



# Flood Risk Management Strategy Highland and Argyll



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## Foreword

Flooding can affect us all. The risk of flooding and its impacts can't be removed entirely from our lives but it can be managed. This strategy takes our knowledge and understanding of flooding and turns it into a set of actions that are planned, prioritised and co-ordinated to tackle flooding in the areas where it affects us the most.

Approximately 4,600 residential and 2,700 non-residential properties are at risk of flooding in the Highland and Argyll Local Plan District. Inverness, Oban, Campbeltown and Fort William are just some of the areas where the greatest impacts of flooding can be found. The annual damages across the region are estimated to be £26.5 million, largely from river and coastal flooding. Across Scotland we now estimate 108,000 properties to be at risk, with the expected annual flood damage being in the region of £252 million.

We can expect these numbers to increase. Changes to the climate, how we live and how we use the land bring more and more people and property into flood risk.

Although the risk of flooding will never be removed entirely, this strategy describes the ambition for managing flooding and the priorities for action. A Local Flood Risk Management Plan co-ordinated by The Highland Council provides additional detail on the responsibility for delivery, funding and coordination of actions across the Local Plan District. Taken together, these documents describe the commitment of public bodies to address flooding.

This Flood Risk Management Strategy is published by SEPA and has been approved by Scottish Ministers. It has been produced with the support and collaboration of The Highland Council, Argyll and Bute Council, Scottish Water and others with an interest in flood management. SEPA took account of the views received through two public consultations carried out during the development of the strategy and its supporting information.

How we plan for and manage our flood risk has far reaching consequences for Scotland's communities. As well as targeting action and resources in the areas where they can achieve most, the strategies also help to increase awareness of flood risk and improve understanding of how it can affect us.



Terry A'Hearn

Chief Executive Officer  
SEPA



# Flood Risk Management Strategy

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# Flood Risk Management Strategy

## Highland and Argyll Local Plan District

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# Highland and Argyll Local Plan District

## 1 Flood risk management in Scotland

### 1.1 What is a Flood Risk Management Strategy?

Flood Risk Management Strategies have been developed to reduce the devastating and costly impact of flooding in Scotland. They coordinate the efforts of all organisations that tackle flooding, be it in our cities or rural areas and be it from rivers, the sea or from surface water. The strategies concentrate the work of these organisations to where the risk of flooding and benefits of investment are greatest.

By publishing these strategies, we are giving individuals, communities and businesses the information to better manage their own responsibilities. Everyone can take action with the confidence of knowing what others are doing and when they are doing it.

Flood Risk Management Strategies set out the short to long term ambition for flood risk management in Scotland. The strategies state the objectives, as agreed by responsible authorities, for tackling floods in high risk areas. Actions that will then deliver these objectives are described and prioritised in six-year planning cycles. The decisions are based on the best evidence available on the causes and consequences of flooding. Through this risk-based and plan-led approach, flood management will improve for individuals, communities and businesses at risk in Scotland.

Each strategy should be read alongside its Local Flood Risk Management Plan. The Local Flood Risk Management Plans have been developed by local authorities and provide additional local detail on the funding and delivery timetable for actions between 2016 and 2021. The publication date of the Local Flood Risk Management Plans is June 2016. Both the Flood Risk Management Strategy and Local Flood Risk Management Plan will be updated every six years.

These Flood Risk Management Strategies are approved by Scottish Ministers and published by SEPA, Scotland's strategic flood risk management authority. They have been prepared in collaboration with all 32 local authorities, Scottish Water and other organisations with a responsibility or interest in managing flooding. They are required under the Flood Risk Management (Scotland) Act 2009 and the European Commission's Floods Directive. The actions proposed to manage flood risk in high risk areas have been developed using the best available information at the time. The number of actions that are actually delivered over the six years set out in the strategy will depend on a number of factors including funding availability, and community engagement issues such as potential objections to a particular flood protection scheme.

### 1.2 How to read this Strategy

Each Flood Risk Management Strategy has three sections:

Section 1 contains background information on the approach taken in Scotland to manage flooding. It explains the duties and aims of organisations involved in tackling flooding, including how they work together and how flood risk management planning is linked to other government policies and initiatives.



Section 2 is the most important section for those individuals and communities seeking to understand their flood risk and its management. For priority areas (called Potentially Vulnerable Areas) there is a short description of the causes and consequences of flooding. The agreed objectives are clearly set out. And, most importantly, the actions that will deliver these objectives are prioritised and described. Section 3 includes supporting information on the sources of flooding in wider river catchments and coastal areas. A glossary is also provided.

### 1.3 Managing flooding in Scotland

Flood risk management in Scotland aims to manage flooding in a sustainable way. Sustainable flood risk management considers where floods are likely to occur in the future and takes action to reduce their impact without moving the problem elsewhere. It considers all sources of flooding, whether from rivers, the sea or from surface water. It delivers actions that will meet the needs of present and future generations whilst also protecting and enhancing the environment.

The sustainable approach to managing flood risk works on a six year planning cycle, progressing through the key stages outlined below.

#### Identifying priority areas at significant flood risk

The first step to delivering a risk-based, sustainable and plan-led approach to flood risk management was SEPA's **National Flood Risk Assessment**, which was published in 2011. The assessment considered the likelihood of flooding from rivers, groundwater and the sea, as well as flooding caused when heavy rainfall is unable to enter drainage systems or the river network. The likelihood of flooding was examined alongside the estimated impact on people, the economy, cultural heritage and the environment. It significantly improved our understanding of the causes and consequences of flooding, and identified areas most vulnerable to floods.

Based on the National Flood Risk Assessment, SEPA identified areas where flooding was considered to be nationally significant. These areas are based on catchment units as it is within the context of the wider catchment that flooding can be best understood and managed. These nationally significant catchments are referred to as **Potentially Vulnerable Areas**. In Scotland, 243 Potentially Vulnerable Areas were identified. They are estimated to contain 92% of the total number of properties at risk.

A small number of Candidate Potentially Vulnerable Areas were identified after the National Flood Risk Assessment in light of new information that warranted further assessment and appraisal. They are included in the flood risk management planning process. The National Flood Risk Assessment will be updated to inform each subsequent planning cycle.

#### Improving the understanding of flooding

SEPA developed **flood hazard and flood risk maps** between 2012 and 2014. These maps improved our understanding of flooding and helped inform the subsequent selection of actions to manage flood risk in Potentially Vulnerable Areas. The flood hazard maps show information such as the extent of flooding, water level, as well as depth and velocity where appropriate. The flood risk maps provide detail on the impacts on people, the economy, cultural heritage and the environment.

In 2012 SEPA also developed an **assessment of the potential for natural flood management**. The assessment produced the first national source of information on where natural flood management actions would be most effective within Scotland.

Flood hazard and flood risk maps and the assessment of the potential for natural flood management can be viewed on the SEPA website [www.sepa.org.uk](http://www.sepa.org.uk).

## Identifying objectives and selecting actions

The objectives and actions to manage flooding will provide the long-term vision and practical steps for delivering flood risk management in Scotland.

Working collaboratively with local partnerships, SEPA has agreed the objectives for addressing the main flooding impacts. Actions that could deliver these agreed objectives have been appraised for their costs and benefits to ensure the right combinations are identified and prioritised. The actions considered in the development of this strategy include structural actions (such as building floodwalls, restoring flood plains, or clearance and repair works to rivers) and non-structural actions (such as flood warning, land use planning or improving our emergency response). Structural and non-structural actions should be used together to manage flood risk effectively.

An assessment of the potential for natural flood management was used to help identify opportunities for using the land and coast to slow down and store water. Natural flood management actions were recommended in areas where they could contribute to the management of flood risk. In such instances these actions were put forward as part of flood protection or natural flood management studies.

## Climate change and future flood risk

The UK Climate Projections (UKCP09) report predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall events. The predicted increase in rainfall is expected to variably increase the potential for river and surface water flooding, and similarly, there is expected to be a rise in sea levels that will vary around the coastline.

The predicted increases in flood risk described in Section 3 are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Flood Risk Management Strategies and Local Flood Risk Management Plans

For flood risk management purposes, Scotland has been divided into 14 **Local Plan Districts**. Each Local Plan District will have a set of complementary plans: Flood Risk Management Strategies produced by SEPA, and Local Flood Risk Management Plans produced by a lead local authority. Flood Risk Management Strategies and Local Flood Risk Management Plans aim to make a strong and lasting contribution to sustainable flood risk management, and will be at the heart of efforts to tackle flooding in Scotland. They will help to target and maximise the benefit of public investment.

### 1.4 How the Flood Risk Management Strategy was developed

#### Partnership working

Many organisations and individuals are involved in helping to improve flood management in Scotland. A piecemeal approach to tackle flooding does not work.

Flooding is too complex, and the causes and impacts too complicated for any single organisation to address alone. Flooding disregards local authority boundaries and cuts across the responsibilities of organisations such as SEPA, Scottish Water and emergency responders. To be successful, flood management requires coordination among organisations as set out in this strategy. A willingness to collaborate by those responsible for flood management is essential.

This strategy has been developed in partnership by:

- Argyll and Bute Council and The Highland Council (lead local authority);
- Cairngorms National Park and Loch Lomond and the Trossachs National Park;
- Scottish Water; and,
- SEPA.

These organisations are working more closely together than ever before. In local partnerships, here and throughout Scotland, SEPA has provided the technical analysis and ensured a consistent national approach is taken. It has provided the evidence upon which to make sensible, informed decisions. Local authorities, Scottish Water and the National Park Authorities have made sure that local knowledge and expertise has informed the decision-making.

### **Consultation, engagement and advice**

SEPA has been keen to hear from the people and communities that live under the threat of flooding to ensure that our technical analysis of the risks is accurate and that efforts to manage flooding are targeted to where most can be achieved. SEPA held two public consultations during the development of the Flood Risk Management Strategies. The first was on the general approach to flood risk management planning and the identification of priority areas (2011); the second, held jointly with local authorities, was on the understanding of flooding in these priority areas and on the objectives and actions to manage flooding (2015).

Further advice has been sought from relevant organisations at key stages. The strategies have benefited from Local Advisory Groups, providing important community and area-based knowledge on both the causes and consequences of flooding and on the appropriate actions for future management. Local Advisory Groups have been especially helpful in considering flood risk management planning in the context of wider plans and initiatives. The Highland Local Advisory Group and the Argyll and Lochaber Local Advisory Group include representatives from a range of sectors, including government agencies, National Park Authorities, local authorities, non-government organisations, utility companies and land and asset managers.

In producing the Flood Risk Management Strategy, SEPA has also taken advice from a National Flood Management Advisory Group. Over 50 member organisations, reflecting the national importance and impact of flooding on our communities, economy, environment and cultural heritage, have been invited at key stages to provide comment and input.

Some of the work carried out by SEPA has been complex and technical in nature for which we have sought professional advice. Through membership of the Scottish Advisory and Implementation Forum for Flooding (SAIFF), we have received assistance from local authorities, Scottish Water, Forestry Commission Scotland, the National Park Authorities and other key interested organisations. We have also developed some of our methods by working with other organisations with similar

responsibilities within the UK and Europe. We have specifically worked with the Environment Agency and English local authorities in the cross border areas.

SEPA's chief statutory function in flood risk management planning is to prioritise future actions across Scotland. To do this, SEPA made a technical, risk-based assessment of the costs and impacts of actions. This independent assessment was used alongside information from partner organisations to jointly agree priorities and identify indicative delivery dates for actions. A National Prioritisation Advisory Group, with representatives from the Scottish Government, COSLA, Scottish Water and local authorities, was established to provide guidance to SEPA on the priority of flood risk management actions, having considered both the technical ranking prepared by SEPA and issues of local priority.

### **Strategic Environmental Assessment and Habitats Regulation Appraisal**

SEPA undertook a strategic environmental assessment to assess the significant environmental effects of the Flood Risk Management Strategies. Our assessment was published in an environmental report, and we consulted the public on our findings. We have published a post-adoption statement, which describes how we have taken account of the environmental assessment and the consultation responses, and how we will monitor any significant environmental effects of the Flood Risk Management Strategies.

We also undertook a Habitats Regulations Appraisal to ensure that the Flood Risk Management Strategies will not adversely affect the integrity of Special Areas of Conservation and Special Protection Areas. We consulted Scottish Natural Heritage and Natural England on our appraisal method and took their views into account. We have applied mitigation measures where required.

## **1.5 Roles and responsibilities for flood risk management planning**

Individuals have a personal responsibility to protect themselves and their property from flooding. However, public bodies have responsibilities too and are working together to reduce the impacts of flooding in Scotland. Responsibility for flood risk management planning falls primarily to SEPA, local authorities and Scottish Water. Some of the key roles are outlined below and more information is available from the SEPA website.

### **Your responsibilities**

Organisations and individuals have responsibilities to protect themselves from flooding. Being prepared by knowing what to do and who to contact if flooding happens can help you reduce the damage and disruption flooding can have on your life.

The first step to being prepared is signing up to Floodline so you can receive messages to let you know where and when flooding is likely to happen. Other useful tools and advice on how to be prepared are available on the Floodline website, including a quick guide to who to contact in the event of a flood. For more information visit: [www.floodlinescotland.org.uk](http://www.floodlinescotland.org.uk). You can also check how your area could be affected by flooding by looking at SEPA's flood maps.

### **SEPA**

SEPA is Scotland's national flood forecasting, flood warning and strategic flood risk management authority. We have a statutory duty to produce Scotland's Flood Risk

Management Strategies. As described above, we work closely with other organisations responsible for managing flood risk through a network of partnerships and stakeholder groups to ensure that a nationally consistent approach to flood risk management is adopted.

SEPA also has a responsibility to identify where in Scotland there is the potential for natural flood management techniques to be introduced. Natural flood management uses the natural features of the land to store and slow down the flow of water.

In running Floodline, we provide direct warnings, live flooding information and advice on how to prepare for or cope with the impacts of flooding 24 hours a day, seven days a week. To help us forecast for flooding we work in partnership with the Met Office through the Scottish Flood Forecasting Service. SEPA has piloted surface water flood forecasting to help urban areas improve their resilience to and preparedness for flooding. The development and wider roll-out of this service is being considered alongside the technical, resource and communication challenges with providing surface water flooding guidance.

To raise awareness of flooding at a national level SEPA runs education initiatives, community engagement programmes and an annual campaign to promote the useful advice and information available through Floodline. We work in partnership with local authorities, Neighbourhood Watch Scotland, Ready Scotland and others to share our resources and help to promote preparedness and understanding of how flood risk is managed.

### **Local authorities and lead local authorities**

Local authorities work together for flood risk management planning purposes through a lead local authority. The lead local authority must perform several important functions over and above the general flood-related duties and powers given to local authorities. Most significantly, the lead local authority, having contributed with other local authorities to the production of the Flood Risk Management Strategy, must prepare a Local Flood Risk Management Plan. Although the lead local authority is responsible for the production of the plan, its content will be drawn from and agreed by all relevant local authorities, other responsible authorities and SEPA. Local authorities have been working collaboratively in the manner described above to develop these Local Flood Risk Management Plans.

It is the responsibility of your local authority to implement its flood protection actions agreed within the Flood Risk Management Strategy, including new schemes or engineering works and their statutory requirements to monitor, clear and maintain watercourses. You can help your local authority to manage flooding by letting them know if debris is blocking watercourses or if flood defences have been tampered with.

During severe flooding, local authorities will work with the emergency services and coordinate shelter for people evacuated from their homes.

### **Scottish Water**

Scottish Water is a responsible authority for flood risk management and is working closely with SEPA, local authorities and others to coordinate plans to manage flood risk.

Scottish Water has the public drainage duty and is responsible for foul drainage and the drainage of rainwater run-off from roofs and any paved ground surface from the boundary of properties. Additionally, Scottish Water helps to protect homes from

flooding caused by sewers either overflowing or becoming blocked. Scottish Water is not responsible for private pipework or guttering within the property boundary.

## National parks

The two National Park Authorities, Loch Lomond and Trossachs National Park and Cairngorms National Park, were designated as responsible authorities for flood risk management purposes in 2012. Both have worked with SEPA, local authorities and Scottish Water to help develop Flood Risk Management Strategies and Local Flood Risk Management Plans. They also fulfil an important role in land use planning, carrying out or granting permission for activities that can play a key role in managing and reducing flood risk.

## Other organisations

- The **Scottish Government** oversees the implementation of the Flood Risk Management (Scotland) Act 2009, which requires the production of Flood Risk Management Strategies and Local Flood Risk Management Plans. Scottish Ministers are responsible for setting the policy framework for how organisations collectively manage flooding in Scotland. Scottish Ministers have also approved this Flood Risk Management Strategy.
- **Scottish Natural Heritage** has provided general and local advice in the development of this Flood Risk Management Strategy. Flooding is seen as natural process that can maintain the features of interest at many designated environmental sites, so Scottish Natural Heritage helps to ensure that any changes to patterns of flooding do not adversely affect the natural environment. Scottish Natural Heritage also provides advice on the impacts of Flood Protection Schemes and other land use development on designated sites and species.
- **Forestry Commission Scotland** was designated in 2012 as a responsible authority for flood risk management planning purposes and has engaged in the development of the Flood Risk Management Strategies through national and Local Advisory Groups. This reflects the widely held view that forestry can play a significant role in managing flooding.
- During the preparation of the flood risk management plans **Network Rail** and **Transport Scotland** have undertaken works to address flooding at a number of frequently flooded sites. Further engagement is planned with SEPA and local authorities to identify areas of future work. There is the opportunity for further works to be undertaken during the first flood risk management planning cycle although locations for these works are yet to be confirmed.
- **Utility companies** have undertaken site specific flood risk studies for their primary assets and have management plans in place to mitigate the effects of flooding to their assets and also minimise the impacts on customers.
- The **Met Office** provides a wide range of scientific support, forecasts and weather warnings. SEPA and the Met Office work together through our partnership; the Scottish Flood Forecasting Service.
- The **emergency services** provide emergency support when flooding occurs and can coordinate evacuations. You should call the emergency services on 999 if you are concerned about your safety or the safety of others and act immediately on any advice provided.

- **Historic Environment Scotland** considers flooding as part of its regular assessments of historic sites. As such, flooding is considered as one of the many factors which inform the development and delivery of its management and maintenance programmes.

## 1.6 Links with other plans and policies

### River basin management planning

River basin management aims to protect and improve the condition of our rivers, lochs, estuaries and coastal waters. Taking action to reduce flood risk in Scotland provides an opportunity to connect with plans to improve the quality of Scotland's water environment at the same time. For example, coordination between river basin management and flood risk management can reduce flood risk, whilst improving water quality and biodiversity.

SEPA is leading the delivery of River Basin Management Plans and Flood Risk Management Strategies and has worked to ensure that there is integration and coordination between them. This coordination, particularly in regard to consultation and engagement, will be important for stakeholders many of whom have an interest in the objectives of both plans.

### Land use and spatial planning

Land use planning decisions are one of the most powerful tools available to manage flood risk. The alignment of flood risk management and land use planning policy is pivotal to achieving sustainable flood risk management. Decisions relating to flood risk management can have significant implications for the location of development and, likewise, decisions relating to the location of development can impact on flood risk. Land use planning has the potential to contribute to sustainable flood risk management through the location, use and design of new development and the redevelopment of existing areas. Actions that deliver national level land use planning policies are summarised in Annex 2.

SEPA is a statutory consultee providing advice on planning applications with regards to flood risk. Guidance aims to minimise flood risk to development and ensure no adverse effects occur elsewhere.

Land use planning objectives and actions have been agreed with responsible authorities, which will ensure that flood risk is adequately taken into account throughout the planning process.

### Emergency planning and response

Emergency plans are prepared under the Civil Contingencies Act 2004. They are in place across Scotland and are prepared by Category 1 and 2 Responders, such as Police Scotland and the Scottish Ambulance Service. Emergency plans ensure the effective management of response to emergencies. Emergency plans can either be generic and deal with all emergencies or specific to deal with, for example, flooding. The information contained in the Flood Risk Management Strategies can be used to inform wider emergency response plans for flooding.

Many organisations have specific roles and responsibilities during an emergency response to a flood for example, local authorities, the Scottish Fire and Rescue Services, Police Scotland and SEPA. In many cases, this response is augmented by the work of voluntary organisations, communities and individuals. During an

emergency, the response by these agencies will be co-ordinated through regional and local resilience partnerships.

## Scottish Water investment plans

There is a close relationship between Flood Risk Management Strategies and Scottish Water's investment plans. Sewer flooding is not considered in detail in this strategy although it remains a high priority for Scottish Water and its customers. Scottish Water's close involvement in flood risk management planning aims to ensure that there is strong coordination between the management of sewer and surface water flooding and the actions to be taken forward by local authorities.

## 1.7 Supporting information

### Sources of flooding described in this strategy

The Flood Risk Management Strategy addresses the risk of flooding from rivers, the coast and surface water. The risk of flooding from rivers is usually due to rainfall causing a river to rise above bank level spreading out and inundating adjacent areas. Coastal flooding is where the risk is from the sea. Sea levels can change in response to tidal cycles or atmospheric conditions. Over the longer term sea levels and coastal flood risk may change due to climate change. Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. There can be interactions between these sources of flooding, but for the purposes of this strategy they are dealt with independently.

The following aspects of flooding have not been incorporated into this strategy:

- **Groundwater** is generally a contributing factor to flooding rather than the primary source. It is caused by water rising up from underlying rocks or flowing from springs.
- **Reservoir breaches** have been assessed under separate legislation (Reservoirs (Scotland) Act 2011). Further information and maps can be found on SEPA's website.
- The Flood Risk Management (Scotland) Act 2009 does not require SEPA or responsible authorities to assess or manage **coastal erosion**. However, SEPA has included consideration of erosion in the Flood Risk Management Strategies by identifying areas that are likely to be susceptible to erosion and where erosion can exacerbate flood risk. As part of considering where actions might deliver multiple benefits, we have looked to see where the focus of coastal flood risk management studies coincides with areas of high susceptibility to coastal erosion. Subsequent detailed studies and scheme design will need to consider coastal erosion in these areas.
- **Coastal flood modelling.** The information on coastal flooding used to set objectives and identify actions is based on SEPA modelling using simplified coastal processes and flooding mechanisms at work during a storm. Wave overtopping cannot be accurately modelled at a national scale due to the importance of local factors such as prevailing wind conditions, the depth and profile of the near-shore sea bed or the influence of any existing defences or management structures. As a result, coastal flood risk may be underestimated in some areas. Conversely, in locations with wide and flat floodplains, the modelling may overestimate flood risk. To address this, in a number of locations where



more detailed local models were available they have been incorporated into the development of the Flood Risk Management Strategies. Where wave overtopping has been specifically identified as a concern – but where no further detailed modelling is available – particular compensation has been made in the selecting actions to address coastal flood risk.

### Commonly used terms

Below are explanatory notes for commonly used terms in this strategy. A glossary of terms is also available.

