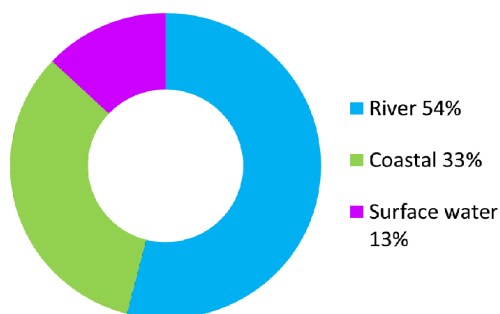


Dalbeattie (Potentially Vulnerable Area 14/19)

Local Plan District	Local authority	Main catchment
Solway	Dumfries and Galloway Council	Kirkgunzeon Lane catchment, Dalbeattie to Needles Eye

Summary of flooding impacts



At risk of flooding

- 280 residential properties
- 80 non-residential properties
- £570,000 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>	<i>Natural flood management works</i>	New flood warning	<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	<i>Surface water plan/study</i>	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

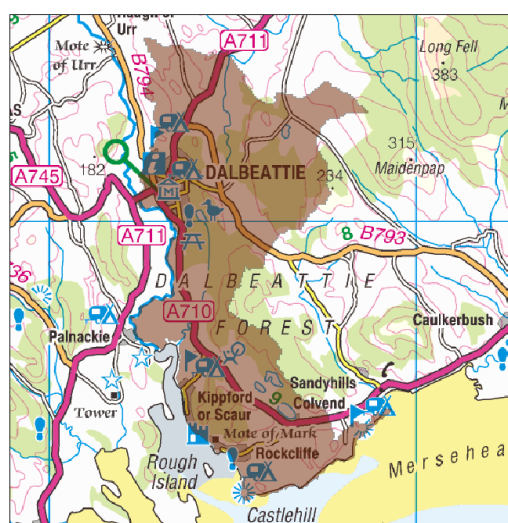
Actions

Dalbeattie (Potentially Vulnerable Area 14/19)

Local Plan District	Local authority	Main catchment
Solway	Dumfries and Galloway Council	Kirkgunzeon Lane catchment, Dalbeattie to Needles Eye

Background

This Potentially Vulnerable Area is located on the south coast of the Solway Local Plan District and incorporates the town of Dalbeattie (shown below). It is approximately 40km².



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There are approximately 280 residential properties and 80 non-residential properties at risk of flooding. The Annual Average Damages are approximately £570,000.

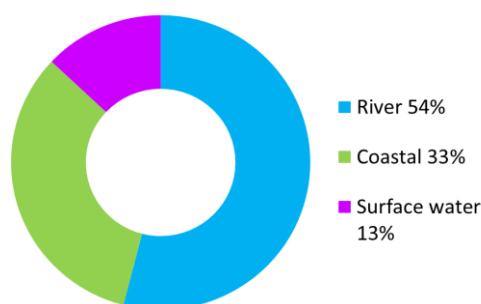


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

River flooding in this area is primarily attributed to the Kirkgunzeon Lane, which flows to Maidenholm where it turns west towards Dalbeattie. This river may cause flooding to residential properties, non-residential properties, roads (notably sections of the A710 and A711), utilities and agricultural land around Maidenholm. These predicted impacts are supported by historical flood reports from Dalbeattie. Areas of notable flood risk in Dalbeattie include High Street, the port area, and along the Mill Burn and Little Burn. The national flood mapping for Dalbeattie does not fully represent the flood defences in the area.

The main coastal risk within this Potentially Vulnerable Area is from the Urr Water, which flows along the western boundary of the Potentially Vulnerable Area from Dalbeattie to the Solway Firth, and is tidal over this entire reach. There is also potential for interaction with river flooding in this location. Coastal flooding is predicted to affect a number of properties and a short section of the road network in Dalbeattie and Kippford.

Surface water flooding is more prevalent in the northern half of the area. However, there are small pockets of surface water flooding within Dalbeattie which may impact on properties, utilities and roads.

Within this Potentially Vulnerable Area it is estimated that climate change will increase the number of residential properties at risk of flooding from approximately 290 to 420 and the number of non-residential properties from approximately 80 to 90.

