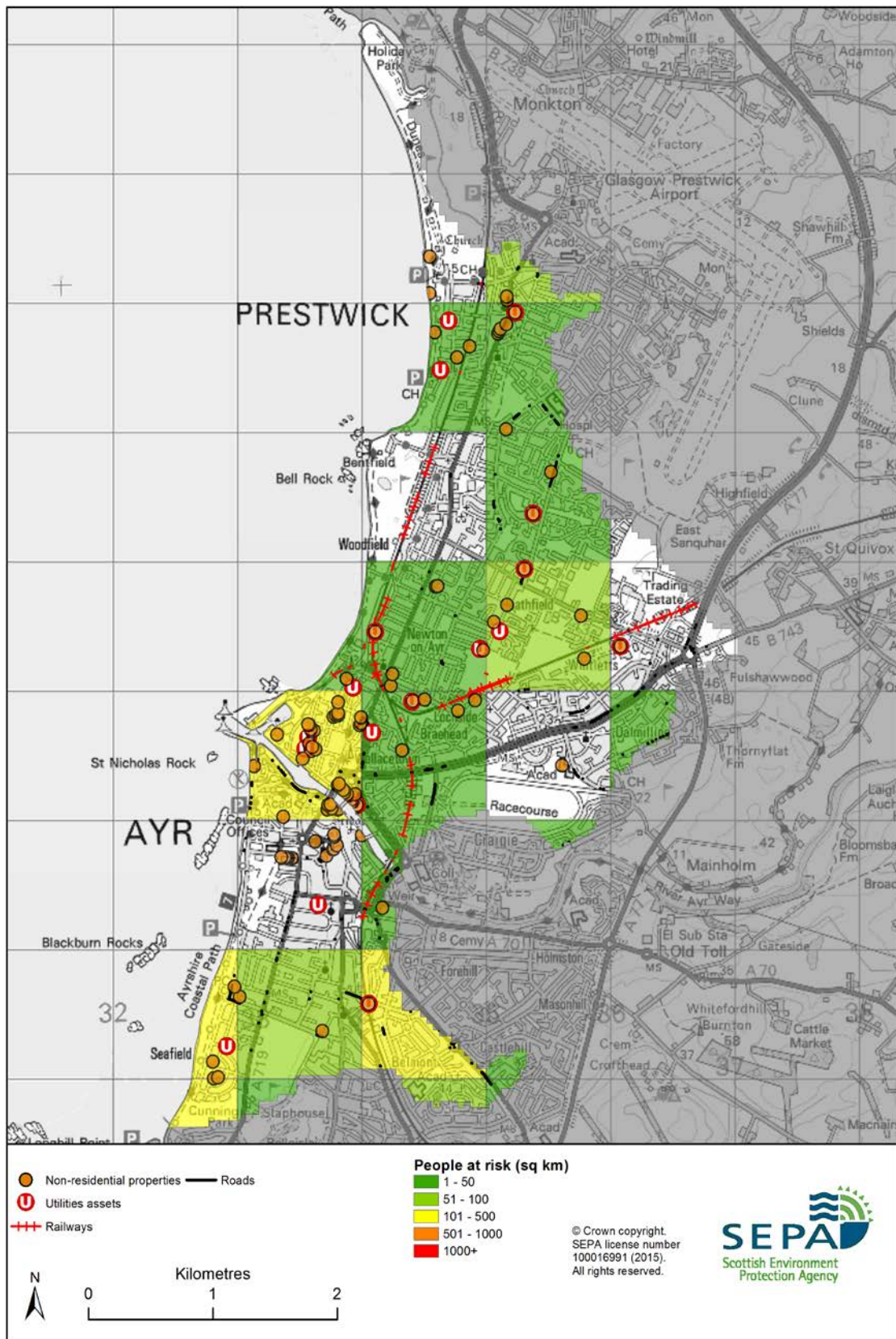


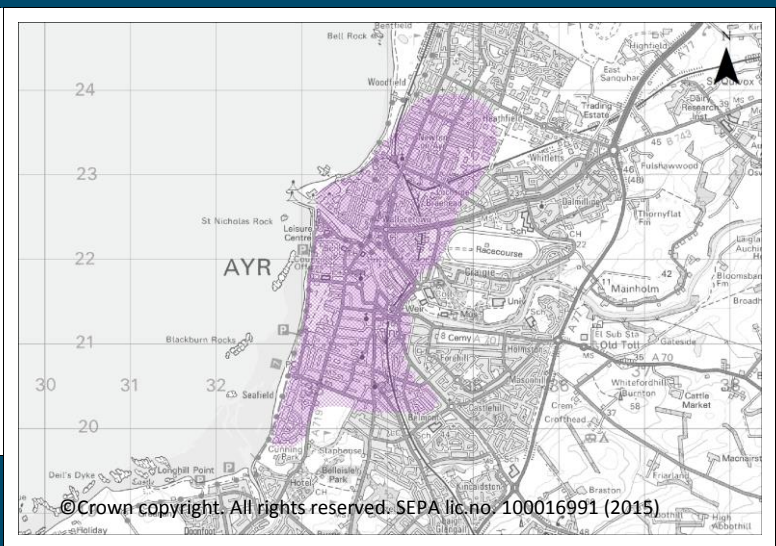
Figure 3: Impacts of flooding

Objectives to manage flooding in Potentially Vulnerable Area 12/09

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 Prestwick and Ayr Potentially Vulnerable Area.

Reduce the risk of coastal and surface water flooding to residential properties and non-residential properties in Ayr

- Indicators:
- 230 residential properties
 - 120 non-residential properties
 - £170,000 Annual Average Damages



Objective ID: 12024

Target area	Objective	ID	Indicators within PVA
Prestwick and Ayr	Reduce the economic damages and risk to people from surface water flooding in Prestwick and Ayr	12043	* See note below
Applies across Ayrshire Local Plan District	Avoid an overall increase in flood risk	12039	<ul style="list-style-type: none"> • 300 residential properties • £240,000 Annual Average Damages
Applies across Ayrshire Local Plan District	Reduce overall flood risk	12082	<ul style="list-style-type: none"> • 300 residential properties • £240,000 Annual Average Damages
Applies across Ayrshire 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 12/09 there are 120 residential properties at risk and Annual Average Damages of £69,000.

Actions to manage flooding in Potentially Vulnerable Area 12/09

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 Prestwick and Ayr Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	Natural flood management works	<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
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	NATURAL FLOOD MANAGEMENT WORKS (120240004)		
Objective (ID):	Reduce the risk of coastal and surface water flooding to residential properties and non-residential properties in Ayr (12024)		
Delivery lead:	South Ayrshire Council		
Status:	Existing	Indicative delivery:	Ongoing
Description:	South Ayrshire Council are currently undertaking sand dune propagation in Ayr, and some of the benefits of this action are to help reduce the risk of coastal erosion and flooding. It is recommended that this should continue.		
Potential impacts			
Economic:	The economic impact of natural flood management actions is difficult to define. However, these actions can reduce flood risk for high likelihood events.		