- Reference to flood risk.** During the development of this strategy flood risk has been assessed over a range of likelihoods. For consistency in reporting information within the strategies, unless otherwise stated, all references to properties or other receptors being ‘at risk of flooding’ refer to a medium likelihood flood (up to a 1 in 200 chance of flooding in any given year). By exception, references will be made to high or low risk flooding, which should be taken to mean a 1 in 10 chance/likelihood or 1 in 1000 chance/likelihood of flooding in any given year respectively.

Chance / likelihood of flooding	
High	1 in 10 year
Medium	1 in 200 year
Low	1 in 1000 year

- Annual Average Damages** have been used to assess the potential economic impact of flooding within an area. Depending on its size or severity each flood will cause a different amount of damage to a given area. Annual Average Damages are the theoretical average economic damages caused by flooding when considered over a very long period of time. It does not mean that damage will occur every year: in many years there will be no damages, in some years minor damages and in a few years major damages may occur. High likelihood events which occur more regularly contribute proportionally more to Annual Average Damages than rarer events. Within the Flood Risk Management Strategies Annual Average Damages incorporate economic damages to the following receptors: residential properties, non-residential properties, vehicles, emergency services, agriculture and roads. They have been calculated based on the principles set out in the Flood Hazard Research Centre Multi-Coloured Handbook (2010).
- History of flooding.** The history of flooding sections of this document report floods that have occurred up to July 2015.

## 1.8 Next steps and monitoring progress

Flood risk management planning has progressed significantly in recent years. Scotland now has the most advanced nationally consistent and locally informed understanding of the causes and consequences of flooding that it has ever had. SEPA is committed to improving this knowledge and understanding during subsequent planning cycles, accepting that these first Flood Risk Management Strategies are based on the best available current knowledge and data.

SEPA has prioritised actions based on funding assumptions provided by Scottish Government and the capacity of local authorities to deliver within the next six years. Lead local authorities will provide an interim report on the progress of delivering all actions in the Local Flood Risk Management Plan not earlier than two years and not later than three years from its publication. A final report will also be prepared at the end of the first planning cycle.

A second set of Flood Risk Management Strategies and Local Flood Risk Management Plans will be published in December 2021 and June 2022 respectively.

### **Licensing acknowledgements**

Full data licensing acknowledgements can be found in Annex 3 of this strategy.

# Flood Risk Management Strategy

## Highland and Argyll Local Plan District

This section is the most relevant for individuals, communities and businesses seeking to understand their local flood risk and its management. There is an overview of the Local Plan District, as well as further detail for every Potentially Vulnerable Area. For each Potentially Vulnerable Area, there is a short description of the causes and consequences of flooding. The agreed objectives are clearly set out and, most importantly, the actions that will deliver these objectives are prioritised and described.

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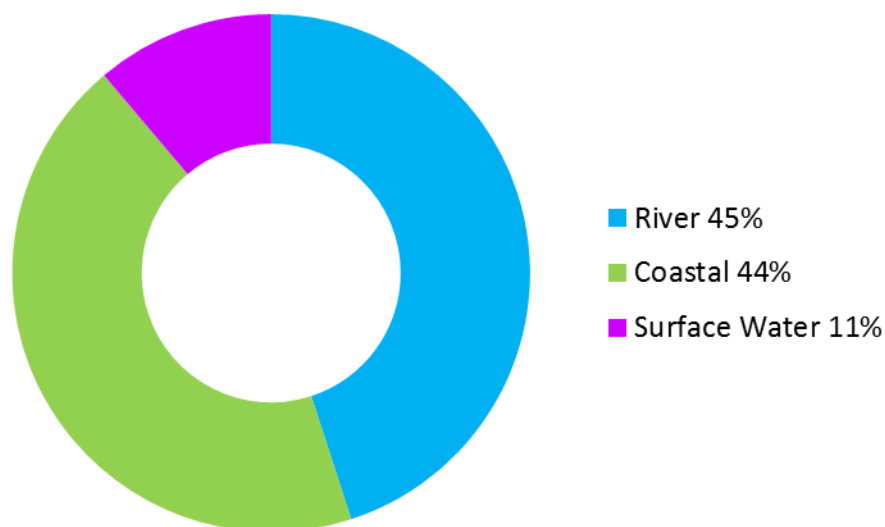
## 2.1 Summary of flooding in the Highland and Argyll Local Plan District

The Highland and Argyll Local Plan District covers the north and north west of mainland Scotland together with the majority of the islands off the west coast, (see Figure 2). It has an area of approximately 29,000km<sup>2</sup> and a coastline with a length of approximately 4,190km. There are 40 Potentially Vulnerable Areas in the Highland and Argyll Local Plan District.

### Flood risk in Highland and Argyll

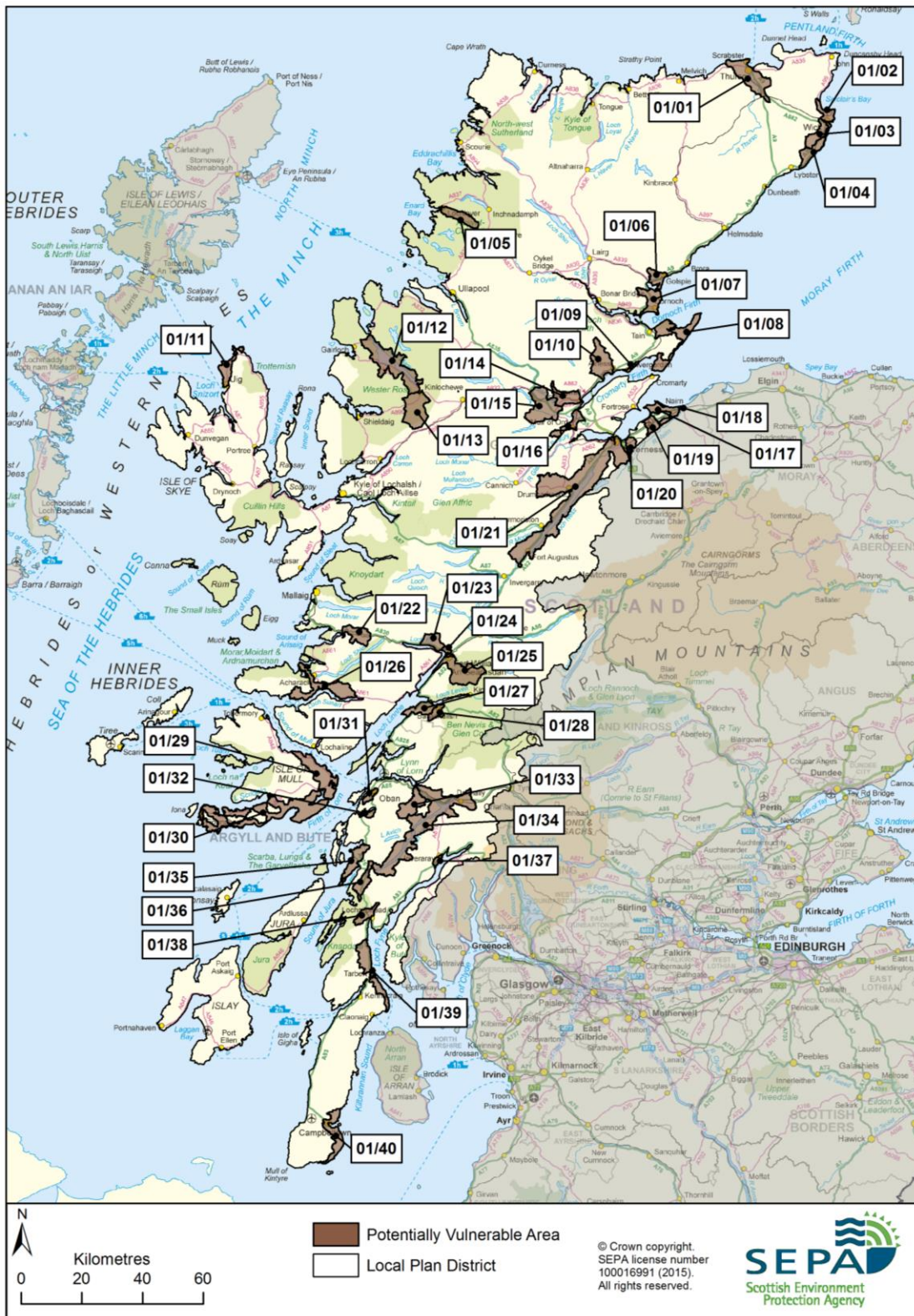
There are approximately 4,600 residential properties and 2,700 non-residential properties at risk of flooding within the Local Plan District. This equates to approximately 7% of properties at risk of flooding nationally. Within the Local Plan District, approximately 6% of all residential properties and 20% of all non-residential properties are at risk and it is estimated that 62% of these are located within Potentially Vulnerable Areas. The Annual Average Damages from flooding (see glossary) are approximately £26.5 million with an estimated 49% of the damages for the entire Local Plan District accounted for in Potentially Vulnerable Areas.

The main source of flooding is from rivers and the sea (Figure 1). The Annual Average Damages caused by river floods are approximately £12 million, with those caused by coastal and surface water floods being approximately £11.5 million and £2.9 million respectively.



**Figure 1:** Annual Average Damages by flood source

Table 1 and Figure 3 show the number of properties at risk and the Annual Average Damages caused by flooding in the main towns and cities within the Local Plan District. This includes damages to residential properties, non-residential properties, transport and agriculture. Please note that economic damages to airports and rail infrastructure are not included as information on damages at this scale is not available.



**Figure 2:** Highland and Argyll Local Plan District with Potentially Vulnerable Areas identified

	Residential and non-residential properties at risk of flooding	Annual Average Damages
Inverness	1,500	£5.4 million
Oban	520	£1.9 million
Campbeltown	500	£520,000
Fort William, Corpach, Caol and Inverlochy	350	£850,000
Nairn (total for Local Plan District 1 and 5).	340	£550,000
Dingwall	150	£270,000
Inveraray	90	£370,000
Ballachulish and Glencoe	90	£280,000
Alness	90	£81,000
Muir of Ord	50	£210,000

**Table 1:** Main areas at risk of flooding

Note that the totals in Table 1 include the whole of the town of Nairn however a small part of Nairn is located in the Findhorn, Nairn and Speyside Local Plan District. Most of the properties at risk of coastal flooding in Nairn are located to the west of the River Nairn and are in the Highland and Argyll Local Plan District.

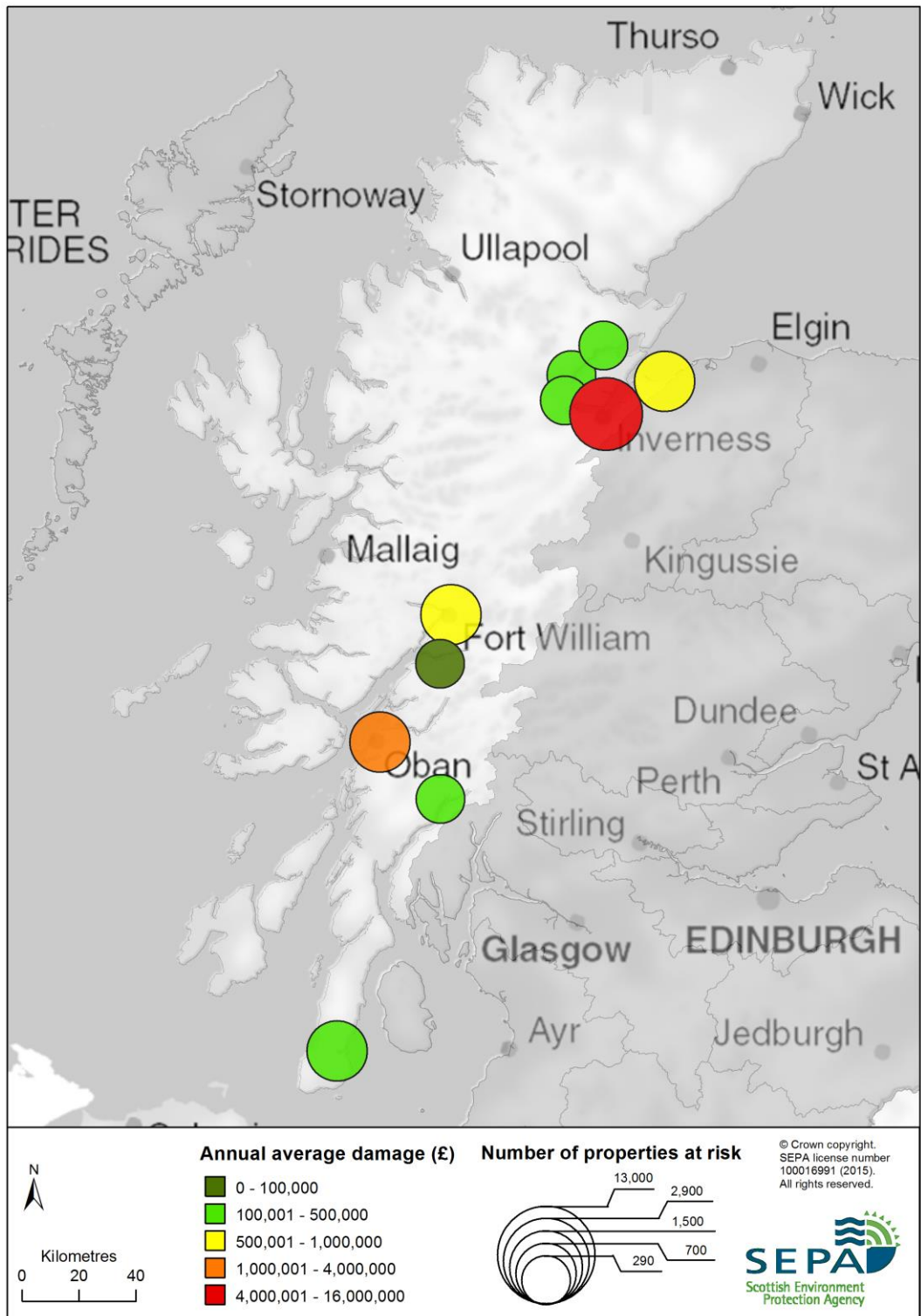
### Background information on the Highland and Argyll Local Plan District

The extent of the Highland and Argyll Local Plan District and the location of the Potentially Vulnerable Areas are shown in Figure 2.

The population of the Highland and Argyll Local Plan District is approximately 280,000. The Local Plan District includes the Inner Hebrides, which consist of 35 inhabited islands and a further 44 uninhabited islands. Inverness is the only city in the Local Plan District, with a population of over 55,000. The next two largest settlements are Fort William and Oban, both of which have populations of less than 10,000.

The Local Plan District contains two local authorities (The Highland Council and Argyll and Bute Council) and small areas of the Cairngorms National Park and Loch Lomond and The Trossachs National Park.

The Local Plan District has a small urban coverage (approximately 1% of land cover) with the main types of land cover across the area heather grassland, acid grassland, bog, and coniferous woodland - each covering between 12% and 19% of the area. Heather, rough grassland, improved grassland, and montane habitats cover from 6% to 9% of the area each.



**Figure 3:** Highland and Argyll Local Plan District areas with most properties at risk of flooding and associated damages



## Objectives and actions in the Highland and Argyll Local Plan District

The objectives are the shared aims for managing flooding. Actions describe where and how flood risk will be managed. Objectives and actions have been set by SEPA and agreed by flood risk management responsible authorities following consultation.

Some flood risk management objectives and actions apply to all areas, whether designated as a Potentially Vulnerable Area or not. For example, flood risk can be managed through national planning policy or as part of ongoing statutory duties for local authorities. The focus of this Flood Risk Management Strategy is to manage flood risk in Potentially Vulnerable Areas where specific actions apply in addition to the generic actions listed below. Further detail on specific actions can be found in the relevant Potentially Vulnerable Area chapter. Local authorities may have further information on how they manage flooding across their area.

Target area	Objective(s)	ID	Indicators
Applies across the Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 4,600 residential properties</li> <li>• 2,700 non-residential properties</li> <li>• 10,000 people</li> </ul>
Applies across the Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 4,600 residential properties</li> <li>• 2,700 non-residential properties</li> <li>• 10,000 people</li> </ul>

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	<b>Reduce overall flood risk. (100002)</b>		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	<b>Reduce overall flood risk. (100002)</b>		
<b>Delivery lead:</b>	-		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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 the Resilient Communities Initiative, and ensuring that properties and businesses are insured against flood damage.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	<b>Reduce overall flood risk. (100002)</b>		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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. Local authorities will be undertaking additional awareness raising activities, further details will be set out in the Local FRM Plans.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	<b>Reduce overall flood risk. (100002)</b>		
<b>Delivery lead:</b>	Local authority, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. The local authorities 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.		

<b>Action (ID):</b>	<b>EMERGENCY PLANS / RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	<b>Reduce overall flood risk. (100002)</b>		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	<b>Avoid an overall increase in flood risk. (100001)</b> <b>Reduce overall flood risk. (100002)</b>		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## 2.2 Potentially Vulnerable Areas

The table below summarises the actions to manage flood risk in the Potentially Vulnerable Areas of this Local Plan District. Further detail is provided in each Potentially Vulnerable Area.

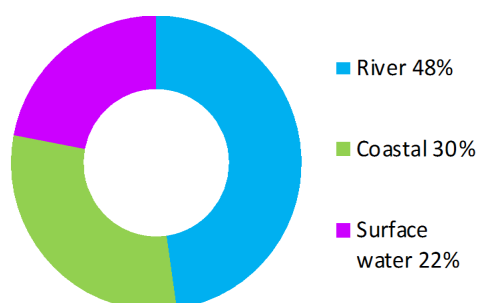
PVA	Flood protection scheme/ works	Natural flood management works	New flood warning	Flood protection study	Natural flood management study	Surface water plan/study	Strategic mapping and modelling	Maintain flood protection scheme*	Maintain flood warning*	Flood forecasting	Property level protection scheme	Community flood action groups	Self help	Awareness raising	Maintenance	Site protection plans	Emergency plans/ response	Planning policies
01/01				✓			✓	N/A	N/A	✓			✓	✓	✓		✓	✓
01/02							✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/03							✓	N/A	N/A	✓			✓	✓	✓		✓	✓
01/04							✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/05				✓				N/A	N/A	✓			✓	✓	✓	✓	✓	✓
01/06	✓			✓			✓	N/A	✓	✓		✓	✓	✓	✓		✓	✓
01/07	✓			✓				N/A	✓	✓			✓	✓	✓		✓	✓
01/08				✓			✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/09							✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/10				✓			✓	N/A	✓	✓			✓	✓	✓	✓	✓	✓
01/11								N/A	N/A	✓			✓	✓	✓		✓	✓
01/12								N/A	N/A	✓			✓	✓	✓		✓	✓
01/13				✓				N/A	N/A	✓			✓	✓	✓		✓	✓
01/14			✓	✓		✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
01/15	✓			✓			✓	N/A	✓	✓			✓	✓	✓	✓	✓	✓
01/16				✓			✓	✓	N/A	✓			✓	✓	✓		✓	✓
01/17	✓			✓			✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/18	✓			✓			✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/19	✓						✓	N/A	N/A	✓			✓	✓	✓		✓	✓
01/20	✓					✓	✓	N/A	N/A	✓			✓	✓	✓		✓	✓
01/21	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓
01/22	✓							N/A	N/A	✓			✓	✓	✓		✓	✓
01/23	✓					✓	✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/24	✓					✓	✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/25	✓			✓		✓	✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/26								N/A	N/A	✓			✓	✓	✓		✓	✓
01/27								N/A	N/A	✓			✓	✓	✓		✓	✓
01/28	✓			✓				N/A	N/A	✓			✓	✓	✓		✓	✓
01/29								N/A	N/A	✓			✓	✓	✓		✓	✓
01/30								N/A	N/A	✓			✓	✓	✓		✓	✓
01/31				✓		✓	✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/32								N/A	N/A	✓			✓	✓	✓		✓	✓
01/33	✓						✓	N/A	N/A	✓			✓	✓	✓		✓	✓
01/34	✓						✓	N/A	N/A	✓			✓	✓	✓		✓	✓
01/35								N/A	N/A	✓			✓	✓	✓		✓	✓
01/36								N/A	N/A	✓			✓	✓	✓		✓	✓
01/37	✓						✓	N/A	N/A	✓			✓	✓	✓		✓	✓
01/38				✓			✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/39				✓			✓	N/A	✓	✓			✓	✓	✓		✓	✓
01/40	✓			✓		✓	✓	N/A	✓	✓			✓	✓	✓		✓	✓

\*Note: N/A is used where there is no formal Flood Protection Scheme or flood warning scheme present.

## Thurso (Potentially Vulnerable Area 01/01)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Thurso, Thurso coastal

### Summary of flooding impacts



#### At risk of flooding

- 10 residential properties
- 10 non-residential properties
- £77,000 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>	<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>	<i>Maintain flood warning</i>	Awareness raising	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

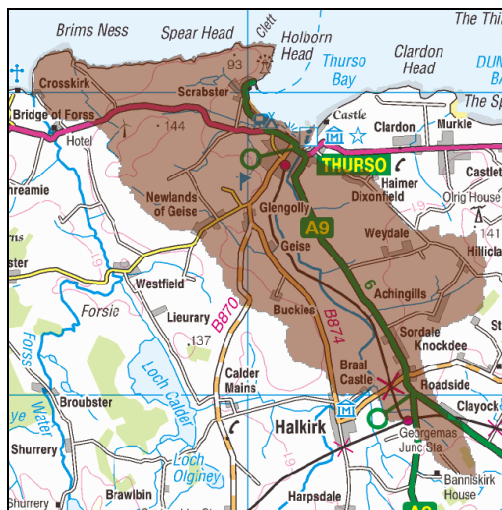
## Thurso (Potentially Vulnerable Area 01/01)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Thurso, Thurso coastal

### Background

This Potentially Vulnerable Area is approximately 81km<sup>2</sup> and includes the town of Thurso and rural areas to the south and west (shown below).

The Potentially Vulnerable Area includes the smaller settlements of Scrabster, Crosskirk, Newlands of Geise, Glengolly, Sordale, Achingills, Weydale and Dixonfield.



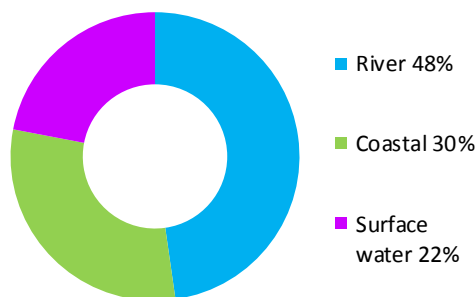
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The A9 and A836 roads pass through the area.

The main river flowing through the area is the River Thurso, which is tidal in its lower reaches.

There are approximately 10 residential and 10 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £77,000 with the majority caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

The main areas of coastal flood risk are at Scrabster and Thurso, while river flood risk primarily affects Thurso from the River Thurso and the Wolf Burn.

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.