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. Impacts are primarily within Dalbeattie, with a concentration of residential and non-residential properties at risk, although properties and roads may be impacted in some other locations. The damages associated with floods of different likelihood are shown in Figure 2. Residential properties affected by river flooding experience the highest economic impact at approximately 60% of the damages followed by non-residential properties. The location of the impacts of flooding is shown in Figure 3.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 2,600)	200	280	320
Non-residential properties (total 240)	50	80	50
People	440	640	710
Community facilities	0	0	0
Utilities assets	<10	10	10
Transport links - roads (km)	1.8	3.5	4.0
Transport links - rail (km)	0	0	0
Environmental designated areas (km ²)	0	0	<0.1
Designated cultural heritage sites	2	2	2
Agricultural land (km ²)	2.0	2.5	2.6

Table 1: Summary of flood impacts¹

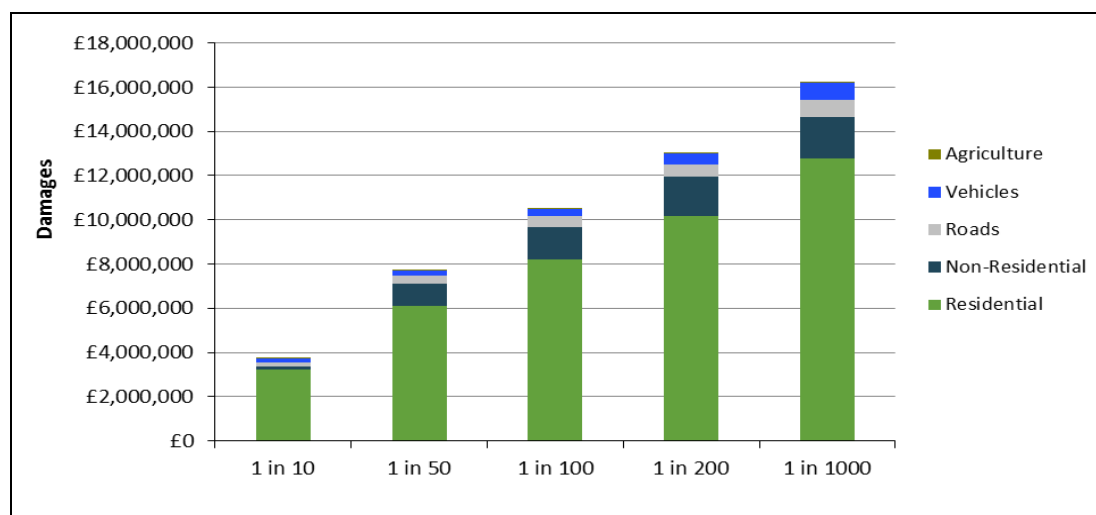


Figure 2: Damages by flood likelihood

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

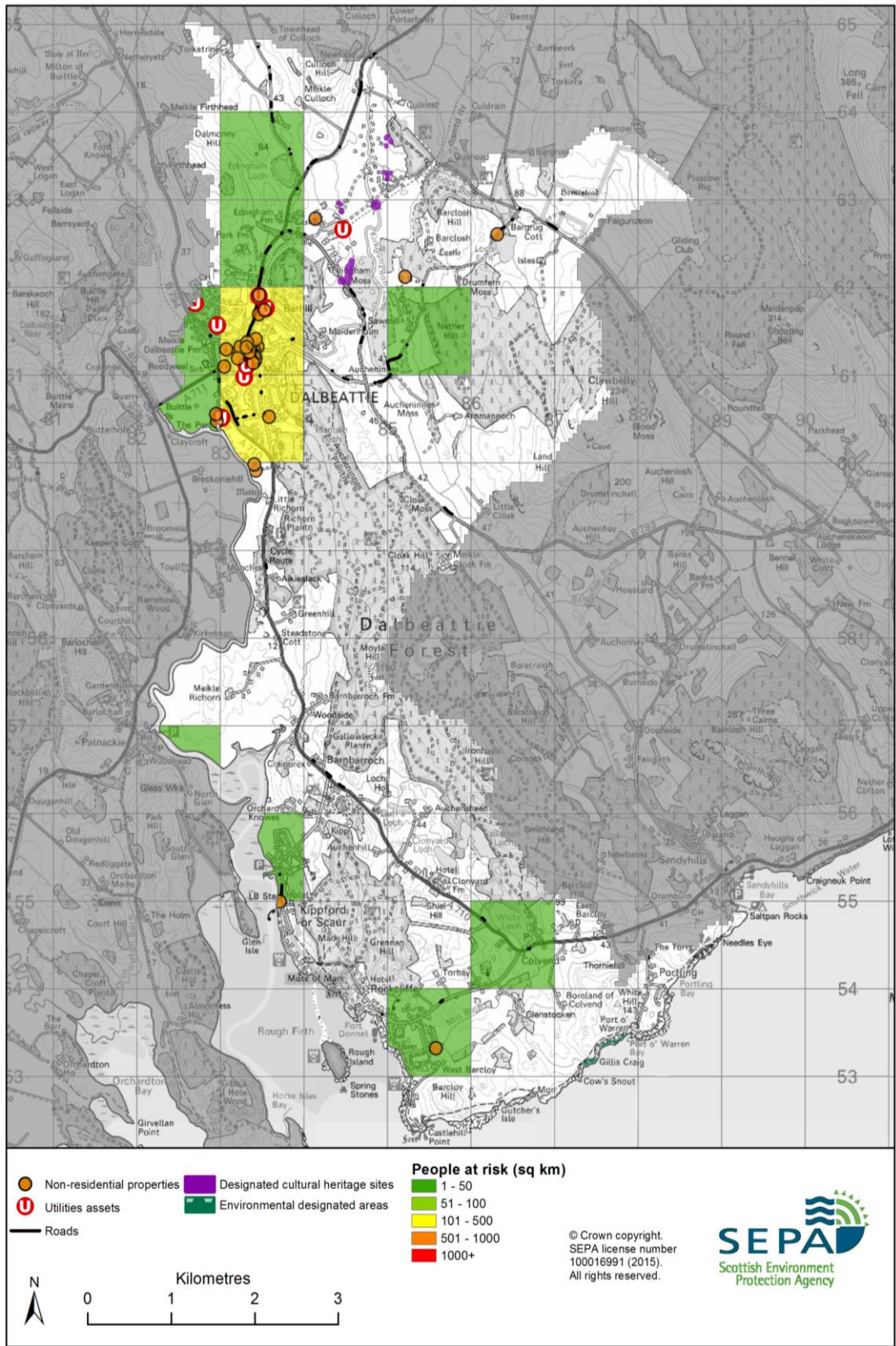


Figure 3: Impacts of flooding

History of flooding

