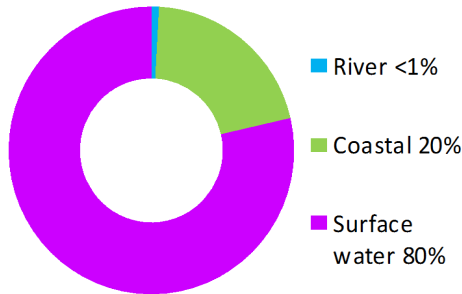


Clyde south - Port Glasgow to Inchinnan (Potentially Vulnerable Area 11/09)

| Local Plan District | Local authority | Main catchment |
|-----------------------|---|---|
| Clyde and Loch Lomond | Inverclyde Council, Renfrewshire Council | Firth of Clyde – Renfrew to Port Glasgow |

Summary of flooding impacts



At risk of flooding

- 190 residential properties
- 60 non-residential properties
- £310,000 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 | 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 |

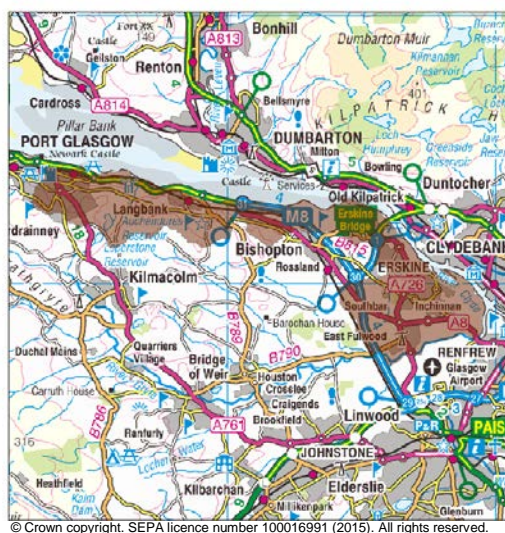
Actions

Clyde south – Port Glasgow to Inchinnan (Potentially Vulnerable Area 11/09)

| Local Plan District | Local authority | Main catchment |
|-----------------------|---|---|
| Clyde and Loch Lomond | Inverclyde Council, Renfrewshire Council | Firth of Clyde – Renfrew to Port Glasgow |

Background

This Potentially Vulnerable Area is located to the west of Glasgow City, at the mouth of the River Clyde, spanning from Port Glasgow in the west to Erskine and Inchinnan in the east, with the southern border along the Black Cart Water (shown below). This area is approximately 40km².



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

There are approximately 190 residential properties and 60 non-residential properties at risk of flooding. The Annual Average Damages are approximately £310,000.

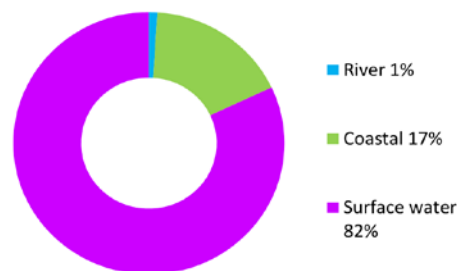


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The greatest risk of flooding in the area is attributed to surface water with the majority of these impacts in Erskine. This flooding is shown to impact residential and non-residential properties along with community facilities and utilities. The areas at highest risk from surface water flooding will require the preparation of surface water management plans.

The northern boundary of this area fronts onto the estuary of the River Clyde. The main impacts of coastal flooding are to transport routes, notably the M8 near the junction with the A8 and a short section of the A8 west of Langbank. In terms of urban areas, non-residential properties are deemed to be at risk in Erskine from the River Clyde estuary and also via tidal areas of the Black Cart Water.

River flooding is not extensive in this area and is primarily attributed to the Finlaystone Burn, to the west of Langbank, and the Black Cart Water, to the south of Erskine. River flooding of the Finlaystone Burn is predicted to affect areas of agricultural land and forestry. The Black Cart Water essentially forms the southern

boundary of the area with a relatively large floodplain affecting roads along its northern bank.

Interaction between coastal and river flooding is a potential issue within the lower reaches of the Black Cart Water, as it is tidally influenced downstream of the M8 in the vicinity of Glasgow Airport. There is also an interaction between tidal and surface water flooding in the vicinity of Langbank, where elevated tidal levels reduce the functionality of the drainage network.

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 surface flooding experience the highest economic impact at approximately 60% of the damages. Non-residential properties and road infrastructure also provide a notable portion of the potential 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 190 to 250 and the number of non-residential properties from approximately 60 to 80.

The location of the impacts of flooding is shown in Figure 3. The impacts are centred around Erskine and Port Glasgow with people, non-residential properties, utilities and the A726 at Erskine affected.