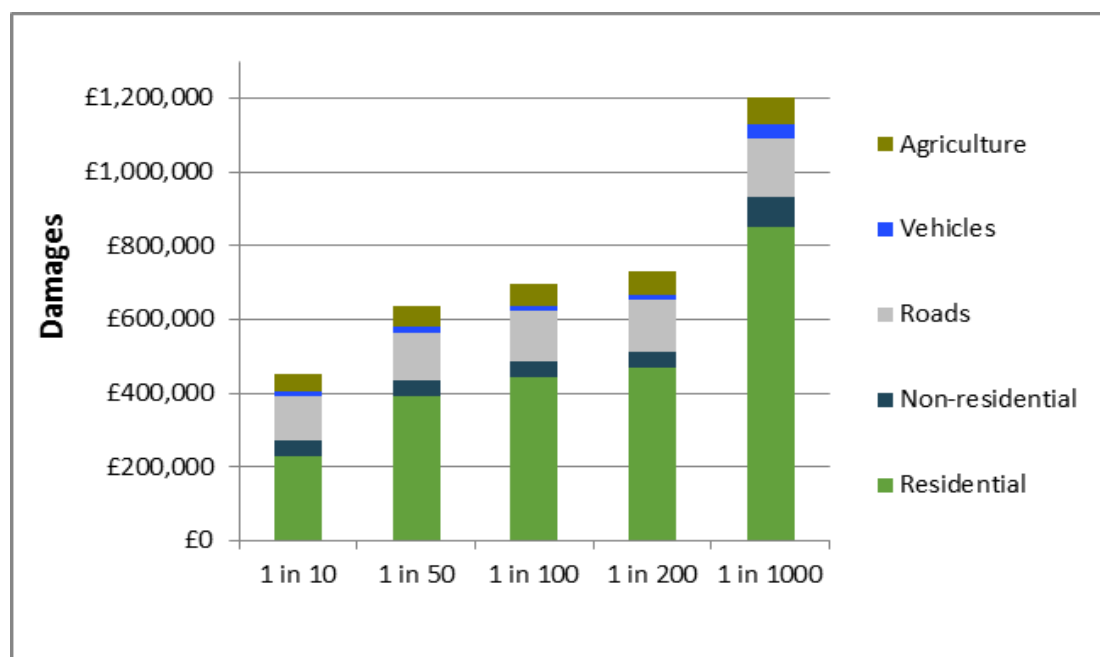
The transport network is affected by flooding notably the A9, A836, B870 and B874. The Wick to Inverness railway line and the branch line to Thurso are at risk of being flooded at several locations.

Six designated cultural heritage sites and small areas of environmental importance are at risk. These include Special Areas of Conservation, Special Protection Areas, and Sites of Special Scientific Interest at Pennylands, Holborn Head, Ushat Head, and North Caithness Cliffs.

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 roads. The location of the impacts of flooding is shown in Figure 3.

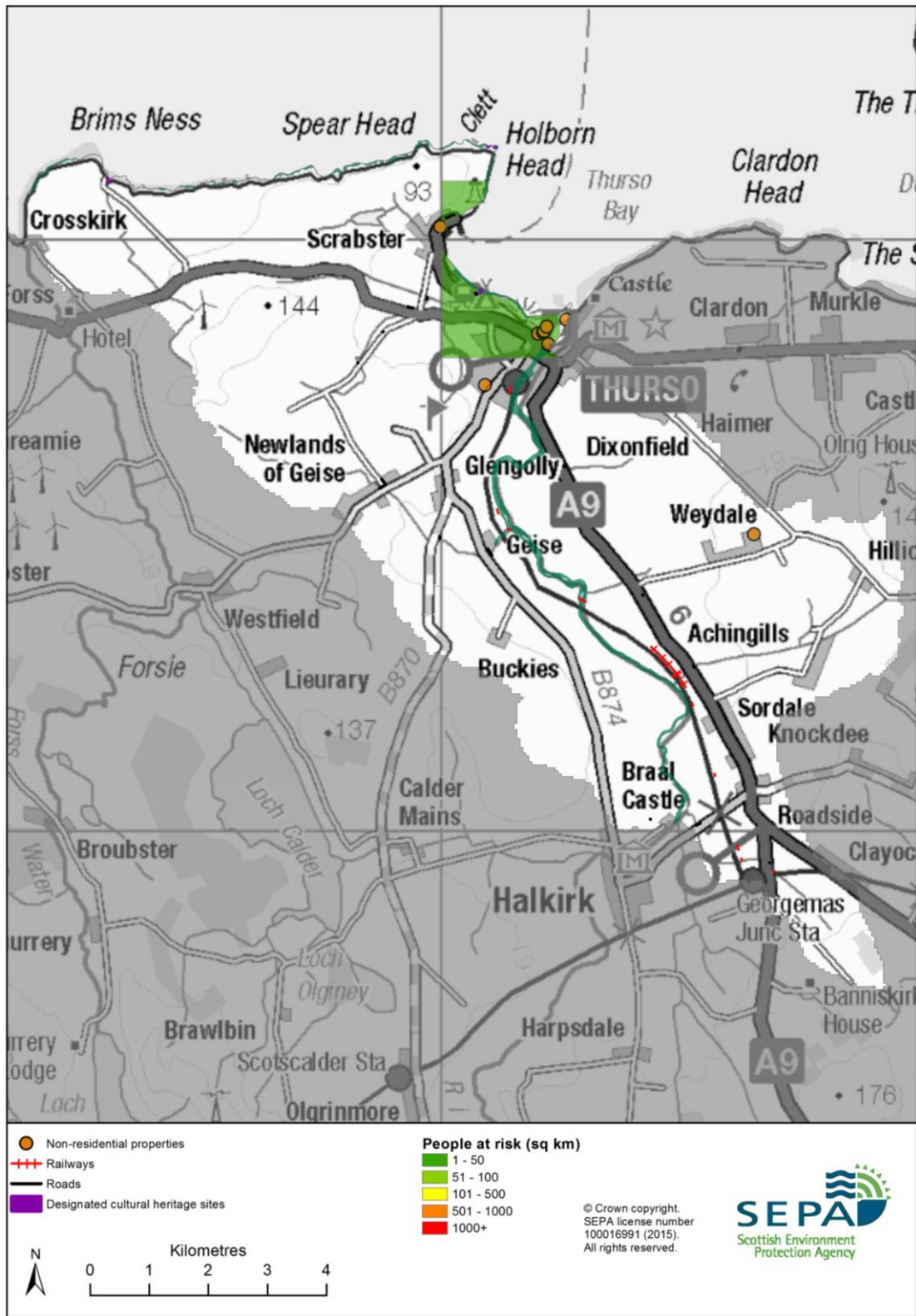
	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 3,700)	<10	10	20
Non-residential properties (total 530)	<10	10	20
People	10	30	40
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at 30 locations Rail at 10 locations	Roads at 30 locations Rail at 10 locations	Roads at 40 locations Rail at 20 locations
Environmental designated areas (km <sup>2</sup> )	0.8	0.8	0.9
Designated cultural heritage sites	6	6	6
Agricultural land (km <sup>2</sup> )	2	3	3

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



**Figure 3: Impacts of flooding**



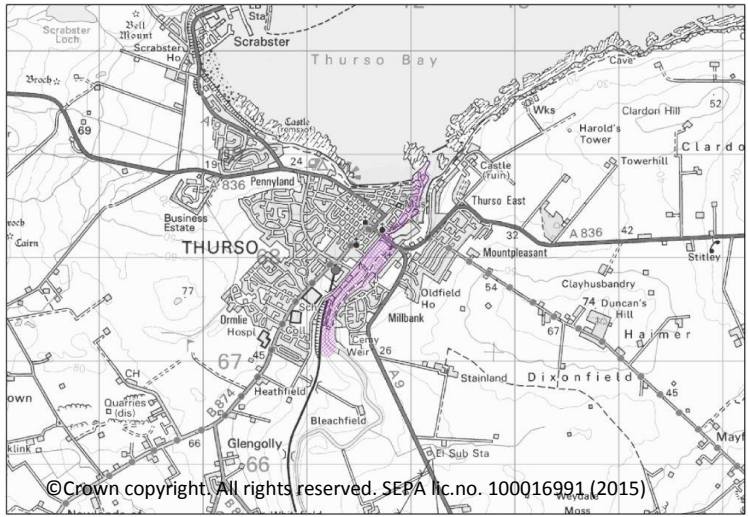
## History of flooding

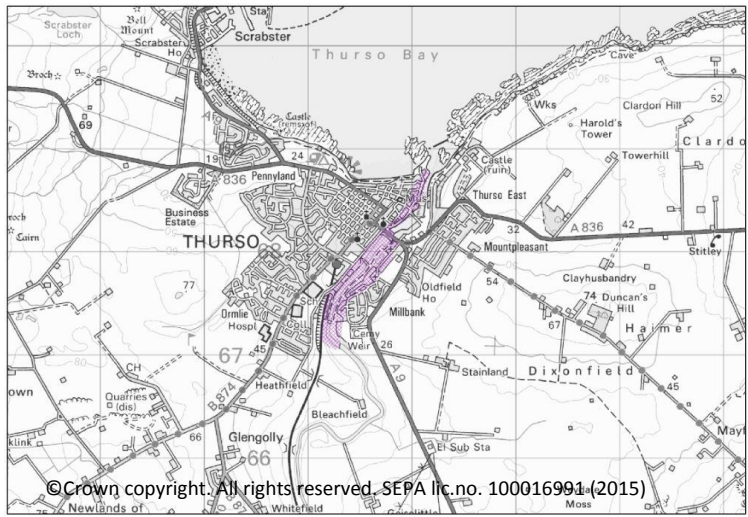
There is an extensive history of flooding in this Potentially Vulnerable Area, primarily from the River Thurso, with several floods being caused by the interaction of the river with high tides. It should be noted that the flood maps do not consider combined river and coastal floods and may thus underestimate flood risk.

- 2006: Olig Street, High Street and Heatherfield Road in Thurso were affected by surface water flooding;
- October 2006: Extensive flooding occurred to residential and non-residential properties, a power station, roads and car parks. This was caused by drainage systems being unable to cope with volume of surface water runoff and the Wolf Burn bursting its banks;
- 2005: A combined tidal and river flood affected a number of commercial and residential properties after the River Thurso breached its defences on both the east and west bank to the north of Thurso Bridge;
- October 2004: Roads and gardens flooded from a variety of sources including surface water, groundwater and river water;
- 1909: River Thurso recorded as flooding;
- 1892: Coastal flooding damaged the harbour breakwater and flooded the harbour area;
- 1873: River Thurso recorded as flooding;
- 1863: River Thurso burst its banks and swept away a bridge opposite Brawl Castle.

**Objectives to manage flooding in Potentially Vulnerable Area 01/01**

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 Thurso Potentially Vulnerable Area.

Reduce risk in Thurso (Riverside area) from coastal flooding	
Indicators:	Target area:
<ul style="list-style-type: none"> <li>£2,100 Annual Average Damages from non-residential properties</li> </ul>	 <p>© Crown copyright. All rights reserved. SEPA lic.no. 100016991 (2015)</p>
Objective ID: 100101	

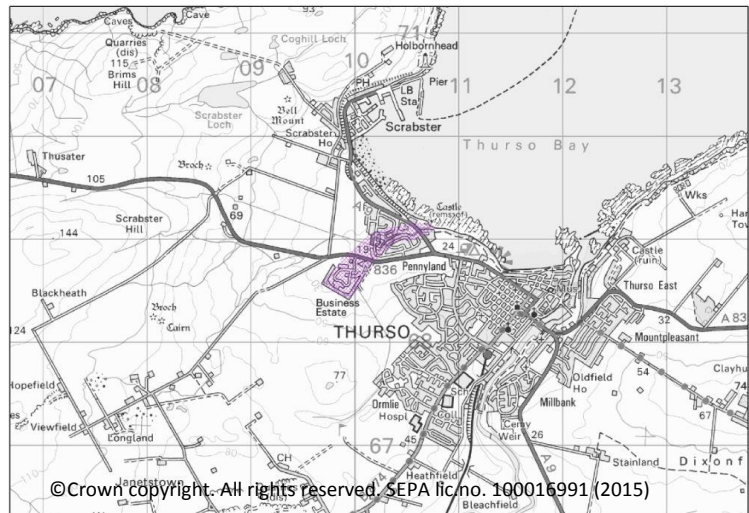
Reduce flood risk in Thurso (Riverside area) from the River Thurso	
Indicators:	Target area:
<ul style="list-style-type: none"> <li>£2,200 Annual Average Damages from non-residential properties</li> </ul>	 <p>© Crown copyright. All rights reserved. SEPA lic.no. 100016991 (2015)</p>
Objective ID: 100102	

## Reduce flood risk in Thurso (Burnside) from the Wolf Burn

Indicators:

Target area:

- £21,000 Annual Average Damages from residential properties



Objective ID: 100103

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 10 residential properties</li> <li>• £77,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 10 residential properties</li> <li>• £77,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/01

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 Thurso Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<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	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

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1001030005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Thurso (Burnside) from the Wolf Burn (100103)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:		Within local authority:
	<b>142 of 168</b>		<b>18 of 23</b>
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A study is required to further investigate the feasibility of improving conveyance along the Wolf Burn (Burnside) and the tributary to the north-west of the Thurso Business Park, with consideration of property level protection for any residual flood risk. Other actions may also be considered in order to develop the most sustainable range of options. The study should look to confirm the extent of works required and the business case for flood protection works. The study should also look to confirm the level of flood risk for Thurso Business Park which may be underestimated based on the history of flooding in the area.		
<b>Potential impacts</b>			
<b>Economic:</b>	The flood protection study should confirm the economic impacts and number of properties at risk. The study could benefit seven residential properties at risk of flooding in this location, with potential damages avoided of up to £620,000. There may also be additional benefits for the Thurso Business Park, which has historically had flooding problems which have not been captured in the analysis.		
<b>Social:</b>	The social benefits will be confirmed once the hydraulic study has been carried out. Currently it is estimated that 15 people may directly benefit from flood protection works. A reduction in flood risk would		

<b>Social:</b>	have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Flood protection works may also reduce disruption to the wider community of Thurso and surrounding areas through reduced flooding to the A9 and A836. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There are unlikely to be any significant impacts on the Pennylands Site of Special Scientific Interest or the North Caithness Cliffs Special Protection Area as the works would be outside of their boundaries. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Thurso Special Area of Conservation.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1001010005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Thurso (Riverside area) from the River Thurso (100102) Reduce risk in Thurso (Riverside area) from coastal flooding (100101)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:		Within local authority:
	<b>156 of 168</b>		<b>22 of 23</b>
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A hydraulic study is required to further improve the understanding of flood risk in this area from combined coastal and river flooding. Following the improvements to the understanding of flood risk, the study should progress to focus on coastal revetments, direct defences and property level protection if justified by the level of flood risk. Other actions may also be considered in order to develop the most sustainable range of options. Due to the history of flooding in Thurso and the need to better understand the risk of combined river and coastal flooding, this study will be taken forward in cycle 1.		
<b>Potential impacts</b>			
<b>Economic:</b>	The flood protection study should confirm the economic impacts and number of properties at risk. Currently it is estimated that potential damages of up to £230,000 could be avoided. The history of flooding however suggests that the potential benefits are likely to be higher.		
<b>Social:</b>	The social benefits including to people and to community facilities will be confirmed once the hydraulic study has been carried out. Negative impacts through disturbance to the local community during the construction phase should be considered.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There are unlikely to be any		

<b>Environmental:</b>	significant impacts on the North Caithness Cliffs Special Protection Area from flood protection works due to its distance offshore from Thurso. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Thurso Special Area of Conservation.
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<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	<b>Indicative delivery:</b>	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	<b>Indicative delivery:</b>	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>This Potentially Vulnerable Area is within the 'Caithness and Sutherland' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	<b>Indicative delivery:</b>	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

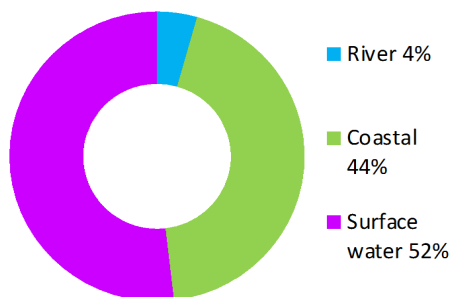
<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Scottish 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.		



## Wick Airport (Potentially Vulnerable Area 01/02)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Thurso coastal

### Summary of flooding impacts



### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £10,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	Maintain flood warning	Awareness raising	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

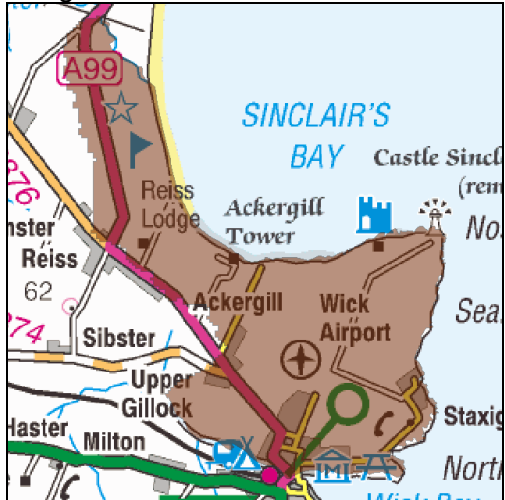
Actions

# Wick Airport (Potentially Vulnerable Area 01/02)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Wick coastal

## Background

This Potentially Vulnerable Area is approximately 20km<sup>2</sup>. It includes the northern part of the town of Wick and the rural area to the north and east including Wick Airport (shown below). It includes the smaller settlements of Ackerhill, Papigoe, Broadhaven and Staxigoe.

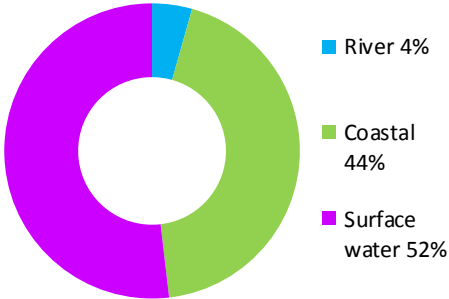


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There are no major rivers; however the Wick River flows just outside the southern boundary.

Fewer than ten residential and non-residential properties are at risk of flooding.

The Annual Average Damages are approximately £10,000 with the majority caused by surface water and coastal flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

The northern part of Wick is affected by coastal flooding. Flooding from wave action is not fully represented in the assessment of flood risk in this area and it is likely that the number of properties at risk and the damages from coastal flooding are underestimated.

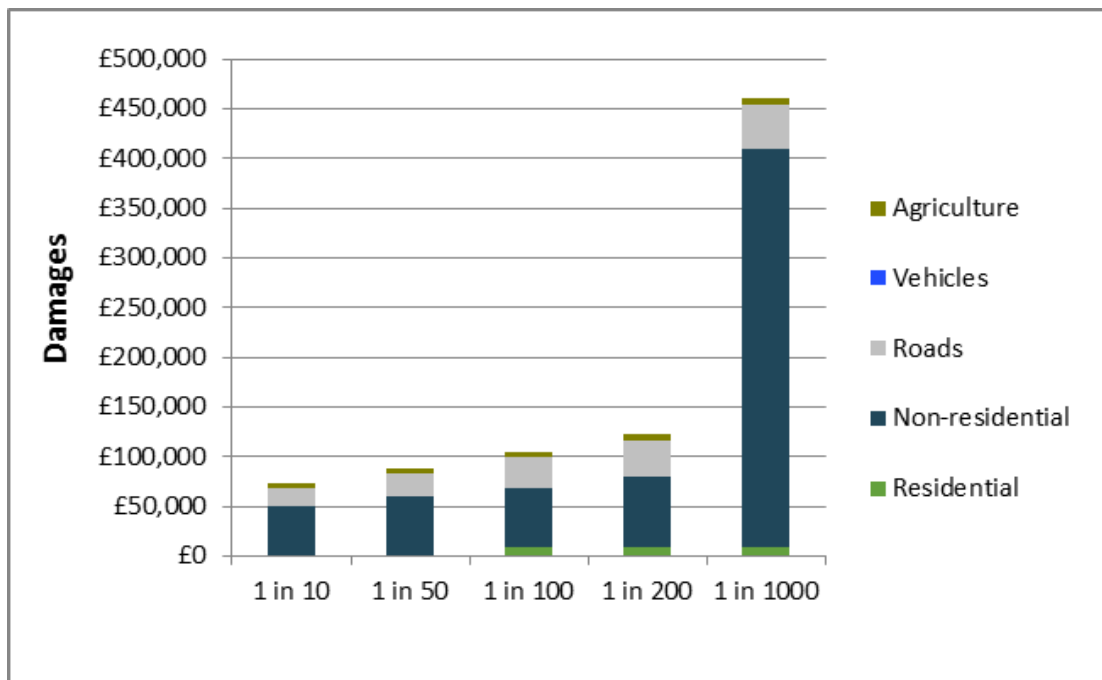
The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The A99 road is at risk of flooding. Note that whilst a small area of airport runway is shown to be at risk, drainage systems have been installed to ensure that it does not affect the operation of the site. Three designated cultural heritage sites and small areas of designated environmental sites are also at risk. These include the Lower Wick River Site of Special Scientific Interest.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to roads. The location of the impacts of flooding is shown in Figure 3.