Areas that affected by flooding in this area include Kippford and Dalbeattie, with flooding from different sources reported every year since 2002. The most significant floods in the area occurred in Dalbeattie. Flooding on 31 October 1977 caused major disruption to gas supplies for two days and significant damage to a footbridge. Flooding in 1982 saw the Urr Water reach its highest levels since records began in 1964. River flooding and surface water flooding was record in Dalbeattie in 2002, 2003, 2004, 2005 and 2008. These floods affected roads and properties.

Parts of the seafront have been affected by tidal surges from the Solway Firth, specifically Airieland, Rockcliffe Village and Foreshore Road. Kippford has also suffered damage from coastal surges, the most recent occurring in January 2014.

Objectives to manage flooding in Potentially Vulnerable Area 14/19

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 Dalbeattie Potentially Vulnerable Area.

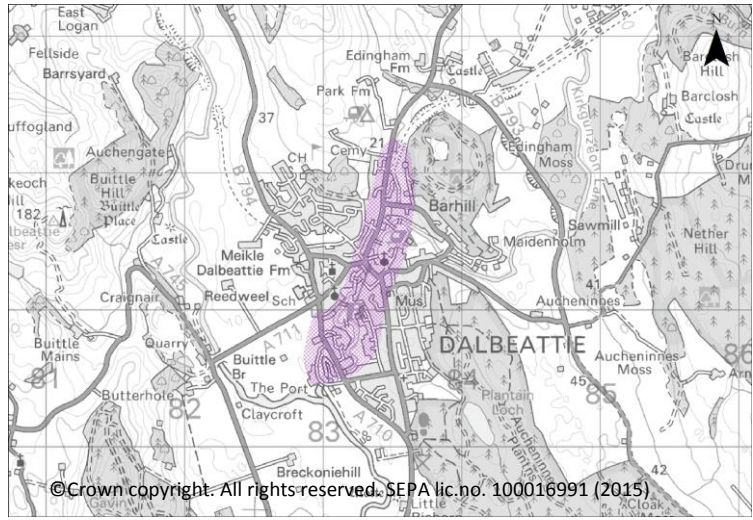
Reduce the risk of river flooding to residential and non-residential properties in Dalbeattie

Indicators:

- 220 residential properties
- 60 non-residential properties
- £600,000 Annual Average Damages

Objective ID: 14025

Target area:



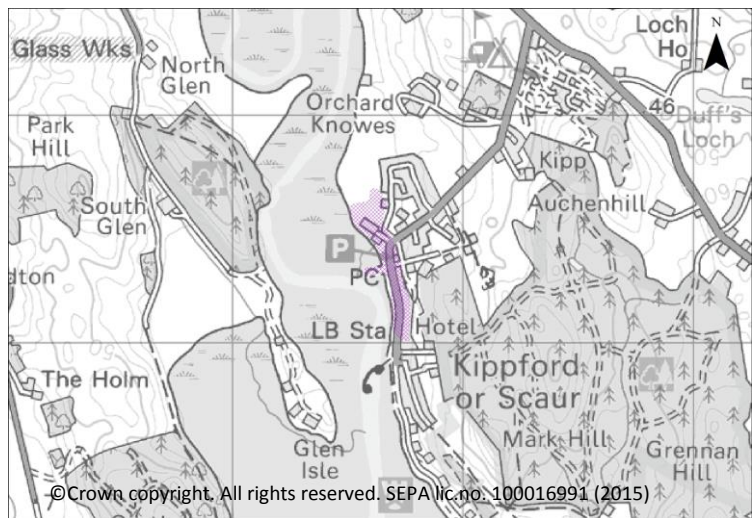
Reduce the risk of coastal flooding to residential properties between Dalbeattie and Kippford

Indicators:

- <10 residential properties
- £12,000 Annual Average Damages

Objective ID: 14026

Target area:



Target area	Objective	ID	Indicators within PVA
Applies across Solway Local Plan District	Avoid an overall increase in flood risk	14033	<ul style="list-style-type: none"> • 280 residential properties • £570,000 Annual Average Damages
Applies across Solway Local Plan District	Reduce overall flood risk	14040	<ul style="list-style-type: none"> • 280 residential properties • £570,000 Annual Average Damages
Applies across Solway 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.		

Actions to manage flooding in Potentially Vulnerable Area 14/19

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 Dalbeattie Potentially Vulnerable Area.

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

Action (ID):	NEW FLOOD WARNING (140400010)		
Objective (ID):	Reduce overall flood risk (14040)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	post 2021
Description:	The area under consideration includes properties in Dalbeattie affected by flooding from Kirkgunzeon Lane/Barr Burn. Further feasibility assessment will be required to assess the potential for delivery and subsequent to that appropriate timescales for delivery can be determined.		

Action (ID):	FLOOD PROTECTION STUDY (141220020)		
Objective (ID):	Reduce the risk of coastal flooding to residential properties between Dalbeattie and Kippford (14026)		
Delivery lead:	Dumfries and Galloway Council		
Priority:	National:	Within local authority:	
	1 of 168	1 of 10	
Status:	Not started	Indicative delivery:	2016-2021
Description:	A study is recommended to further develop the understanding of coastal flooding along the Solway coastline. This study should build on from the previous shoreline management plan to investigate flooding and coastal erosion, wave overtopping and the current coastal protection offered. The study may focus in detail on Potentially Vulnerable Areas however it could also look at the risk to		

	<p>other areas.</p> <p>The study will help to develop an understanding of coastal issues and identify where further work may be required to mitigate against flooding.</p>
Potential impacts	
Economic:	There are 259 residential properties and 64 non-residential properties at risk of flooding over the extent of this study. The potential damages avoided over this area are estimated to be up to £26.1 million.
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:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. To be in accord with the flood risk management strategy, the responsible authority should seek to ensure as part of the study that the Solway coastal study will not have an adverse effect on the integrity of the Loch of Inch and Torrs Warren Special Protection Area, Upper Solway Flats and Marshes Special Protection Area, Luce Bay and Sands Special Area of Conservation, and Solway Firth Special Area of Conservation. There is the potential for impacts on several coastal Sites of Special Scientific Interest.

Action (ID):	FLOOD PROTECTION STUDY (140250005)		
Objective (ID):	Reduce the risk of river flooding to residential and non-residential properties in Dalbeattie (14025)		
Delivery lead:	Dumfries and Galloway Council		
Priority:	National:		Within local authority:
	25 of 168		2 of 10
Status:	Ongoing	Indicative delivery:	2016-2021
Description:	<p>A study is recommended to further investigate the standard of protection of the current defences in Dalbeattie along with the current and future level of risk in the town. If a review of the risk identifies future work is required now or in the future, the study should examine the feasibility of a enhancing the flood protection scheme, focusing on improvement to the conveyance of the Kirkgunzeon Lane watercourse, and the improvement of direct flood defences on the Kirkgunzeon Lane.</p> <p>This study should also consider the role natural flood management actions can have to reduce runoff and slow water within the river. Other actions may also be considered to select the most sustainable combination of actions.</p>		
Potential impacts			
Economic:	The flood protection study should consider how to reduce flood risk to 146 residential properties and 49 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £14 million.		