Social:	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 and create opportunities for recreation and tourism.		
Environmental:	Natural flood management actions can have a positive impact on the ecological quality of the environment by restoring and enhancing natural habitats. Sand dune restoration offshore of Seafield in Ayr has the potential to impact upon the coastal processes and sediment supply to the Maidens to Doonfoot Site of Special Scientific Interest and the Troon Golf Links and Foreshore Site of Special Scientific Interest. The impacts could be positive or negative and would require further study. Dune restoration in the area could provide greater areas of habitat for flora and fauna to colonise.		

Action (ID):	FLOOD PROTECTION STUDY (121030005)		
Objective (ID):	Reduce the risk of coastal and surface water flooding to residential properties and non-residential properties in Ayr (12024)		
Delivery lead:	North Ayrshire Council and South Ayrshire Council		
Priority:	National:	Within local authority:	
	8 of 168	1 of 5	
Status:	Not started	Indicative delivery:	2016-2021
Description:	A shoreline management plan is recommended, this study is not limited to Potentially Vulnerable Areas but should cover the whole of the Ayrshire coastline and any areas beyond this which may be influenced by changes in coastal processes. The study should investigate flooding and coastal erosion, wave overtopping and the current coastal protection offered. The study will help to develop an understanding of coastal issues and identify where further work may be required to mitigate against flooding.		
Potential impacts			
Economic:	The study should consider how to reduce flood risk along the Ayrshire coastline. For the entire study area potential damages avoided are estimated to be up to £26 million.		
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. Ayr Estuary (water body ID 200018), within this study area, is identified by river basin management planning to be at less than good status. Opportunities to improve the condition of the estuary should be considered by coordinating with river basin management planning.		