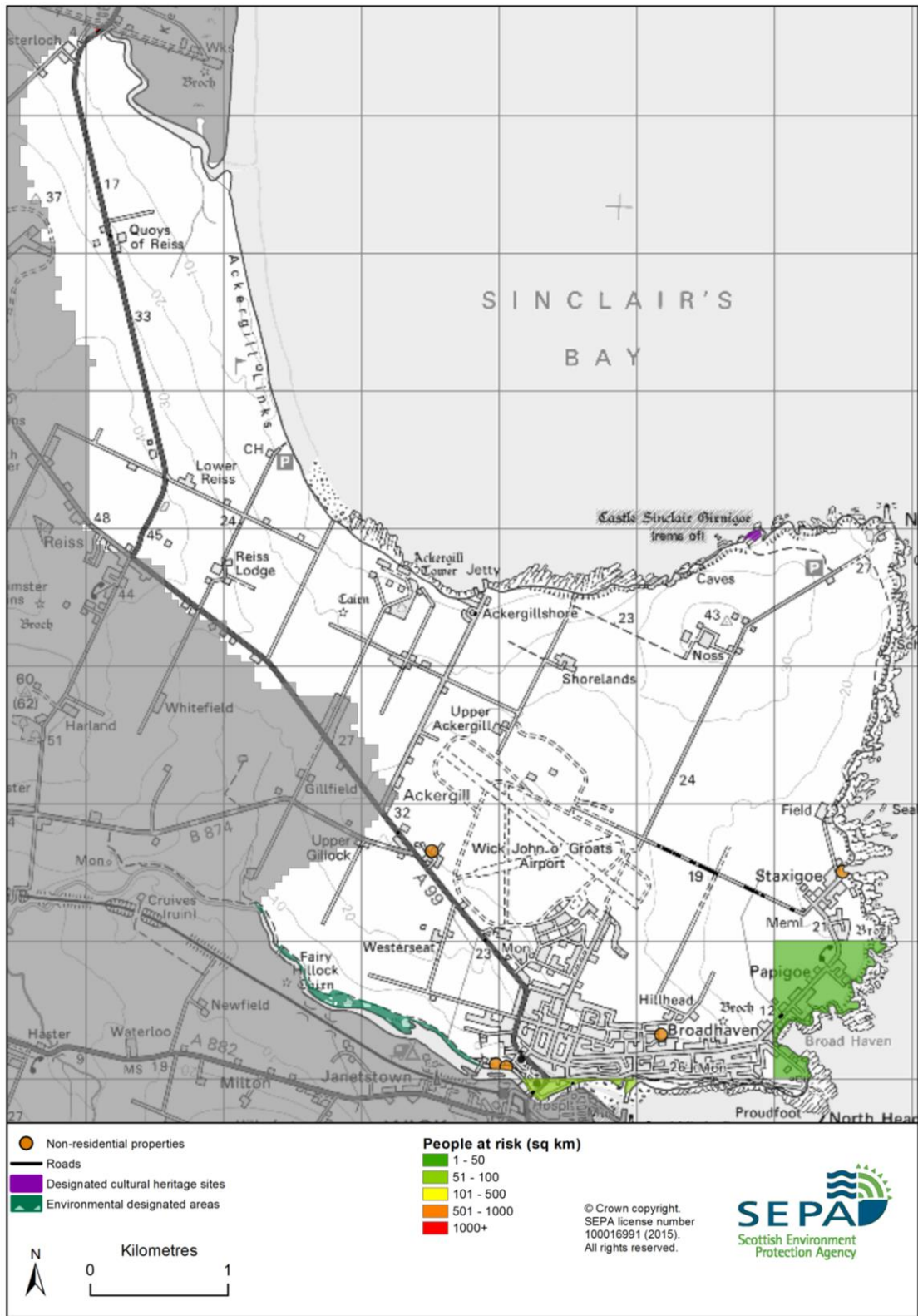
	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 1,700)	<10	<10	<10
Non-residential properties (total 280)	<10	<10	10
People	<10	<10	<10
Community facilities	0	0	0
Utilities assets	0	0	<10
Transport links (excluding minor roads)	Roads at 10 locations <0.01km <sup>2</sup> of airport runway	Roads at 10 locations <0.01km <sup>2</sup> of airport runway	Roads at 20 locations <0.01km <sup>2</sup> of airport runway
Environmental designated areas (km <sup>2</sup> )	<0.1	<0.1	<0.1
Designated cultural heritage sites	2	3	3
Agricultural land (km <sup>2</sup> )	0.2	0.3	0.4

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



**Figure 3: Impacts of flooding**

## History of flooding

- 2006 – present: Four floods have affected this area. In September 2009, gardens and roads flooded due to drainage systems being unable to cope with volume of surface water;
- In October 2006 flooding affected gardens and roads but not properties;
- 1931: Alexandra Place flooded;
- July 1903: River flooding washed away a railway embankment and houses in Alexandra Place and Lower Pulteneytown, one person drowned as a result;
- A total of five floods between 1869 and 1909 affected property, including two coastal floods in 1869 and 1877.

## Objectives to manage flooding in Potentially Vulnerable Area 01/02

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 Wick Airport Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £10,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £10,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/02

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 Wick Airport Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Wick' flood warning area which is part of the Moray Firth coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Caithness and Sutherland' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>From 2016 SEPA will work towards raising awareness of flood risk through partnership activities with Transport Scotland and local infrastructure operators.</p> <p>Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.</p>		



<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

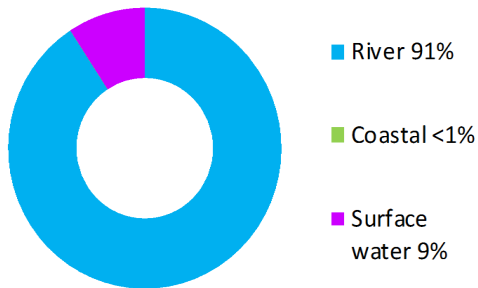
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Providing an emergency response to 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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

# Wick - Burn of Newton (Potentially Vulnerable Area 01/03)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Wick coastal

## Summary of flooding impacts



### At risk of flooding

- 40 residential properties
- <10 non-residential properties
- £190,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<i>Surface water plan/study</i>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<b>Strategic mapping and modelling</b>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

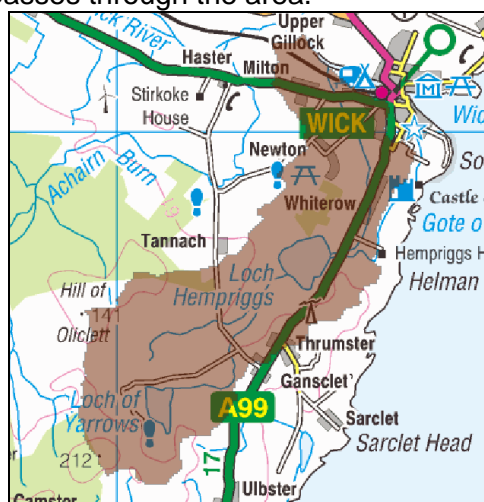
Actions

# Wick – Burn of Newton (Potentially Vulnerable Area 01/03)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Wick coastal

## Background

This Potentially Vulnerable Area is approximately 30km<sup>2</sup>. It includes the south west part of Wick, and the smaller settlements of Thrumster, Milton, and Newton (shown below). The A99 passes through the area.

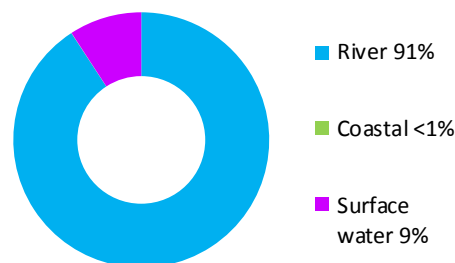


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The Burn of Newton is the largest river in the area.

There are approximately 40 residential properties and fewer than 10 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £190,000 with the majority caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

## Summary of flooding impacts

The Mill Lade poses flood risk to properties in Old Wick, and the Burn of Newton affects properties in south west Wick. Flood risk from the Burn of Newton is potentially underestimated due to the uncertainty of modelled flow between the Mill Lade and Burn of Newton.

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.

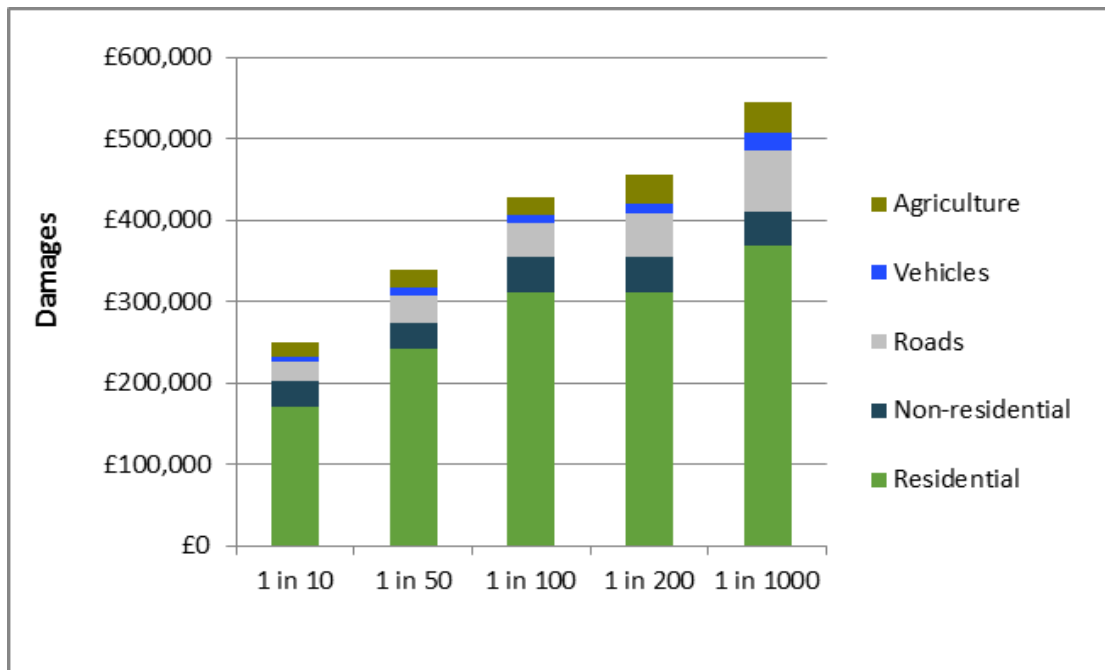
Transport links potentially affected by flooding include the A99, A882 and the Wick to Inverness railway line in several locations. Seven designated cultural heritage sites and small areas of environmental importance are at risk. The sites affected include Special Areas of Conservation, Special Protection Areas and Sites of Special Scientific Interest at Caithness and Sutherland Peatlands, Oliclett, and Thrumster Mill Loch.

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 roads.

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 480)	<10	40	40
Non-residential properties (total 70)	<10	<10	<10
People	10	80	80
Community facilities	0	0	0
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations Rail at <10 locations	Roads at 30 locations Rail at <10 locations	Roads at 30 locations Rail at <10 locations
Environmental designated areas (km <sup>2</sup> )	0.2	0.2	0.2
Designated cultural heritage sites	5	7	7
Agricultural land (km <sup>2</sup> )	0.9	2	2

**Table 1:** Summary of flooding impacts<sup>1</sup>

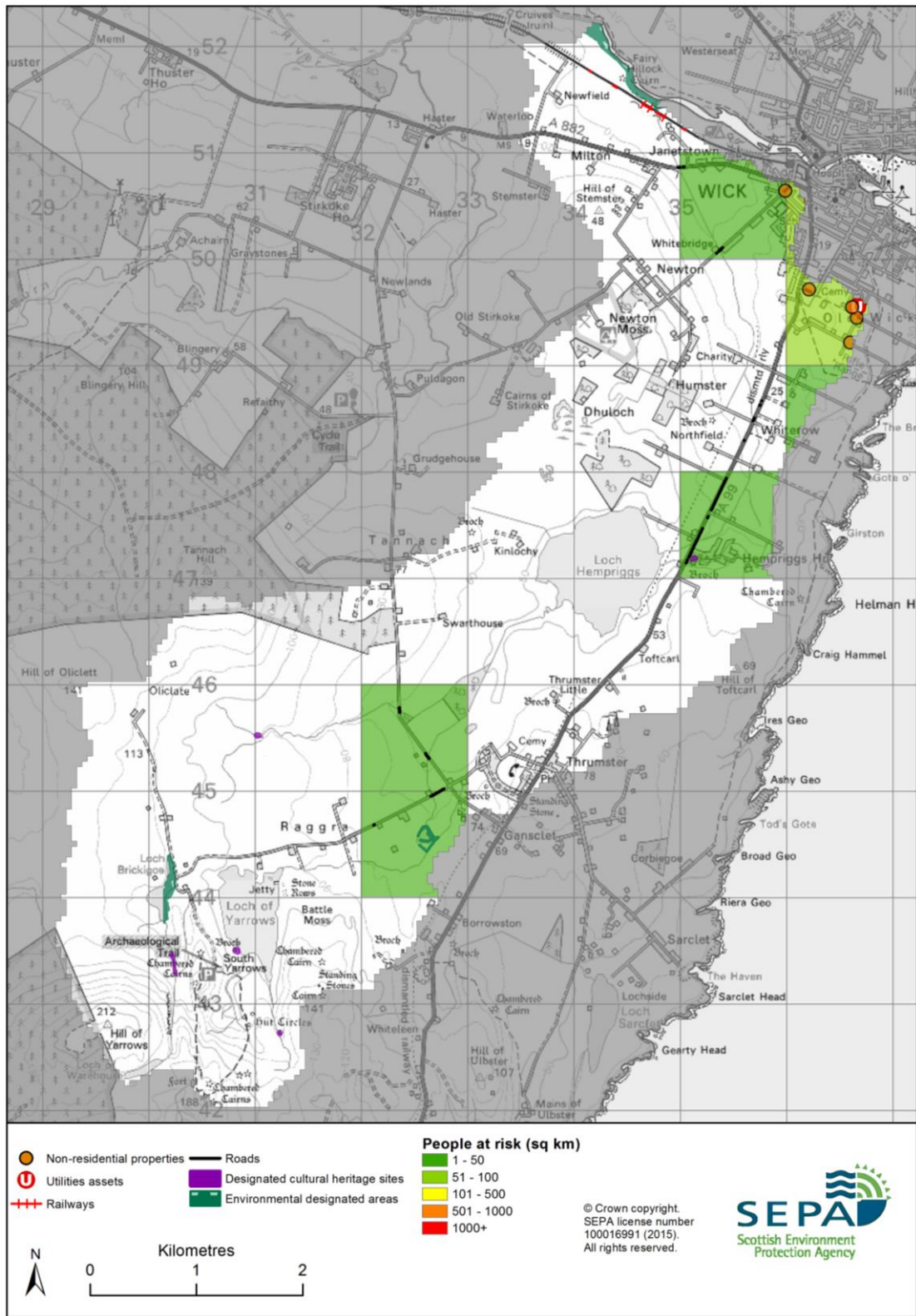


**Figure 2:** Damages by flood likelihood

## History of flooding

There have been six floods recorded in this Potentially Vulnerable Area since 2006. These floods are predominantly associated with surface water, although in October 2006 flooding was exacerbated by blocked culverts.

<sup>1</sup> 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 01/03

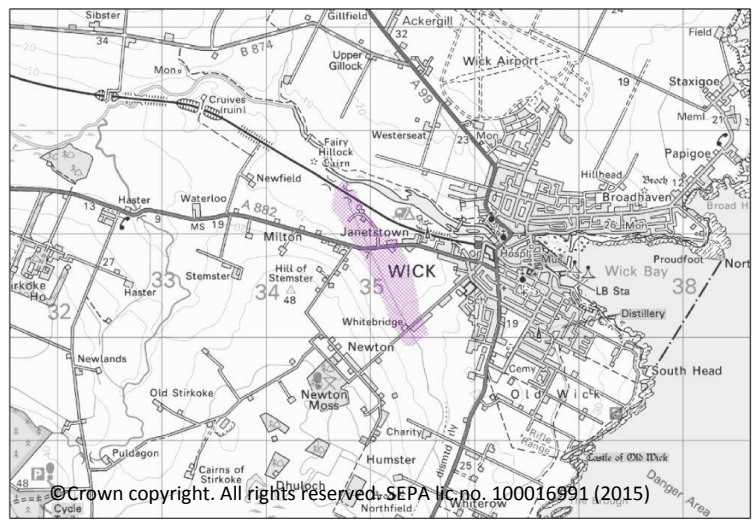
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

### Reduce flood risk in Wick from the Burn of Newton

Indicators:

Target area:

- 70 people
- £170,000 Annual Average Damages



Objective ID: 100301

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £190,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £190,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/03

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 Wick - Burn of Newton Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020016)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Wick from the Burn of Newton (100301)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will be seeking to develop the flood hazard mapping in the area of Loch Hempriggs to the confluence with the Wick River to improve understanding of the flood risk. The extent and timing of the completed improvements will be dependent on detailed scoping and data availability.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Caithness and Sutherland' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		



<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

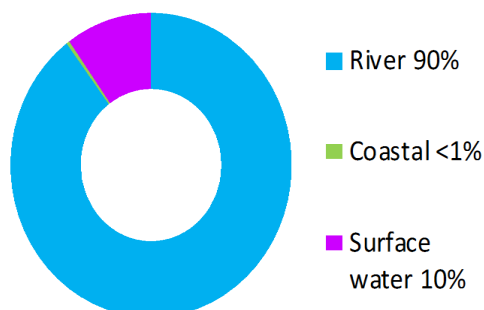
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Providing an emergency response to 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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Wick Coastal (Potentially Vulnerable Area 01/04)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Wick coastal

### Summary of flooding impacts



#### At risk of flooding

- 40 residential properties
- 20 non-residential properties
- £400,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	Maintain flood warning	Awareness raising	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

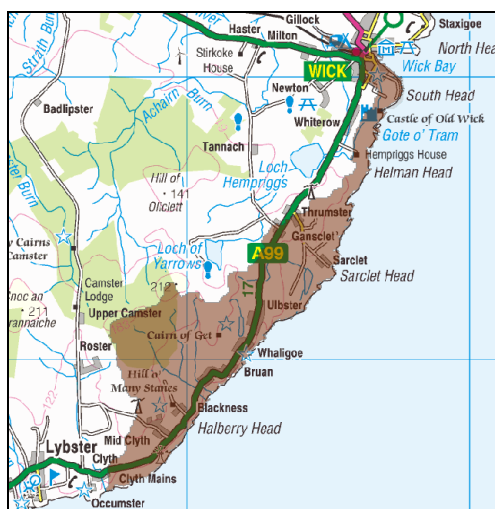
Actions

## Wick Coastal (Potentially Vulnerable Area 01/04)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Wick coastal

### Background

This Potentially Vulnerable Area is approximately 36km<sup>2</sup>. It includes the south east part of Wick and the mainly rural area along the coastline to the south (shown below). It includes the smaller settlements of Sarclet, Gansclet, Whaligoe, Brean and Blackness. The A99 road passes through the area.

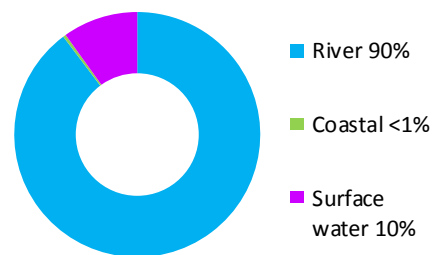


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The Wick River flows along the northern boundary of the area and there are also a number of smaller watercourses including the Mill Lade, which runs between Loch Hempriggs and the distillery in Wick.

There are approximately 40 residential properties and 20 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £400,000 with the majority caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

The majority of river flood risk is caused by the Mill Lade in south west Wick. Flood risk from the Mill Lade is potentially overestimated due to the uncertainty of modelled flow between the Mill Lade and the Burn of Newton. In addition, flooding from wave action is not fully represented in the assessment of flood risk in this area and the number of properties at risk and the damages from coastal flooding may be underestimated as a result.

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.

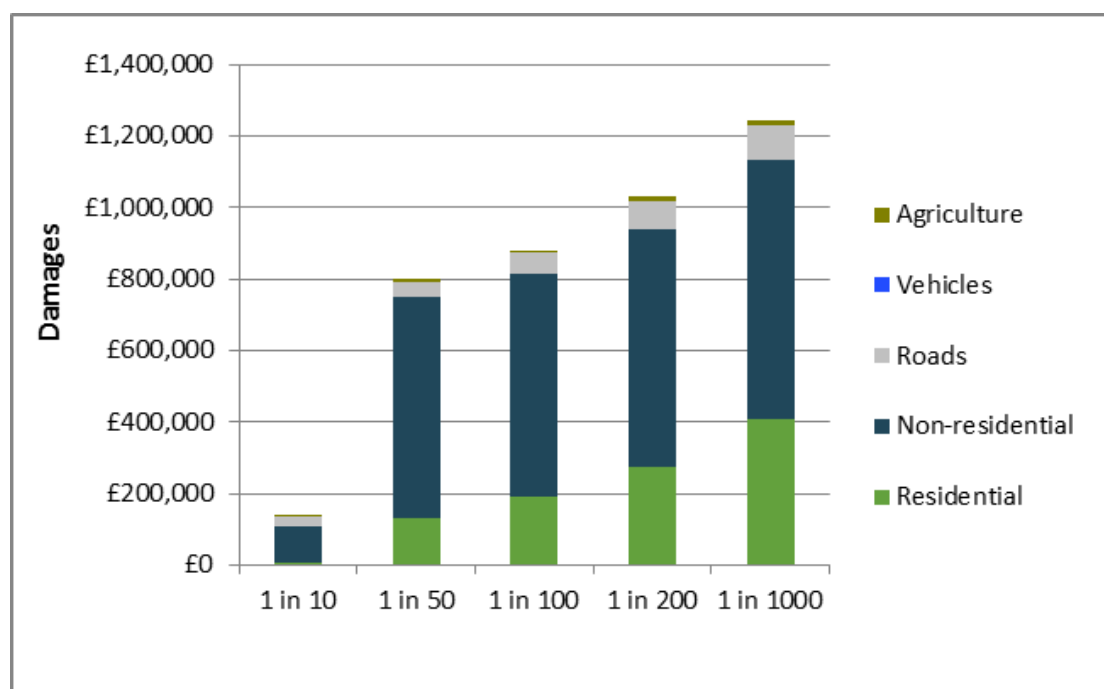
The A99 road, one designated cultural heritage site and small areas of environmental importance are also at risk. These include East Caithness Cliffs Special Area of Conservation, Special Protection Area and Marine Protected Area.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential

properties followed by damages to residential properties. The location of the impacts of flooding is shown in Figure 3.