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. In addition there are three utilities which have been identified as potentially benefitting from this action. 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. Natural flood management actions can have a positive impact by restoring and enhancing natural habitats. This study is proposed for the river Kirkgunzeon Lane (water body ID 10589). The physical condition of this river is identified by river basin management planning to be at less than good status. Future works could improve the condition of the river or degrade it. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. There are no international or national level environmental designations that are likely to be impacted by this action. Downstream of these works there may be slight negative impacts on water quality through increased erosion and sedimentation on the Kirkgunzeon Burn and the Rough Estuary. There is likely to be a temporary loss of habitat and displacement of species where constrictions are removed.

Action (ID):	FLOOD PROTECTION STUDY (140260005)		
Objective (ID):	Reduce the risk of coastal flooding to residential properties between Dalbeattie and Kippford (14026)		
Delivery lead:	Dumfries and Galloway Council		
Priority:	National:	Within local authority:	
	146 of 168	9 of 10	
Status:	Not started	Indicative delivery:	2022-2027
Description:	Initial assessment to refine knowledge of coastal flooding issues is to be made within the Solway coastal study. Depending on the outcomes from this study further work may be required to mitigate flooding impacts to roads and properties in the area.		
Potential impacts			
Economic:	There are four residential properties at risk of flooding in this location, with potential damages avoided of up to £640,000.		
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):	STRATEGIC MAPPING AND MODELLING (140400016)		
Objective (ID):	Reduce overall flood risk (14040)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	<p>SEPA will seek to develop flood mapping in the Gretna to Portpatrick 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.</p> <p>SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 1,100km² 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.</p>		

Action (ID):	STRATEGIC MAPPING AND MODELLING (140400019)		
Objective (ID):	Reduce overall flood risk (14040)		
Delivery lead:	Scottish Water		
Status:	Not started	Indicative delivery:	2016-2021
Description:	<p>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.</p>		

Action (ID):	MAINTAIN FLOOD PROTECTION SCHEME (140250017)		
Objective (ID):	Reduce the risk of river flooding to residential and non-residential properties in Dalbeattie (14025)		
Delivery lead:	Dumfries and Galloway Council		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Dalbeattie Flood Protection Scheme was completed in 1981 and consisted of flood banks, flood walls, and channel improvements to Kirkgunzeon Lane, Dalbeattie Burn and Drumjohn Burn. Maintenance should be continued. The level of protection provided by these defences may decrease due to the impact of climate change.</p>		

Action (ID):	MAINTAIN FLOOD WARNING (140400030)		
Objective (ID):	Reduce overall flood risk (14040)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the Rough Firth and Southernness Point flood warning areas which are part of the Solway coastal flood warning scheme.		

Action (ID):	FLOOD FORECASTING (140400009)		
Objective (ID):	Reduce overall flood risk (14040)		
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 (140400011)		
Objective (ID):	Reduce overall flood risk (14040)		
Delivery lead:	—		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p> <p>Dumfries and Galloway Council has a Pilot Flood Product Subsidy Scheme in place, it is recommended that this should be continued. Residential or business properties that are identified as being at risk of flooding are eligible for the scheme. There are various products to reduce the impact of flooding to properties which can be purchased as part of the scheme.</p>		

Action (ID):	AWARENESS RAISING (140400013)		
Objective (ID):	Reduce overall flood risk (14040)		
Delivery lead:	Responsible authorities		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p> <p>SEPA will engage with the community and promote Floodline in the Rough Firth and Southerness Point coastal flood warning areas. This will be achieved through direct mailing for new flood warning areas and education events.</p> <p>Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.</p>		

Action (ID):	MAINTENANCE (140400007)		
Objective (ID):	Reduce overall flood risk (14040)		
Delivery lead:	Dumfries and Galloway 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>		

Action (ID):	EMERGENCY PLANS/RESPONSE (140400014)		
Objective (ID):	Reduce overall flood risk (14040)		
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> <p>Dumfries and Galloway Council along with the Scottish Fire and Rescue Service, SEPA and the Scottish Flood Forum have procured a Flood Pod. The Pod can be deployed to an area at risk of a flood emergency and is filled with flood protection equipment which is issued to the public.</p>		

Action (ID):	PLANNING POLICIES (140330001)		
Objective (ID):	Avoid an overall increase in flood risk (14033) Reduce overall flood risk (14040)		
Delivery lead:	Planning authority		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p>		