History of flooding

Surface water flooding occurred between November and December 2006 when flooding affected the A8 carriageway near Inchinnan. This was due to a combination of high tides, blocked road gullies and the culvert capacity being exceeded. During the same period there was also flooding from a combination of sources in the Erskine area.

| | 1 in 10 | 1 in 200 | 1 in 1000 |
|---|--|---|---|
| | High likelihood | Medium likelihood | Low likelihood |
| Residential properties (total 6,900) | 20 | 190 | 250 |
| Non-residential properties (total 9,100) | 20 | 60 | 80 |
| People | 40 | 420 | 550 |
| Community facilities | <10 Educational buildings | <10 Includes: educational buildings and healthcare facilities | <10 Includes: educational buildings and healthcare facilities |
| Utilities assets | 10 | 20 | 20 |
| Transport links - roads (km) | 1.7 (of which 0.2 is motorway and 1.9 is A road) | 4.4 (of which 1.5 is motorway and 4.1 is A road) | 5.2 (of which 2.2 is motorway and 4.6 is A road) |
| Transport links - rail (km) | 0.4 | 1.2 | 1.6 |
| Environmental designated areas (km ²) | 2.2 | 2.4 | 2.5 |
| Designated cultural heritage sites | 10 | 11 | 11 |
| Agricultural land (km ²) | 2.4 | 3.1 | 3.4 |