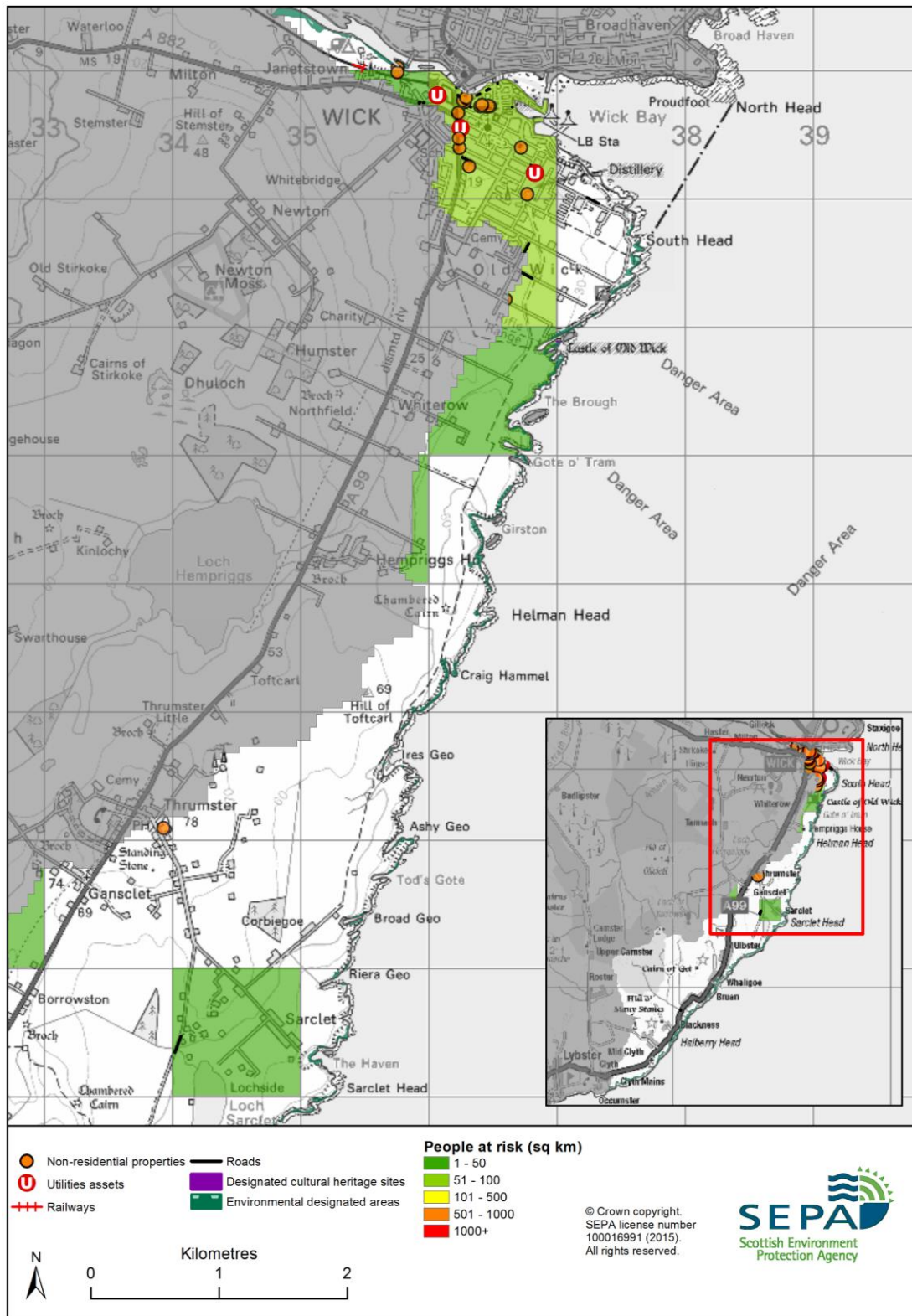
	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 2,000)	<10	40	50
Non-residential properties (total 280)	<10	20	20
People	<10	100	110
Community facilities	0	0	0
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations Rail at <10 locations	Roads at 30 locations Rail at <10 locations	Roads at 40 locations Rail at <10 locations
Environmental designated areas (km <sup>2</sup> )	0.4	0.4	0.4
Designated cultural heritage sites	1	1	1
Agricultural land (km <sup>2</sup> )	0.3	0.6	0.7

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



**Figure 3: Impacts of flooding**

## History of flooding

- There have been five floods since 2001, including:
  - September 2009: Roads were flooded and property threatened;
  - October 2006: Property and roads flooded;
- 1860-1879: Several coastal floods during this period caused significant damage to the harbour.

## Objectives to manage flooding in Potentially Vulnerable Area 01/04

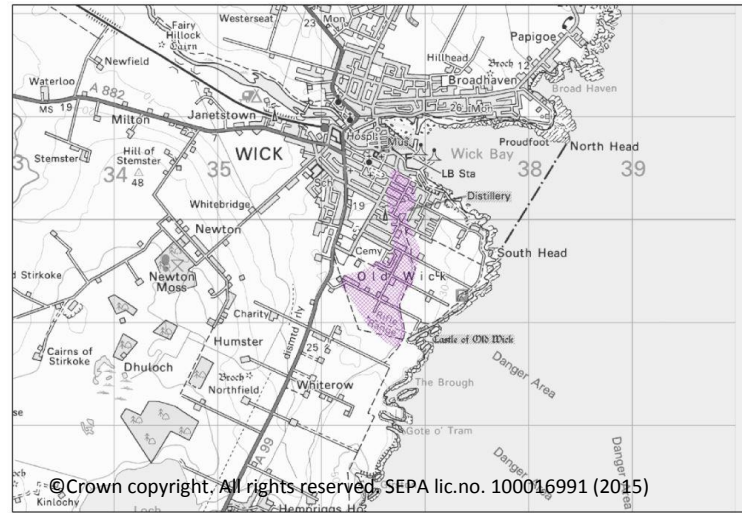
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

### Reduce flood risk in Wick from the Mill Lade

Indicators:

Target area:

- 70 people
- £360,000 Annual Average Damages



Objective ID: 100401

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £400,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £400,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/04

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 Wick Coastal Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will be seeking to incorporate additional surface water hazard mapping information into the flood maps to improve understanding of flood risk. Approximately 2,100km <sup>2</sup> of improved data is currently available within this Local Plan District.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1004010016)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Wick from the Mill Lade (100401)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will be seeking to develop the flood hazard mapping in the area of Loch Hempriggs to the confluence with the Wick River to improve understanding of the flood risk. The extent and timing of the completed improvements will be dependent on detailed scoping and data availability.		



<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Wick' flood warning area which is part of the Moray Firth coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Caithness and Sutherland' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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 communities and promote Floodline using most the appropriate mix of methods for the area. These could include direct mailings, education activities, participation in events and media. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

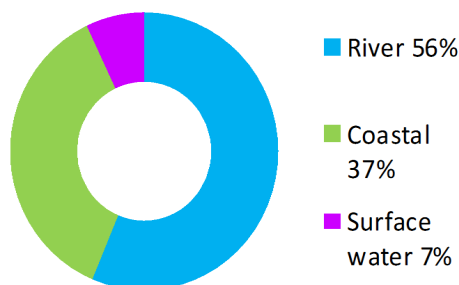
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Lochinver (Potentially Vulnerable Area 01/05)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Minch coastal

### Summary of flooding impacts



#### At risk of flooding

- 10 residential properties
- 10 non-residential properties
- £140,000 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>	<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>	<i>Maintain flood warning</i>	Awareness raising	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	Flood forecasting	Self help	Maintenance	Planning policies

Actions

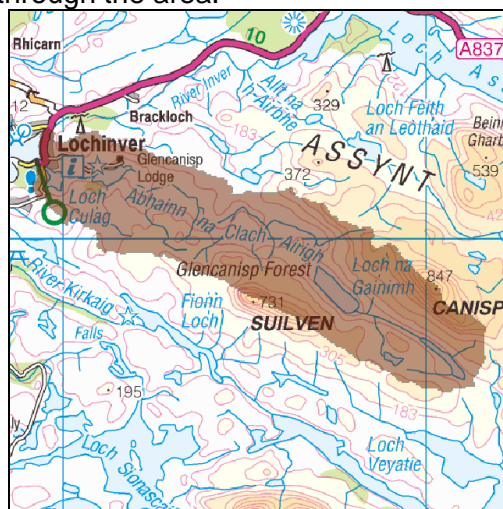
# Lochinver (Potentially Vulnerable Area 01/05)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Minch coastal

## Background

This Potentially Vulnerable Area covers Lochinver and the rural areas to the south east (shown below). It is approximately 35km<sup>2</sup>.

A short section of the A837 passes through the area.

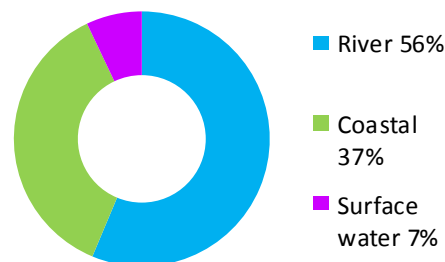


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The main river in this area is the Abhainn na Clach Airigh system which includes several lochs, the largest of which is Loch na Gainimh.

There are approximately 10 residential properties and 10 non-residential properties at risk of flooding.

The Annual Average Damages are £140,000 with the majority caused by river flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

Coastal flood risk affects Lochinver seafront along the head of Loch Inver and the Culaig Hotel. River flood risk is also focused on Lochinver.

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.

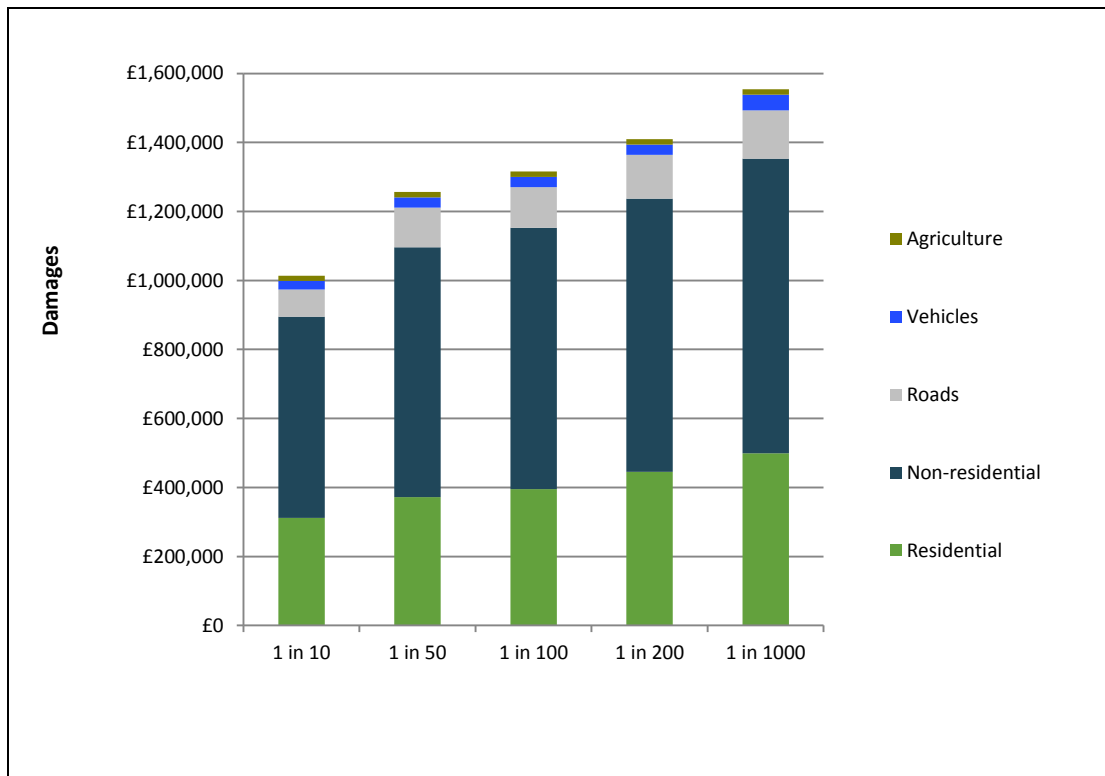
Lochinver Pre-school and Primary School are at risk from river and surface water flooding, as is a short section of the A837 road.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to residential properties and roads.

The location of the impacts is shown in Figure 3.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 60)	10	10	10
Non-residential properties (total 60)	10	10	20
People	20	20	30
Community facilities	<10 Educational buildings	<10 Educational buildings	<10 Educational buildings
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	Roads at 10 locations	Roads at 10 locations	Roads at 10 locations
Environmental designated areas (km <sup>2</sup> )	0	0	0
Designated cultural heritage sites	0	0	0
Agricultural land (km <sup>2</sup> )	0.9	1	1

**Table 1:** Summary of flooding impacts<sup>1</sup>

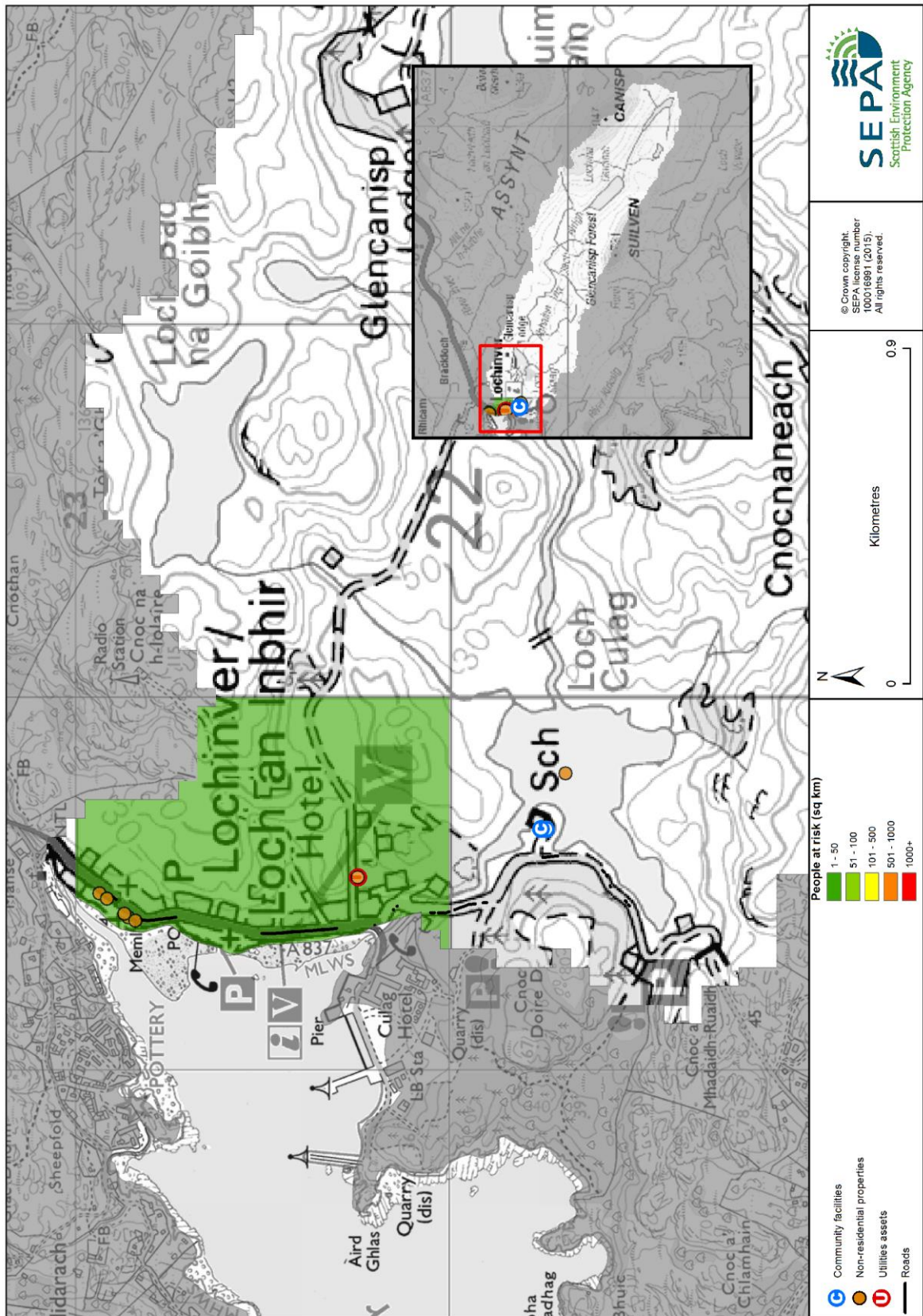


**Figure 2:** Damages by flood likelihood

## History of flooding

In February 1998 heavy rainfall caused flooding up to three inches deep and is understood to have affected Lochinver Primary School.

<sup>1</sup> 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 01/05

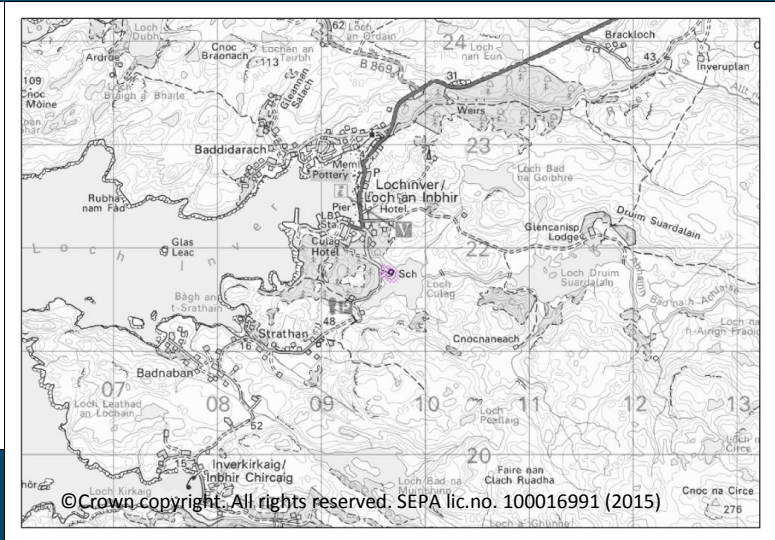
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

### Reduce the number of community facilities at risk of flooding from Loch Culag in Lochinver

Indicators:

- 2 educational buildings

Objective ID: 100501



Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 10 residential properties</li> <li>• £140,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 10 residential properties</li> <li>• £140,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/05

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 Lochinver Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1005010005)</b>		
<b>Objective (ID):</b>	Reduce the number of community facilities at risk of flooding from Loch Culag in Lochinver (100501)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>132 of 168</b>	<b>15 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A study is required for Lochinver Primary School and nursery to reduce the risk of flooding from Loch Culag. The study should primarily focus on direct defences around the perimeter of the school grounds, but other actions may also be considered in order to develop the most sustainable range of options. The study should look to confirm the size of defence required and the business case for flood protection works.		
<b>Potential impacts</b>			
<b>Economic:</b>	The flood protection study should consider how to reduce the impact of flooding to Lochinver Primary School and nursery. Potential damages avoided of up to £1.8 million.		
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. Flood protection works for Lochinver Primary School and nursery may reduce disruption to pupils and the community (e.g. teachers and parents) during flood events, as the school would be able to remain open. Flood protection works could also protect the access road to the school. Negative impacts through disturbance to the local community during the construction phase should be considered.		

<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential that flood protection works could impact on habitats at the edge of Loch Culag. Direct defences could impact on the natural landscapes. There are no environmentally designated sites which could be affected by flood protection works for Lochinver Primary School and nursery.
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<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Caithness and Sutherland' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>SITE PROTECTION PLANS (1005010015)</b>		
<b>Objective (ID):</b>	Reduce the number of community facilities at risk of flooding from Loch Culag in Lochinver (100501)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	<p>Site protection plans are developed to identify whether normal operation of a facility can be maintained during a flood. This may be due to existing protection or resilience of the facility or the network. A site protection plan for Lochinver primary and secondary school should be developed.</p>		

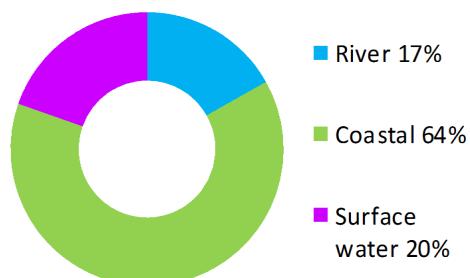
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000020001)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Golspie (Potentially Vulnerable Area 01/06)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Brora coastal

### Summary of flooding impacts



### At risk of flooding

- 60 residential properties
- 10 non-residential properties
- £190,000 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>	Community flood action groups	<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
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

## Golspie (Potentially Vulnerable Area 01/06)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Brora coastal

### Background

This Potentially Vulnerable Area is approximately 38km<sup>2</sup>. It includes Golspie and the mainly rural area to the south and west including the settlements of Littleferry, Kirkton, and Culmailly (shown below).

The A9 road passes through the area.

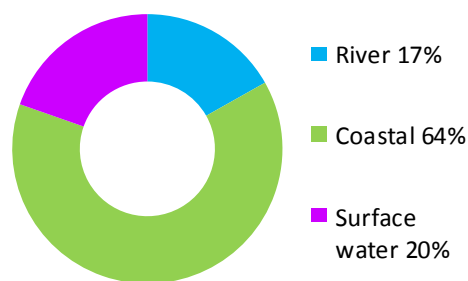


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The main river is the Culmailly Burn. Loch Lunndaith is also located in the area.

There are approximately 60 residential and 10 non-residential properties at risk of flooding.

The Annual Average Damages from flooding are approximately £190,000 with the majority caused by coastal flooding.



**Figure 1:** Annual Average Damages by flood source

### Summary of flooding impacts

Coastal flood risk is centred on the seafront in Golspie with a second area of coastal flood risk further to south around the caravan site and kart track. Flooding from wave action is not fully represented in the assessment of flood risk in this area and the number of properties at risk and the damages from coastal flooding may be underestimated as a result.

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.

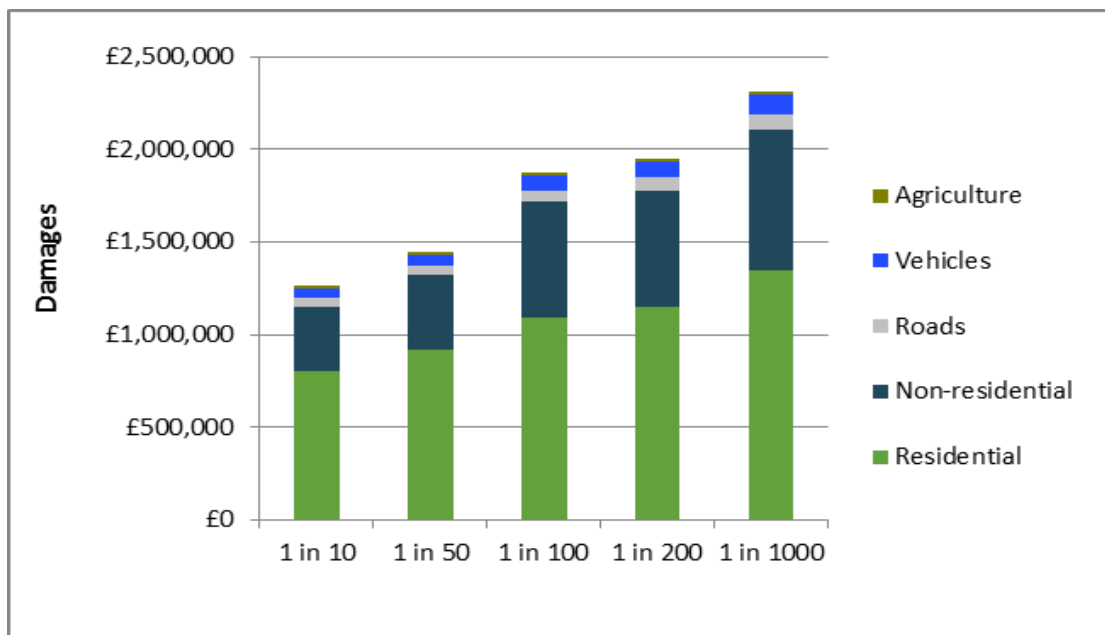
A nursing home, the A9 road and the Wick to Inverness railway in a number of locations are at risk of being flooded. One designated cultural heritage site and areas of environmental importance are also at risk. These include Dornoch Firth and Loch Fleet Special Protection Area, Loch Fleet Special Protection Area and Loch Fleet Site of Special Scientific Interest.

The damages associated with floods of different likelihood are shown in Figure 2. Residential and non-residential properties experience the greatest economic impact.