Action (ID):	FLOOD PROTECTION STUDY (120240005)		
Objective (ID):	Reduce the risk of coastal and surface water flooding to residential properties and non-residential properties in Ayr (12024)		
Delivery lead:	South Ayrshire Council		
Priority:	National:	Within local authority:	
	122 of 168	3 of 3	
Status:	Not started	Indicative delivery:	2022-2027
Description:	<p>The shoreline management plan for the Ayrshire coastline will help to provide an understanding of coastal issues and ensure potential mitigation actions will not create further issues elsewhere.</p> <p>In parallel a surface water management plan of Ayr will examine the surface water risk and examine actions to mitigate the risk including sustainable drainage systems.</p> <p>The output from these studies should be reviewed to identify the requirement to examine the feasibility of a flood protection scheme to</p>		

	protect against flooding in the area. Any further study should examine the most sustainable combination of actions to manage flooding.
Potential impacts	
Economic:	The flood protection study should consider how to reduce flood risk to 112 residential properties and 19 non-residential properties in this location, with potential damages avoided of up to £1.5 million.
Social:	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. In addition there is one utility which has been identified as potentially benefitting from this action. There may be negative impacts through disturbance to the local community during the construction phase.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. A flood protection study is proposed for Ayr Estuary (water body ID 200018). The physical condition of this estuary is identified by river basin management planning to be at less than good status. 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 Maidens to Doonfoot Site of Special Scientific Interest and the Troon Golf Links and Foreshore Site of Special Scientific Interest have the potential to be affected by any alteration in sediment movement or erosion patterns caused by the seawalls. Direct defences can lead to erosion of the sand dunes and beach within and along the coast from where the actions are proposed due to effects on coastal processes. There may also be the permanent loss of habitat from the footprint of new structures. This could increase flood risk to other areas currently protected by the sand dunes. There is the potential for slight positive impacts on water quality from the implementation of sustainable drainage systems in the area. There is the potential for negative impacts on heritage structures on the Esplanade, at the harbour, and at the protected bridges along the Ayr Estuary. There is potential for negative impacts on the visual setting of the war heritage structures on the Esplanade and the setting of the Ayr Central Heritage Conservation Area.

Action (ID):	SURFACE WATER PLAN/STUDY (120431018)		
Objective (ID):	Reduce the economic damages and risk to people from surface water flooding in Prestwick and Ayr (12043)		
Delivery lead:	South Ayrshire 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 (120431019)		
Objective (ID):	Reduce the economic damages and risk to people from surface water flooding in Prestwick and Ayr (12043)		
Delivery lead:	Scottish Water in partnership with South Ayrshire Council		
Status:	Ongoing	Indicative delivery:	2016-2021
Description:	An integrated catchment study for Prestwick and Ayr is under development which will assess the most sustainable combination of actions to mitigate flooding.		

Action (ID):	STRATEGIC MAPPING AND MODELLING (120820016)		
Objective (ID):	Reduce overall flood risk (12082)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	SEPA will seek to develop flood mapping in the Ayr to Ardrossan area to improve understanding of coastal 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 (120820019)		
Objective (ID):	Reduce overall flood risk (12082)		
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 (120240017)		
Objective (ID):	Reduce the risk of coastal and surface water flooding to residential properties and non-residential properties in Ayr (12024)		
Delivery lead:	South Ayrshire Council		
Status:	Existing	Indicative delivery:	Ongoing
Description:	The South Pier protects the entrance of Ayr Harbour from the action of waves while also reducing siltation in the channel. An existing seawall runs from the South Pier to the mouth of the River Doon, the purpose of which is to protect coastal erosion however it also provides a limited level of flood protection to the area. These defences will be maintained, and will continue to manage flooding according to the design standard at the time of construction. Levels of flood risk are likely to increase over time as a consequence of climate change.		

Action (ID):	MAINTAIN FLOOD WARNING (120820030)		
Objective (ID):	Reduce overall flood risk (12082)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the Ayr Seafield the Prestwick Links Road flood warning areas which are part of the Firth of Clyde coastal flood warning scheme.		

Action (ID):	FLOOD FORECASTING (120820009)		
Objective (ID):	Reduce overall flood risk (12082)		
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 (120820011)		
Objective (ID):	Reduce overall flood risk (12082)		
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 (120820013)		
Objective (ID):	Reduce overall flood risk (12082)		
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 work towards raising awareness of flood risk through partnership activities with Transport Scotland and local infrastructure operators. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	MAINTENANCE (120820007)		
Objective (ID):	Reduce overall flood risk (12082)		
Delivery lead:	South Ayrshire Council, asset / land managers		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p> <p>South Ayrshire Council has a number of structures which help to protect Ayr and Prestwick from coastal flooding. These include concrete seawalls, sheet pile walls, rock armour and gabions. South Ayrshire Council inspects the coastal structures on an annual basis and undertakes additional reactive inspections as and when required.</p>		

Action (ID):	EMERGENCY PLANS/RESPONSE (120820014)		
Objective (ID):	Reduce overall flood risk (12082)		
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>		

Action (ID):	PLANNING POLICIES (120390001)		
Objective (ID):	Avoid an overall increase in flood risk (12039) Reduce overall flood risk (12082)		
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.		