Table 1: Summary of flooding impacts¹

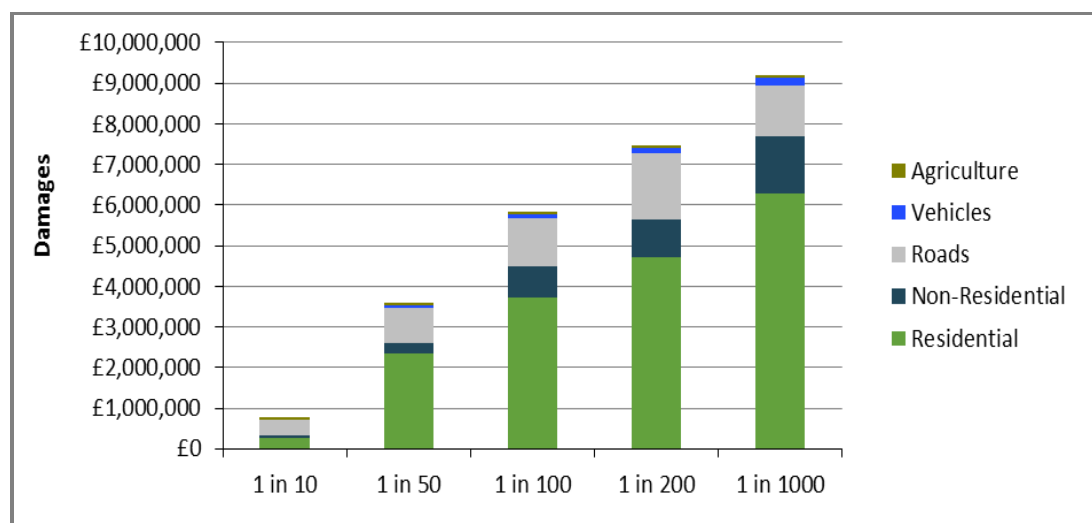


Figure 2: Damages by flood likelihood

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

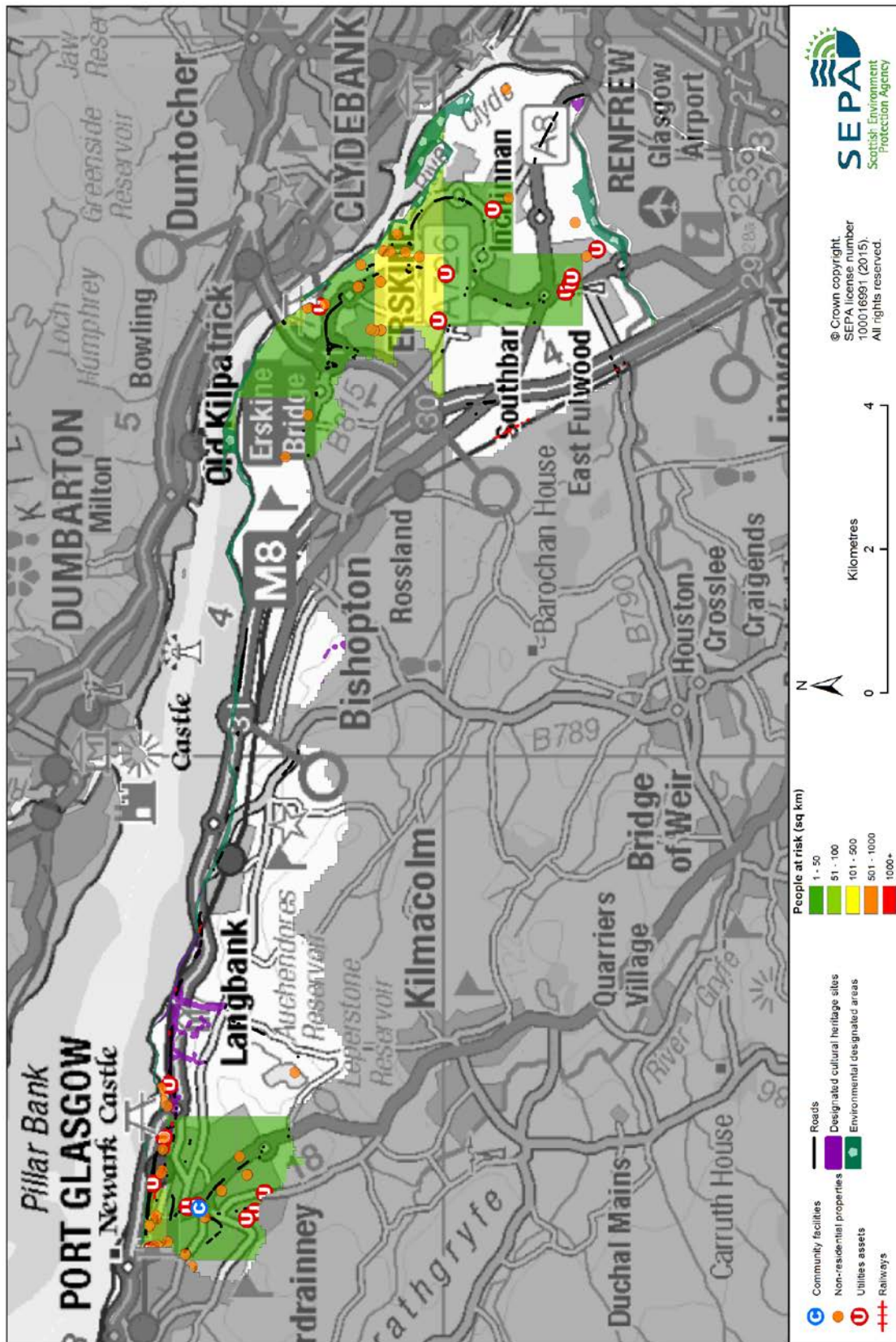


Figure 3: Impact of flooding

Objectives to manage flooding in Potentially Vulnerable Area 11/09

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 Clyde south - Port Glasgow to Inchinnan Potentially Vulnerable Area.

| Target area | Objective | ID | Indicators within PVA |
|--|---|-------|---|
| Langbank | Reduce the physical or disruption risk related to the transport network for rail. | 11302 | <ul style="list-style-type: none"> • 0.3km of rail track at 2 locations |
| Port Glasgow | Reduce the economic damages and risk to people from surface water flooding in Port Glasgow | 11109 | * See note below |
| Inchinnan | Reduce the economic damages and risk to people from surface water flooding in Inchinnan | 11115 | * 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"> • 190 residential properties • £310,000 Annual Average Damages |
| Applies across Clyde and Loch Lomond Local Plan District | Reduce overall flood risk | 11132 | <ul style="list-style-type: none"> • 190 residential properties • £310,000 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 11/09 there are 190 residential properties at risk and Annual Average Damages of £260,000.

Actions to manage flooding in Potentially Vulnerable Area 11/09

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 Clyde south - Port Glasgow to Inchinnan 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 SCHEME/WORKS (11302021) | | |
| Objective (ID): | Reduce the physical or disruption risk related to the transport network for rail. (11302) | | |
| 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): | SURFACE WATER PLAN/STUDY (111091018) | | |
| Objective (ID): | Reduce the economic damages and risk to people from surface water flooding in Port Glasgow (11109) | | |
| Delivery lead: | Inverclyde 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 (111091019) | | |
| Objective (ID): | Reduce the economic damages and risk to people from surface water flooding in Port Glasgow (11109) | | |
| Delivery lead: | Scottish Water in partnership with Inverclyde Council | | |
| Status: | Not started | 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): | SURFACE WATER PLAN/STUDY (111150018) | | |
| Objective (ID): | Reduce the economic damages and risk to people from surface water flooding in Inchinnan (11115) | | |
| Delivery lead: | Renfrewshire Council | | |
| Status: | Not started | Indicative delivery: | 2022-2027 |
| 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 (111150019) | | |
| Objective (ID): | Reduce the economic damages and risk to people from surface water flooding in Inchinnan (11115) | | |
| Delivery lead: | Scottish Water in partnership with Renfrewshire Council | | |
| Status: | Not started | 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 (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): | 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 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 (111320007) | | |
| Objective (ID): | Reduce overall flood risk (11132) | | |
| Delivery lead: | Inverclyde Council and Renfrewshire 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. | | |