The location of the impacts is shown in Figure 3.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 730)	40	60	60
Non-residential properties (total 110)	<10	10	20
People	80	120	130
Community facilities	0	<10 Healthcare facilities	<10 Healthcare facilities
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	Roads at 10 locations	Roads at 20 locations	Roads at 20 locations
	Rail at 10 locations	Rail at 10 locations	Rail at 10 locations
Environmental designated areas (km <sup>2</sup> )	1	2	2
Designated cultural heritage sites	1	1	1
Agricultural land (km <sup>2</sup> )	0.6	0.9	1

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources





## History of flooding

Since 2005 there have been four recorded river and surface water floods that have affected roads and property, including:

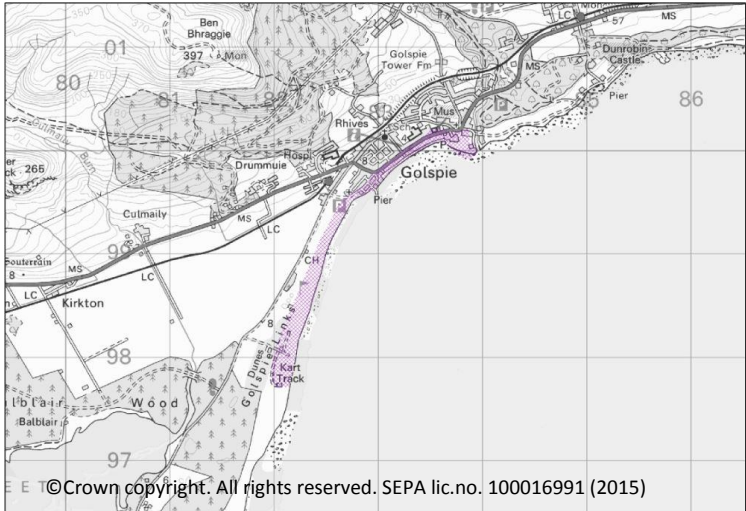
- December 2012: Coastal storms caused damage and flooding to Golspie;
- October 2006: Rhives Burn exceeded the capacity of the culvert under Rhives Road;

Surface water is reported to affect the gardens of properties along Tower Street and can be an issue along Main Street.

In 1864 Golspie Burn overflowed destroying several bridges and roads. A similar flood also occurred in 1903.

## Objectives to manage flooding in Potentially Vulnerable Area 01/06

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 Golspie Potentially Vulnerable Area.

Reduce risk in Golspie from coastal flooding	
Indicators:	Target area:
<ul style="list-style-type: none"> <li>40 people</li> <li>£68,000 Annual Average Damages from residential properties</li> <li>£29,000 Annual Average Damages from non-residential properties</li> </ul>	 <p style="font-size: small; margin-top: 5px;">© Crown copyright. All rights reserved. SEPA lic.no. 100016991 (2015)</p>
Objective ID: 100601	

Target area	Objective	ID	Indicators within PVA
Golspie	Reduce the physical or disruption risk related to the transport network for roads	1300	<ul style="list-style-type: none"> <li>3 locations on the A9 with a total length of 150m</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>60 residential properties</li> <li>£190,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>60 residential properties</li> <li>£190,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/06

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 Golspie Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1300021)</b>		
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for roads (1300)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A9.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1006010005)</b>		
<b>Objective (ID):</b>	Reduce risk in Golspie from coastal flooding (100601)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>104 of 168</b>	<b>9 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	The study should primarily focus on coastal management (revetments), direct defences (flood walls), natural flood management (wave attenuation through beach recharge) and consideration of property level protection for any residual risk, but other actions may also be considered in order to develop the most sustainable range of options. The study should look to confirm the extent and size of defences required and the business case for flood		

	protection works.
Potential impacts	
<b>Economic:</b>	The study should benefit 18 residential and three non-residential properties at risk of flooding in this location, with potential damages avoided of up to £3.3 million. Note there are likely to be additional benefits of reducing losses due to coastal erosion.
<b>Social:</b>	Approximately 40 people may directly benefit from flood protection works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Works may also reduce disruption to the wider community of Golspie and surrounding areas through reduced flooding to the A9. There are potential impacts on amenity and access to the foreshore for the community, which should be considered during the flood protection study. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered. Note there are likely to be additional social benefits of reducing coastal erosion.
<b>Environmental:</b>	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. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on coastal habitats, and increased erosion and disruption of natural processes. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the Moray Firth Special Area of Conservation, and Dornoch Firth and Loch Fleet Special Protection Areas. There is potential to directly impact on the Loch Fleet Site of Special Scientific Interest. Beach recharge will very often involve proposals to obtain the donor sediment from the low intertidal or shallow subtidal in the vicinity. There are potential adverse effects on biodiversity, active coastal processes, and even coastal flood risk if sediment extraction allows greater wave attack.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will be seeking to incorporate additional surface water hazard mapping information into the flood maps to improve understanding of flood risk. Approximately 2,100km <sup>2</sup> of improved data is currently available within this Local Plan District.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Helmsdale to Embo' flood warning area which is part of the Moray Firth coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Caithness and Sutherland' flood alert area.</p>		

<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (1000020012)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Community		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	The Golspie Flood Prevention Group was formed to allow concerned parties in Golspie to express their concern about flooding and flood management in Golspie. Further the group will to be able to input into any decisions made concerning flood management in Golspie.		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

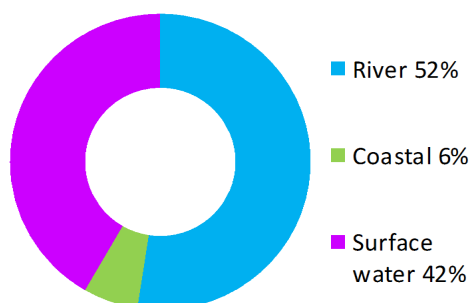
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Providing an emergency response to 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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000020001)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Dornoch (Potentially Vulnerable Area 01/07)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Dornoch coastal

### Summary of flooding impacts



### At risk of flooding

- <10 residential properties
- 20 non-residential properties
- £64,000 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	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	Flood forecasting	Self help	Maintenance	Planning policies

Actions



## Dornoch (Potentially Vulnerable Area 01/07)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Dornoch coastal

### Background

This Potentially Vulnerable Area is approximately 60km<sup>2</sup>. It includes Dornoch and the surrounding mainly rural areas including the settlements of Embo, Skelbo and Hilton (shown below).

The A9 and A949 pass through the area.

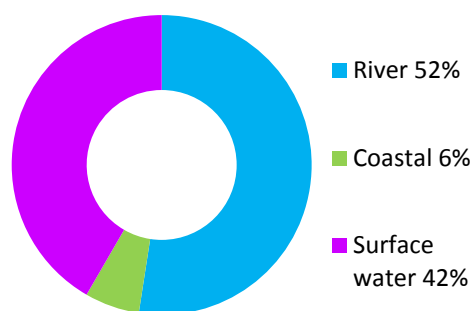


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The main rivers in the area are the River Evelix and the Skelbo Burn.

There are fewer than 10 residential properties and approximately 20 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £64,000 with the majority caused by river and surface water flooding.



**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

Coastal flood risk in the area is found to the south of Dornoch in the vicinity of the Dornoch Links and the airstrip. The main river flood risk is to Dornoch from the Dornoch Burn and to property at Skelbo and Bridgend from the Skelbo Burn.

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.

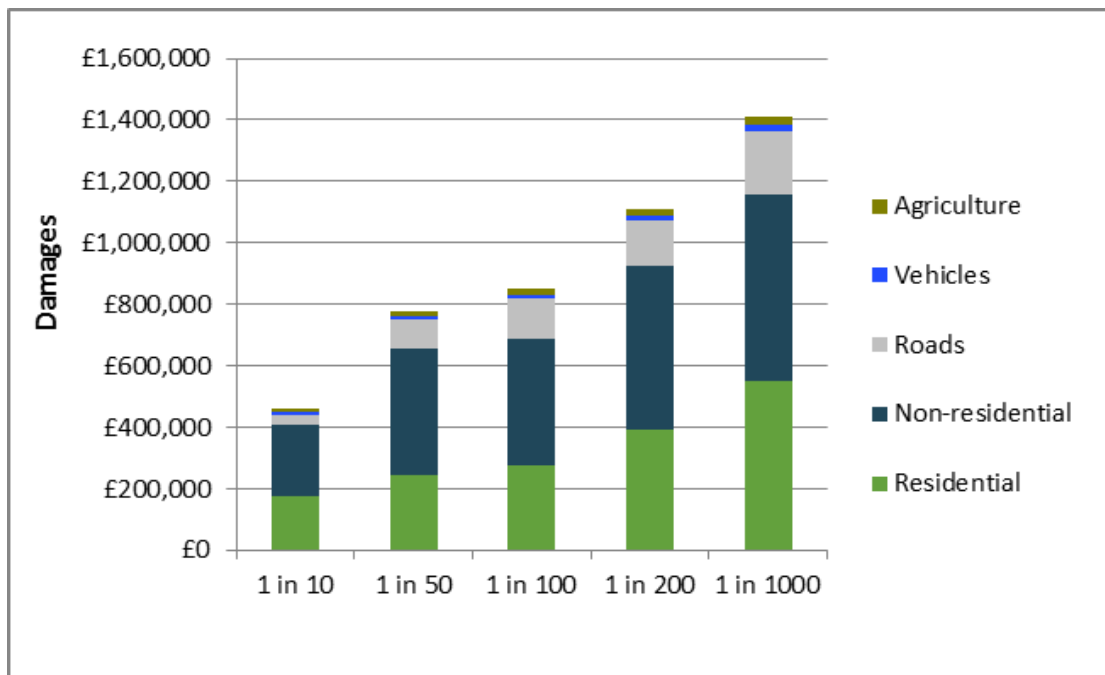
Roads potentially affected by flooding include the A9 and A949. Seven designated cultural heritage sites and large areas of environmental importance are also at risk. The sites affected include Special Areas of Conservation, Special Protection Areas, and Sites of Special Scientific Interest at Dornoch Firth, Morrish More and Loch Fleet.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to 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 1,200)	<10	<10	10
Non-residential properties (total 240)	10	20	30
People	<10	20	30
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 40 locations	Roads at 60 locations	Roads at 70 locations
Environmental designated areas (km <sup>2</sup> )	3	3	3
Designated cultural heritage sites	6	7	7
Agricultural land (km <sup>2</sup> )	0.4	0.7	0.9

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

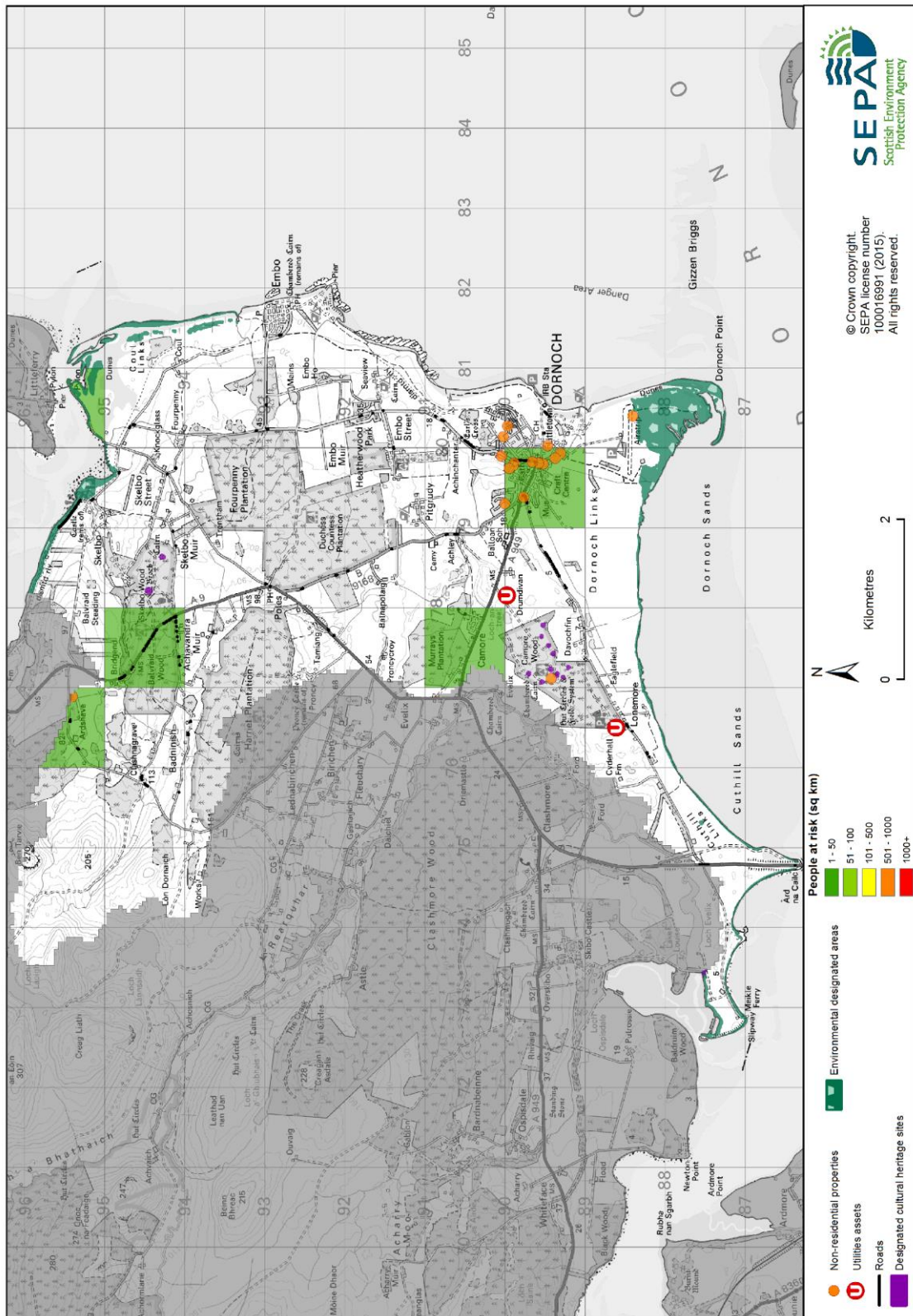


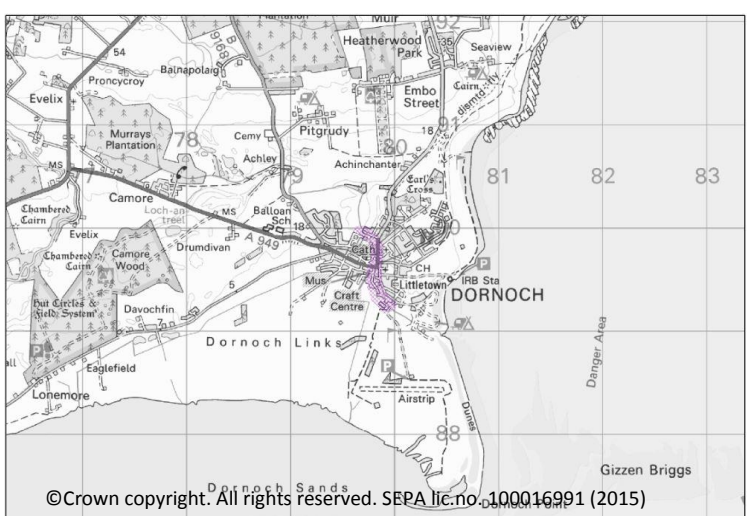
Figure 3: Impacts of flooding

## History of flooding

Five floods have been recorded since 1997. Most of these have been associated with the Dornoch Burn overflowing and affected roads and property. The caravan park by the golf links in Dornoch was notably affected by the coastal storms in December 2012.

## Objectives to manage flooding in Potentially Vulnerable Area 01/07

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 Dornoch Potentially Vulnerable Area.

Reduce flood risk in Dornoch from the Dornoch Burn	
Indicators:	Target area:
<ul style="list-style-type: none"> <li>£7,700 Annual Average Damages from residential properties</li> <li>£12,000 Annual Average Damages from non-residential properties</li> </ul>	 <p style="font-size: small; text-align: center;">© Crown copyright. All rights reserved. SEPA lic.no. 100016991 (2015)</p>
Objective ID: 100701	

Target area	Objective	ID	Indicators within PVA
Dornoch	Reduce the physical or disruption risk related to the transport network for roads	1301	<ul style="list-style-type: none"> <li>5 locations on the A9 with a total length of 130m</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>&lt;10 residential properties</li> <li>£64,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>&lt;10 residential properties</li> <li>£64,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/07

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 Dornoch 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	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	Flood forecasting	Self help	Maintenance	Planning policies

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1301021)</b>		
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for roads (1301)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A9.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1007010005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Dornoch from the Dornoch Burn (100701)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>150 of 168</b>	<b>19 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A study is required for Dornoch to investigate the impact on flood risk of structures crossing the burn and potential blockage scenarios. The study should primarily focus on modification of conveyance (removal or replacement of structures), installation/modification of river control structures (trash screens), direct defences (flood walls), and consideration of property level protection for any residual risk. Other actions may also be considered to develop the most sustainable		

	range of options. The study should look to confirm the type and extent of defences required and the business case for flood protection works.
Potential impacts	
<b>Economic:</b>	The flood protection study should confirm the economic impacts and number of properties at risk. Currently it is estimated that two residential and five non-residential properties could benefit from the study, with potential damages avoided of up to £650,000. The history of flooding however suggests that the potential benefits are likely to be higher.
<b>Social:</b>	The social benefits including to people and to community facilities will be confirmed once the hydraulic study has been carried out. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on habitats and changes to channel morphology. There are unlikely to be any significant impacts on the Moray Firth Special Area of Conservation and Special Protection Area due to the distance upstream of the works compared to the coastal designated areas.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Helmsdale to Embo' flood warning area which is part of the Moray Firth coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Caithness and Sutherland' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		



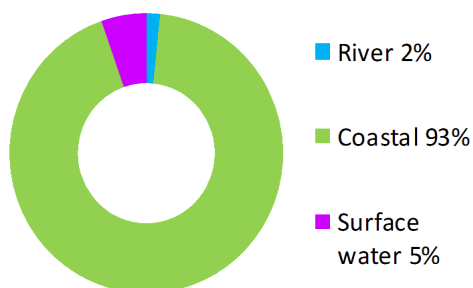
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Tarbat Ness (Potentially Vulnerable Area 01/08)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Cromarty coastal

### Summary of flooding impacts



### At risk of flooding

- 40 residential properties
- 10 non-residential properties
- £130,000 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>	<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	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

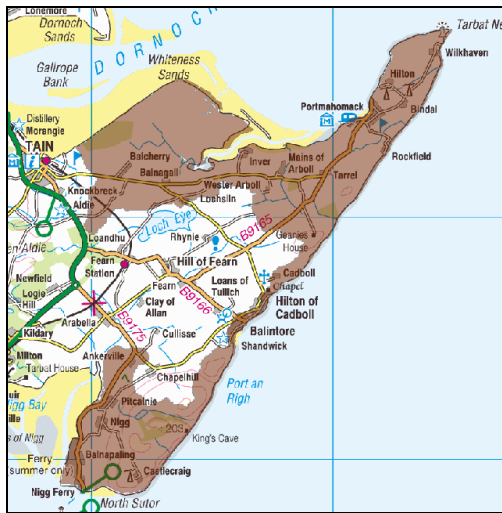
Actions

# Tarbat Ness (Potentially Vulnerable Area 01/08)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Cromarty coastal

## Background

This Potentially Vulnerable Area is approximately 78km<sup>2</sup>. It is situated north of the Moray Firth between the Dornoch Firth and the Cromarty Firth (shown below).

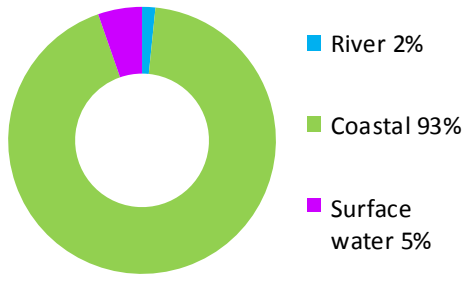


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The area is mainly rural but includes the villages of Portmahomack, Inver, Balintore and Nigg.

There are approximately 40 residential and 10 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £130,000 with the majority caused by coastal flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

The main areas of coastal flood risk are in Inver, Portmahomack and to the south west of Ankerville. Flooding from wave action is not fully represented in the assessment of flood risk in this area and it is likely that the number of properties at risk and the damages from coastal flooding are underestimated as a result. Wave overtopping has been taken into account in the setting of objectives and actions.

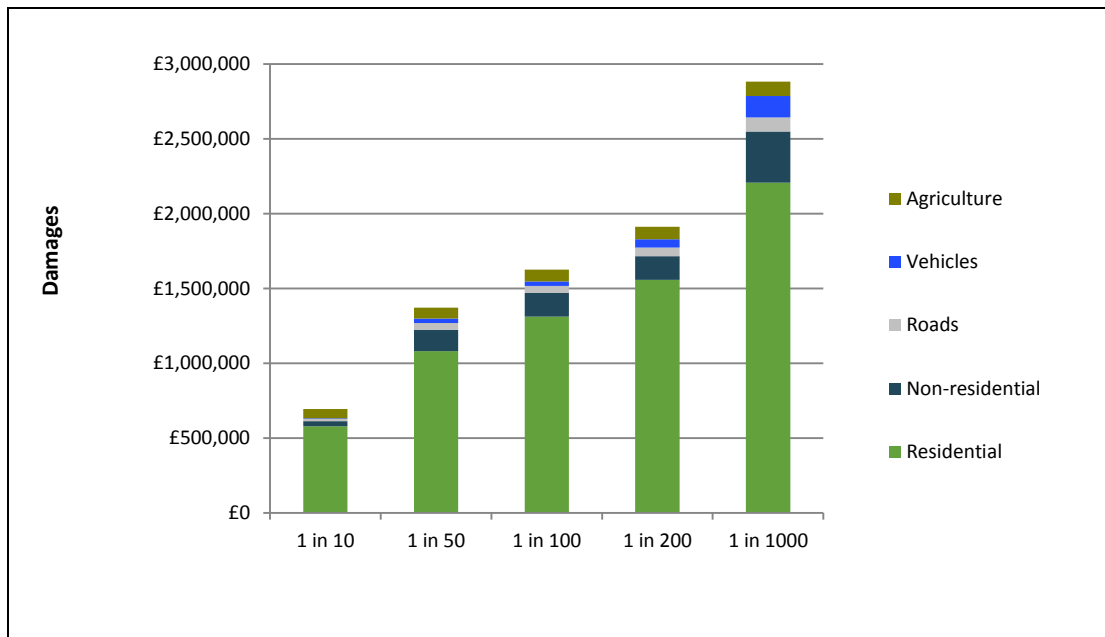
The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

Roads affected by flooding include the B9165 at Portmahomack and the B9175 north of Nigg. Two designated cultural heritage sites and extensive areas of environmental importance are at risk. These include Dornoch Firth and Loch Fleet Special Protection Area, Dornoch Firth and Morrish More Special Areas of Conservation, Rosemarkie to Shandwick Coast Site of Special Scientific Interest (SSSI) and Tarbat Ness SSSI.

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. 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 1,300)	20	40	60
Non-residential properties (total 180)	<10	10	20
People	40	100	130
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations	Roads at 30 locations	Roads at 40 locations
Environmental designated areas (km <sup>2</sup> )	17	21	23
Designated cultural heritage sites	2	2	2
Agricultural land (km <sup>2</sup> )	3	4	5

**Table 1:** Summary of flooding impacts<sup>1</sup>

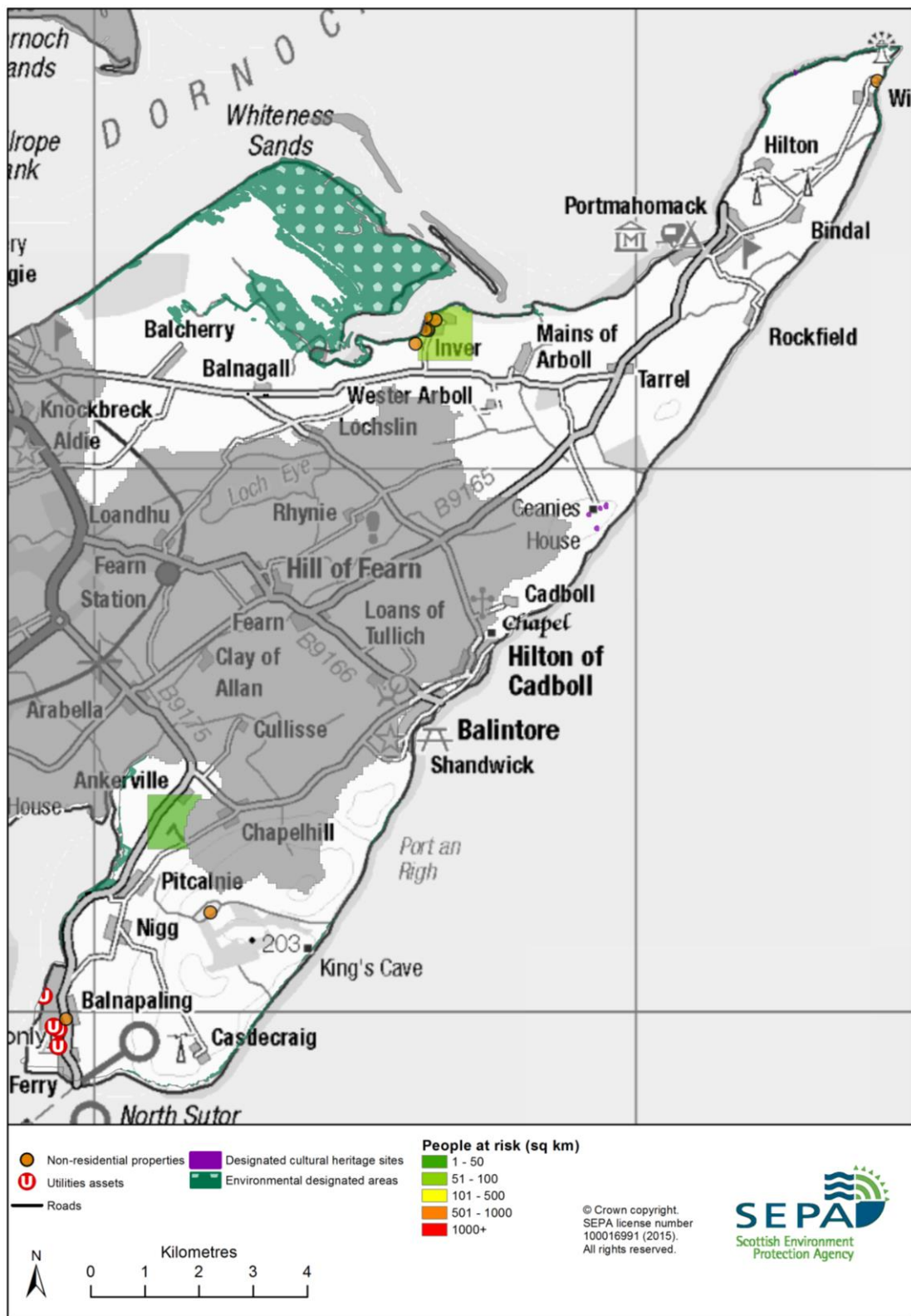


**Figure 2:** Damages by flood likelihood

## History of flooding

Coastal flooding due to wave overtopping is known to affect communities across Tarbat Ness including Inver, Portmahomack, Rockfield and Balintore. In 2001 and 2002, surface water flooding affected a small number of properties.

<sup>1</sup> 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 01/08

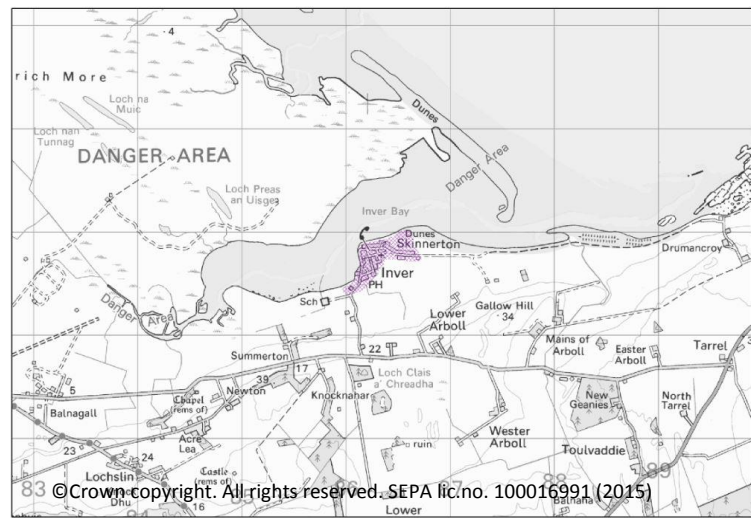
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

### Reduce risk in Inver and Skinnerton from coastal flooding

Indicators:

Target area:

- £85,000 Annual Average Damages from residential properties



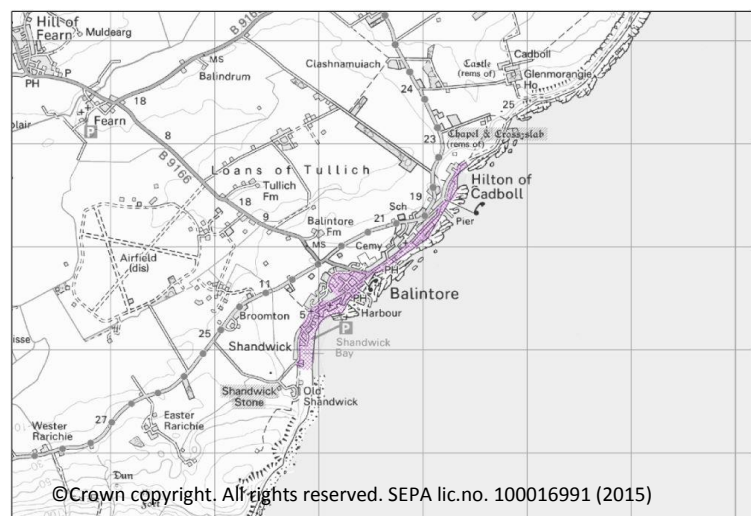
Objective ID: 100801

### Reduce risk in Balintore from coastal flooding

Indicators:

Target area:

- 410 people
- £86,000 Annual Average Damages from residential properties



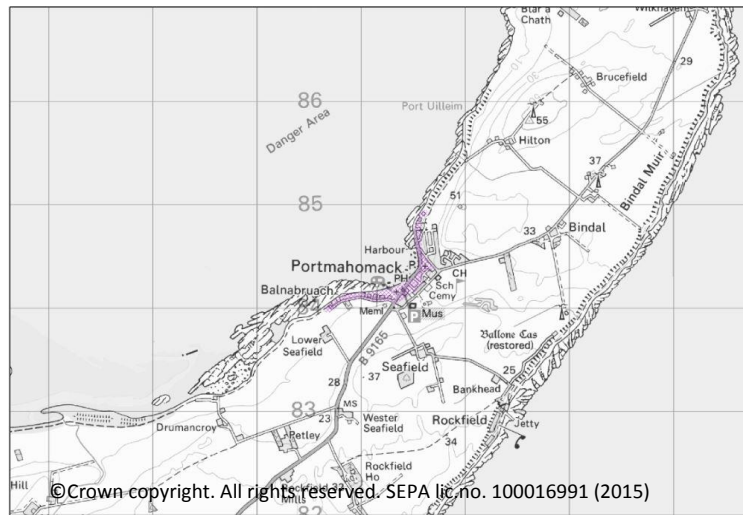
Objective ID: 100802

## Reduce risk in Portmahomack from coastal flooding

Indicators:

Target area:

- 140 people
- £29,000 Annual Average Damages from residential properties



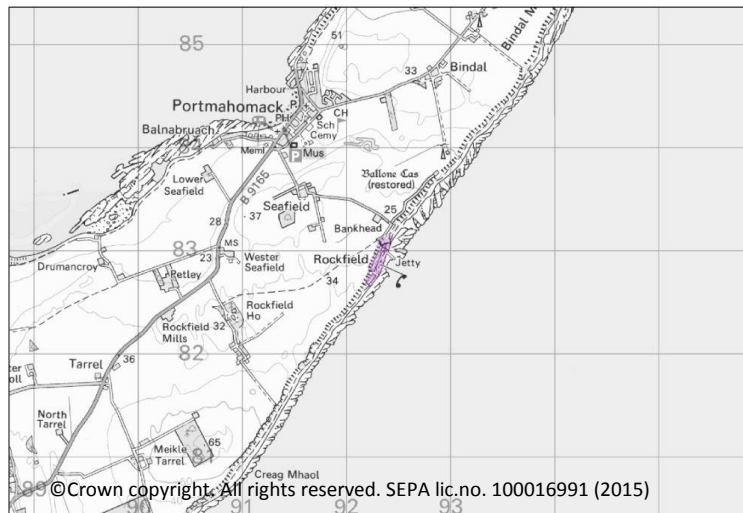
Objective ID: 100803

## Reduce risk in Rockfield from coastal flooding

Indicators:

Target area:

- 40 people
- £8,400 Annual Average Damages from residential properties



Objective ID: 100804

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £130,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £130,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/08

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 Tarbat Ness Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1008010005)</b>		
<b>Objective (ID):</b>	Reduce risk in Rockfield from coastal flooding (100804) Reduce risk in Portmahomack from coastal flooding (100803) Reduce risk in Balintore from coastal flooding (100802) Reduce risk in Inver and Skinnerton from coastal flooding (100801)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:		Within local authority:
	<b>53 of 168</b>		<b>4 of 23</b>
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A study is required to further investigate the feasibility of a flood protection scheme for Tarbat Ness, focusing on Skinnerton, Balintore, Portmahomack and Rockfield. This may involve different solutions in different locations. The impact of waves on flood risk should be explored. The study should focus on revetments, direct defences, offshore breakwater, relocation and property level protection, but other actions may also be considered in order to develop the most sustainable range of options.		
<b>Potential impacts</b>			
<b>Economic:</b>	The flood protection study should consider how to reduce the impact of flooding to residential and non-residential properties. Potential damages of up to £8 million could be avoided in all four locations.		
<b>Social:</b>	Approximately 675 people may directly benefit from flood protection actions taken as a result of the study. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Local roads may also benefit,		

<b>Social:</b>	reducing disruption for the wider community. There are potential impacts on amenity and access to the foreshore for the community and there may be negative impacts through disturbance during the construction phase, which should be considered during the flood protection study.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for negative impacts on coastal habitats through increased erosion and disruption of natural processes. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the Moray Firth , Dornoch Firth and Morrich More Special Area of Conservation; and Dornoch Firth and Loch Fleet Special Protection Area. There is potential for impacts on the Morrich More Site of Special Scientific Interest. Indirect impacts on the Rosemarkie to Shandwick Coast Site of Special Scientific Interest and Tarbat Ness Site of Special Scientific Interest should be considered. The area of dunes to the north of Skinnerton will require careful consideration.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Cromarty Firth', 'Portmahomack to Inver' and 'Rockfield to Balintore' flood warning areas which are part of the Moray Firth coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Easter Ross and Great Glen' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

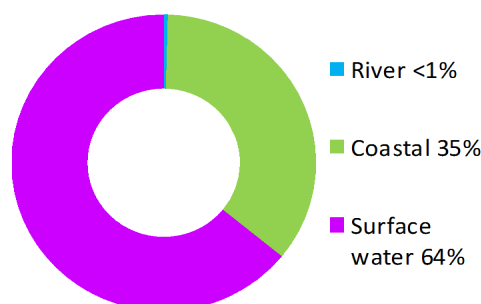
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Providing an emergency response to 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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Invergordon (Potentially Vulnerable Area 01/09)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Cromarty coastal

### Summary of flooding impacts



### At risk of flooding

- <10 residential properties
- 20 non-residential properties
- £6,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	Maintain flood warning	Awareness raising	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

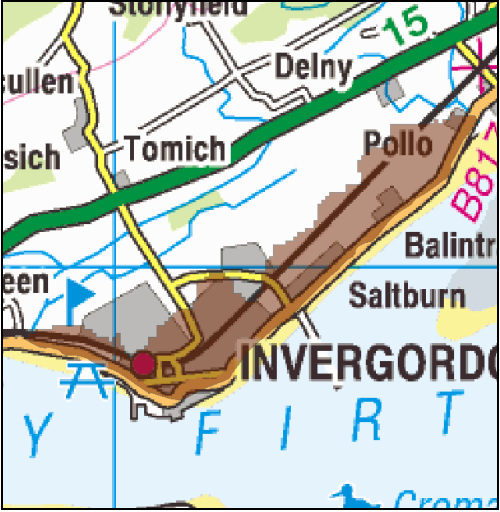
Actions

# Invergordon (Potentially Vulnerable Area 01/09)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Cromarty coastal

## Background

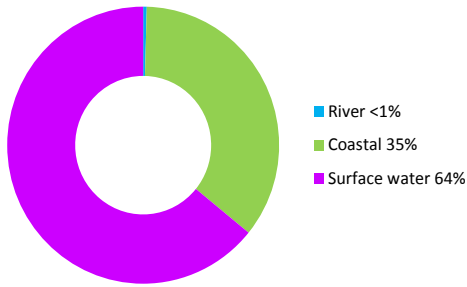
This Potentially Vulnerable Area is approximately 4km<sup>2</sup>. It is located on the northern bank of the Cromarty Firth and includes Invergordon and its oil rig repair facility (shown below). The B817 road runs through the area.



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There are fewer than 10 residential properties and approximately 20 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £6,000 with the majority of these caused by surface water flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

Surface water flooding affects roads and properties across Invergordon. Coastal flood risk is limited to short sections of the B817. Flooding from wave action is not fully represented in the assessment of flood risk in this area and it is possible that the number of properties at risk and the damages from coastal flooding are underestimated.

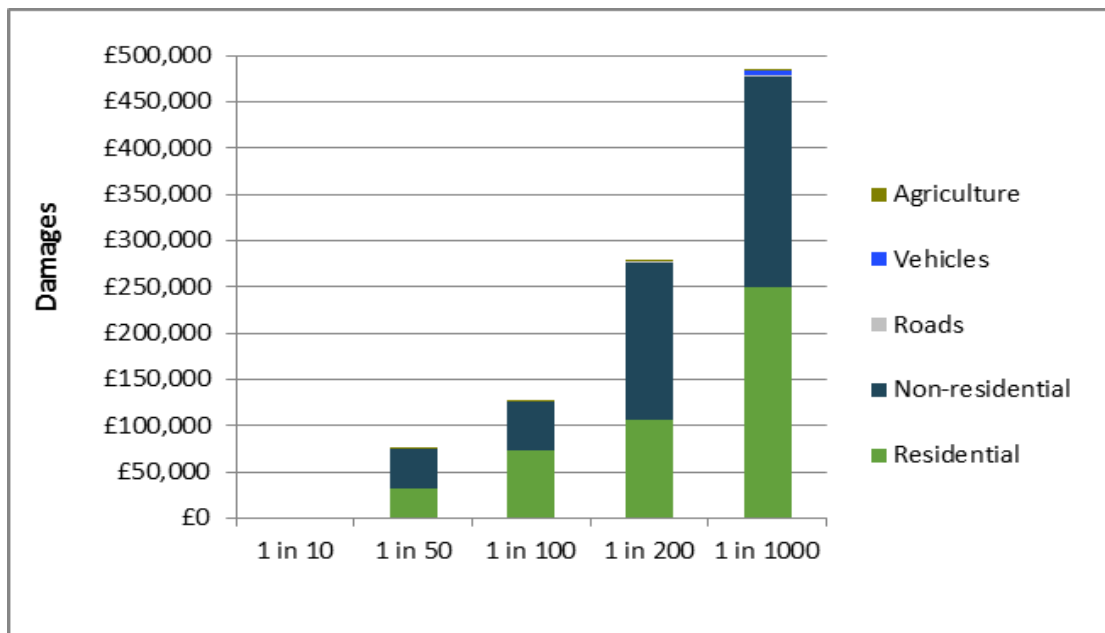
The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

Roads at risk of flooding include the B817, which links the communities along the northern bank of the Cromarty Firth. The Wick to Inverness railway line is at risk of being flooded at several locations. Small areas of the Cromarty Firth Special Protection Area and Site of Special Scientific Interest are at risk.

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 of flooding is shown in Figure 3.

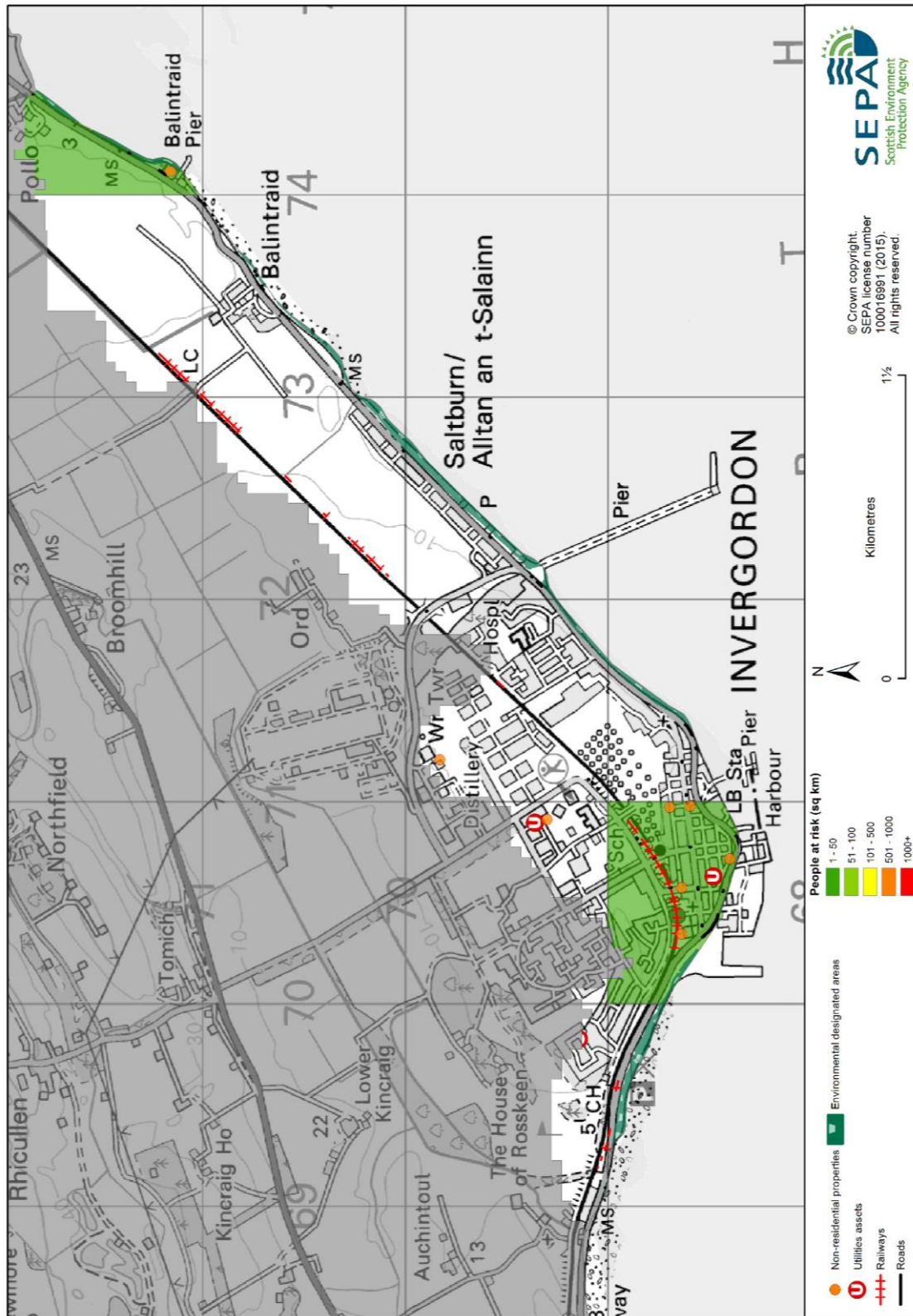
	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 1,300)	<10	<10	10
Non-residential properties (total 210)	<10	20	20
People	<10	<10	20
Community facilities	0	0	0
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations Rail at <10 locations	Roads at 30 locations Rail at 10 locations	Roads at 30 locations Rail at 10 locations
Environmental designated areas (km <sup>2</sup> )	0.2	0.2	0.2
Designated cultural heritage sites	0	0	0
Agricultural land (km <sup>2</sup> )	<0.1	<0.1	<0.1

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



**Figure 3: Impacts of flooding**



## History of flooding

The following floods have been recorded for this Potentially Vulnerable Area:

- August 2004: serious flood occurred which resulted in the capacity of drainage systems being exceeded. Fire fighters used pumps and sandbags to prevent properties in several streets from flooding;
- 2001: Surface water flooding affected roads.

## Objectives to manage flooding in Potentially Vulnerable Area 01/09

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 Invergordon Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £6,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £6,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/09

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 Invergordon Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Cromarty Firth' flood warning area which is part of the Moray Firth coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Easter Ross and Great Glen' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

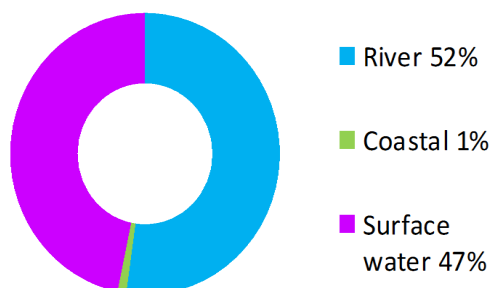
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Providing an emergency response to 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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Alness (Potentially Vulnerable Area 01/10)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Alness, Cromarty coastal

### Summary of flooding impacts



#### At risk of flooding

- 50 residential properties
- 60 non-residential properties
- £180,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	Site protection plans
Flood protection study	<i>Natural flood management study</i>	Maintain flood warning	Awareness raising	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

## Alness (Potentially Vulnerable Area 01/10)

Local Plan District	Local authority	Main catchments
Highland and Argyll	The Highland Council	River Alness Cromarty coastal

### Background

This Potentially Vulnerable Area is 60km<sup>2</sup>. It is located on the north of the Cromarty Firth and includes Alness and the mainly rural areas to the north (shown below). The A9 and B9176 and B817 all pass through the area.

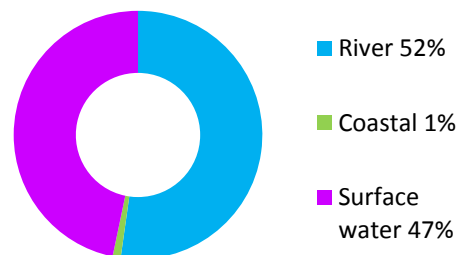


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The main river in this Potentially Vulnerable Area is the River Alness / River Averon.

There are approximately 50 residential properties and 60 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £180,000 with the majority caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

River flood risk in Alness is from the River Alness / Averon in the south and east of the town and the Contullich Burn in the west.

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.

A school and a nursing home are at risk of flooding. The A9 road is potentially affected by flooding and the Wick to Inverness railway line is at risk of being flooded in several locations.

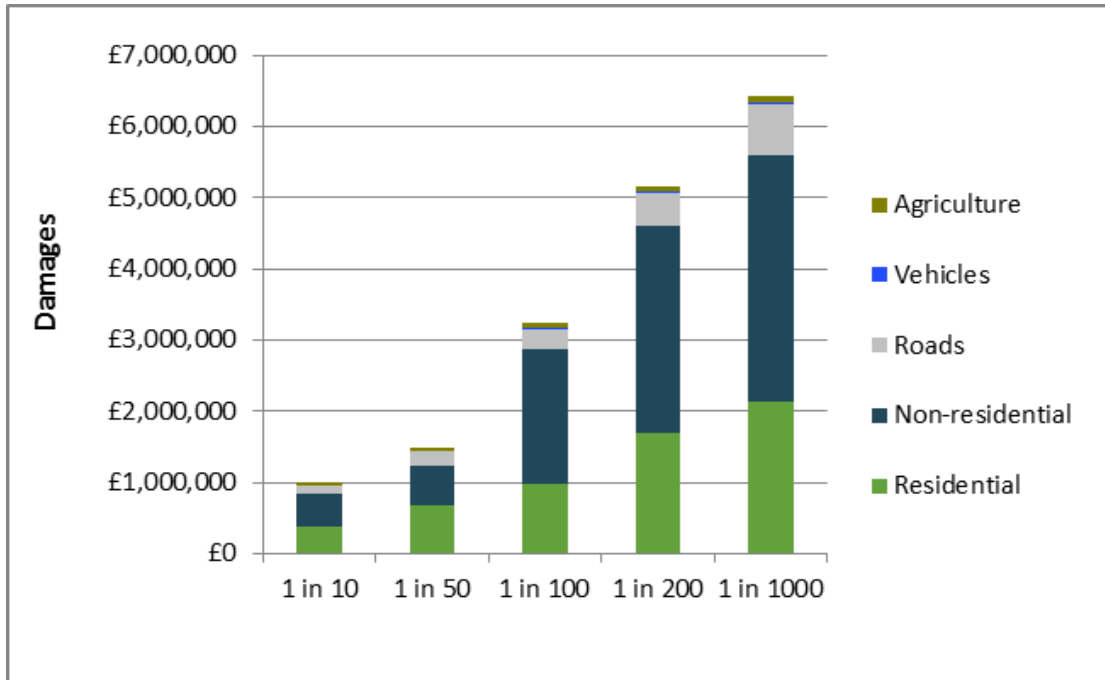
There are seven designated cultural heritage sites and a small area of environmental importance at risk. These include the Cromarty Firth Special Protection Area and Site of Special Scientific Interest (SSSI), and the Alness River Valley SSSI.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to 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 2,000)	<10	50	60
Non-residential properties (total 310)	<10	60	70
People	20	120	130
Community facilities	0	<10 Healthcare facilities	<10 Healthcare facilities
Utilities assets	<10	10	10
Transport links (excluding minor roads)	Roads at 60 locations Rail at <10 locations	Roads at 90 locations Rail at 10 locations	Roads at 100 locations Rail at 20 locations
Environmental designated areas (km <sup>2</sup> )	1	1	1
Designated cultural heritage sites	6	7	7
Agricultural land (km <sup>2</sup> )	1	2	2

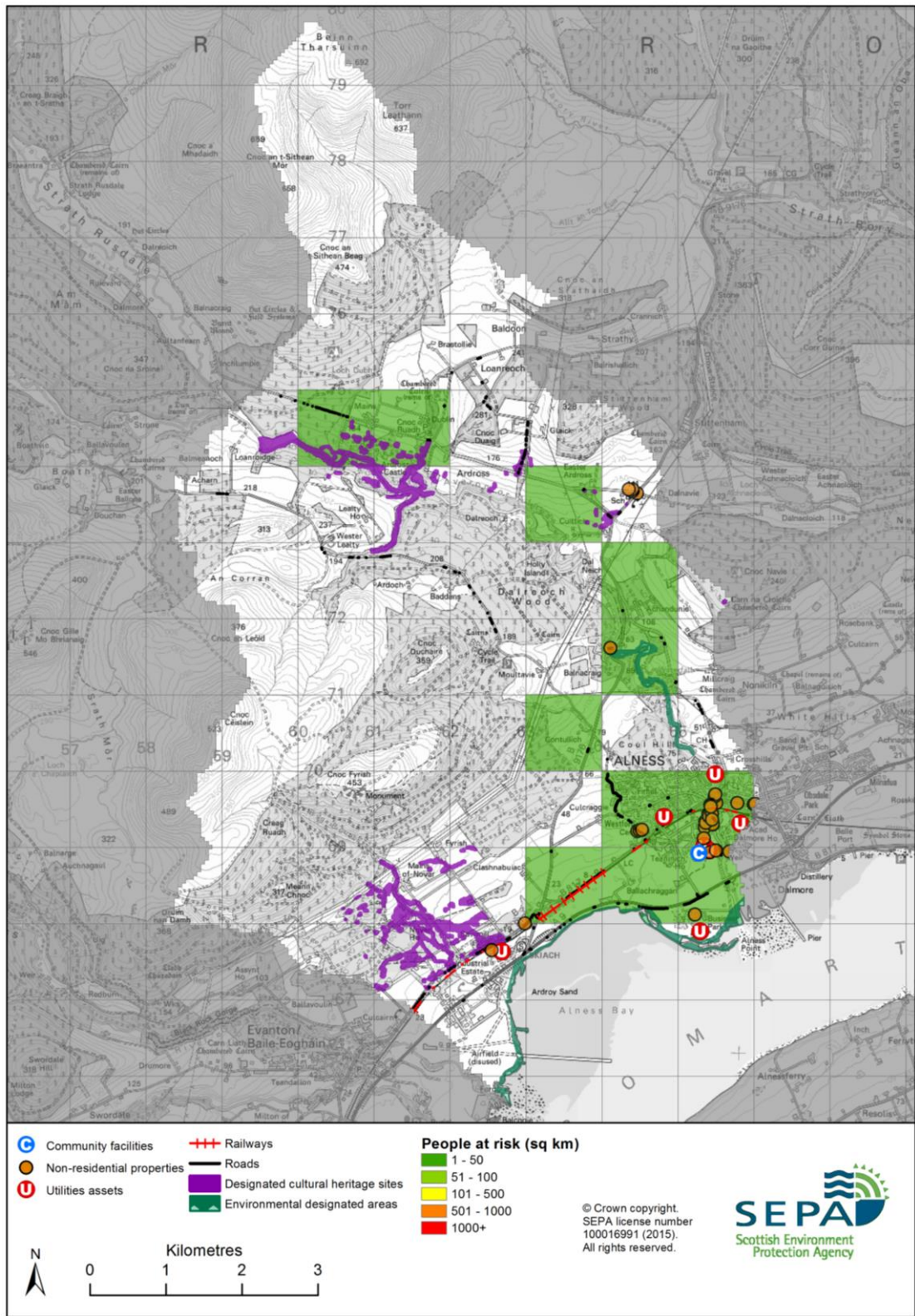
**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources





**Figure 3: Impacts of flooding**

## History of flooding

The earliest recorded flooding for this Potentially Vulnerable Area was in 1878. Since 2001 there have been three recorded incidents of river and surface water flooding which affected property. In October 2006, two separate landslides above the B9176 diverted surface water flows onto the road; the resulting blockages caused sections of culvert to collapse.

## Objectives to manage flooding in Potentially Vulnerable Area 01/10

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 Alness Potentially Vulnerable Area.

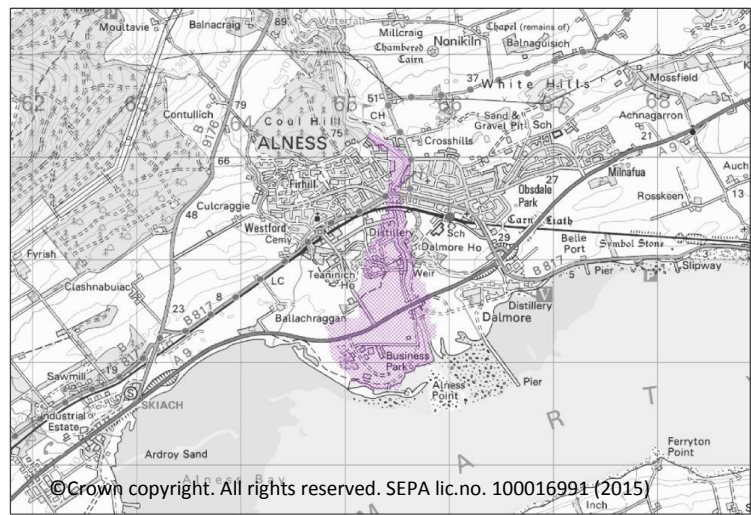
### Reduce flood risk in Alness from the River Alness / Averon

Indicators:

Target area:

- 60 people
- £9,300 Annual Average Damages from residential properties
- £30,000 Annual Average Damages from non-residential properties
- 1 nursing home
- 1 educational building

Objective ID: 101001



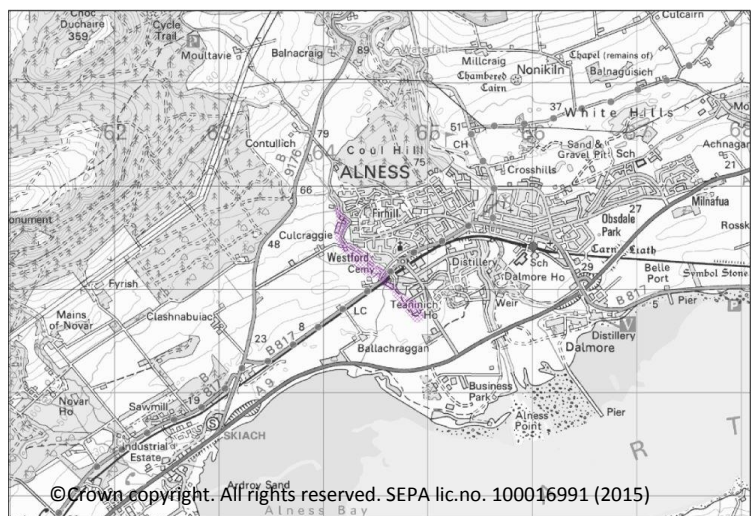
### Reduce flood risk in Alness from the Contullich Burn

Indicators:

Target area:

- 20 people
- £18,000 Annual Average Damages from residential properties
- £1,700 Annual Average Damages from non-residential properties

Objective ID: 101002



Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 50 residential properties</li> <li>• £180,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 50 residential properties</li> <li>• £180,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/10

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 Alness Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1010020005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Alness from the Contullich Burn (101002)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>135 of 168</b>	<b>16 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A study is recommended to further investigate the feasibility of a flood protection scheme for the Contullich Burn, focusing on trash screens for trees and other large debris (installation/modification of river control structures), sediment management (natural flood management) and consideration of property level protection. Other actions may also be considered to develop the most sustainable range of options. The study should look to confirm the business case for flood protection works.		
<b>Potential impacts</b>			
<b>Economic:</b>	The standard of protection, which could be provided by flood protection works, needs to be confirmed by the study. Up to seven residential and two non-residential properties may benefit from the study, with potential damages avoided of up to £670,000.		
<b>Social:</b>	Approximately 15 people may directly benefit from flood protection works. Alness has a higher than average proportion of vulnerable residents. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Flooding to roads (including B817) and the railway line may be reduced, potentially benefitting the wider community. Natural flood management actions can restore and enhance natural environments		

<b>Social:</b>	and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	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. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for a trash/debris screen to impact on the channel morphology. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the Cromarty Firth Special Protection Area. There are unlikely to be any significant impacts on the Cromarty Firth Site of Special Scientific Interest.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1010020016)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Alness from the River Alness / Averon (101001)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will review existing modelling and data for this area, to determine if any improvements can be made to the flood maps. SEPA will support the local authority if further work beyond a strategic scale is required.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Cromarty Firth' flood warning area which is part of the Moray Firth coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Easter Ross and Great Glen' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>SITE PROTECTION PLANS (1010010015)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Alness from the River Alness / Averon (101001)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Site protection plans are developed to identify whether normal operation of a facility can be maintained during a flood. This may be due to existing protection or resilience of the facility or the network. A site protection plan for a school and a nursing home should be developed.		

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

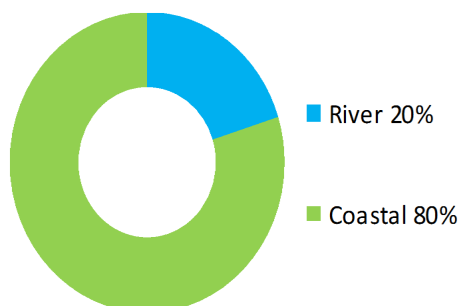


<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Scottish 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.		

## Uig, Isle of Skye (Potentially Vulnerable Area 01/11)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Isle of Skye coastal

### Summary of flooding impacts



#### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £38,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<i>Surface water plan/study</i>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

Actions

# Uig, Isle of Skye (Potentially Vulnerable Area 01/11)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Isle of Skye coastal

## Background

This Potentially Vulnerable Area is approximately 31km<sup>2</sup>. It is located to the north of Uig on the Isle of Skye (shown below). It is a mainly rural area with scattered properties along the A855 road and small settlements at Kilmuir, Duntulm and Monkstadt.

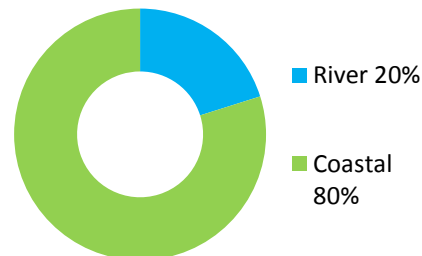


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There are no major rivers in this area however there are numerous small watercourses and drains including Draine Mhor.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are approximately £38,000 with the majority caused by coastal flooding.



**Figure 1: Annual Average Damages by flood source**

## Summary of flooding impacts

Coastal flood risk in this area affects properties in Uig. River flood risk is limited with some risk identified to property near Kilmuir.

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.

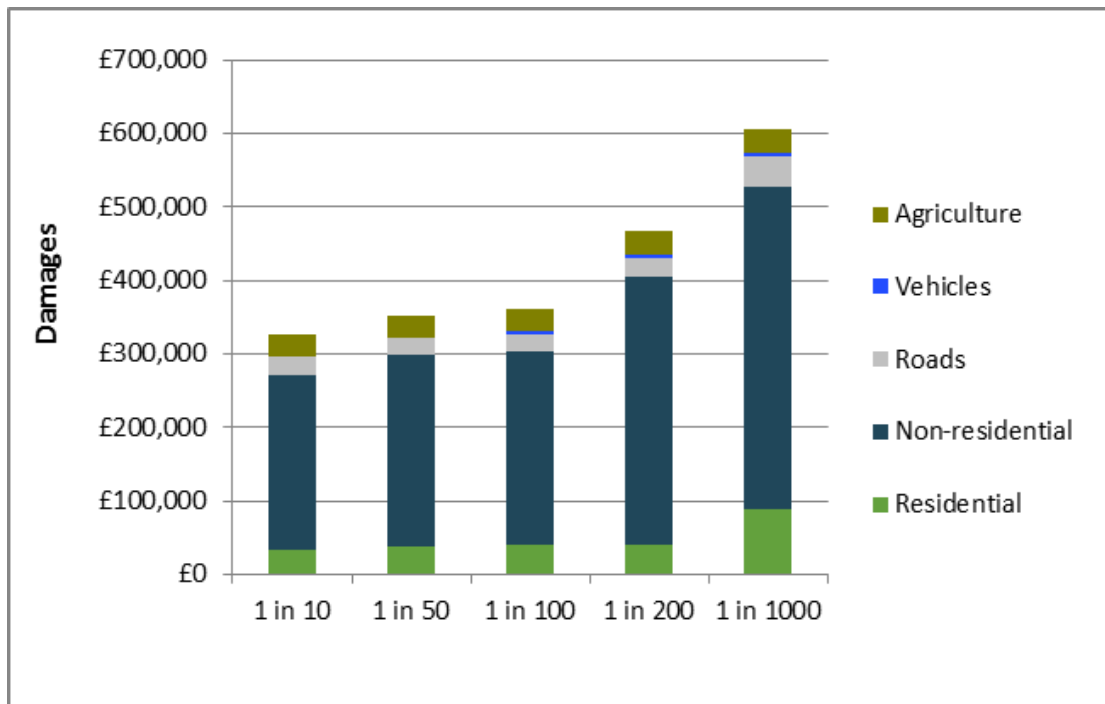
The A855 is at risk of being flooded at several locations. Two designated cultural heritage sites and a small area of environmental importance are at risk of flooding. This includes Rubha Hunish, which is a Site of Special Scientific Interest.

The damages associated with floods of different likelihood are shown in Figure 2. Non-residential properties experience the greatest economic impact.

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 250)	<10	<10	<10
Non-residential properties (total 100)	<10	<10	<10
People	<10	<10	<10
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at <10 locations	Roads at <10 locations	Roads at <10 locations
Environmental designated areas (km <sup>2</sup> )	<0.1	<0.1	0.1
Designated cultural heritage sites	2	2	2
Agricultural land (km <sup>2</sup> )	1	1	1

**Table 1:** Summary of flooding impacts<sup>1</sup>

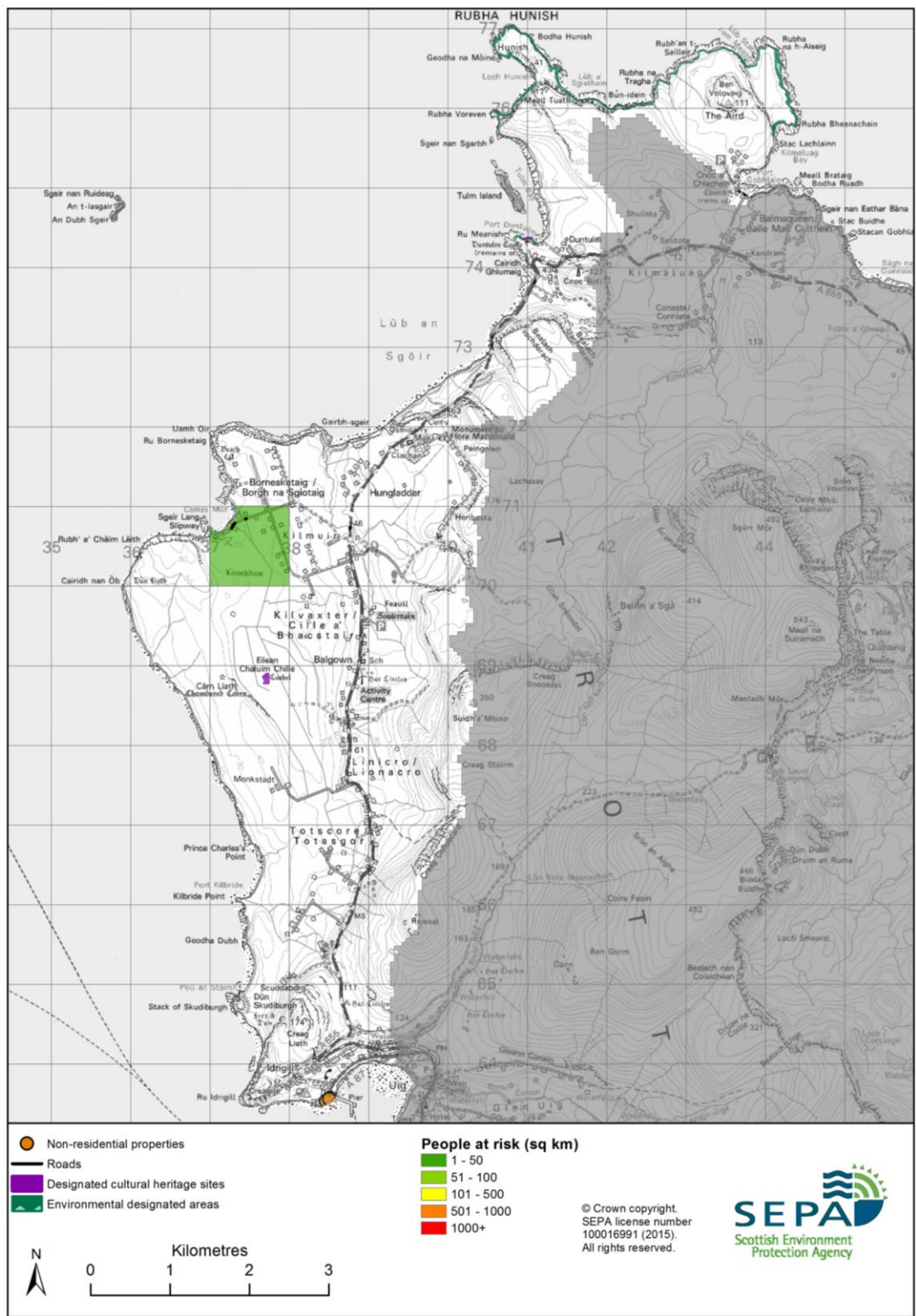


**Figure 2:** Damages by flood likelihood

## History of flooding

In 2005 a culvert was unable to cope with the volume of water, which caused flooding over the main road at Kilmuir. In 2005, Uig Harbour was affected by storm damage.

<sup>1</sup> 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 01/11

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 Uig, Isle of Skye Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £38,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £38,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/11

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 Uig, Isle of Skye Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Skye and Lochaber' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		



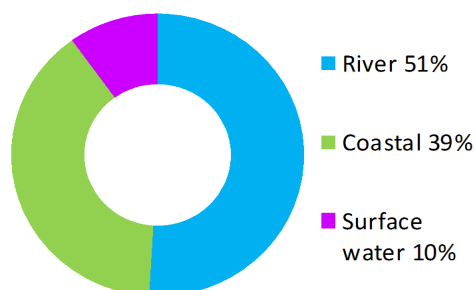
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Poolewe (Potentially Vulnerable Area 01/12)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Ewe

### Summary of flooding impacts



### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £28,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<i>Surface water plan/study</i>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

Actions

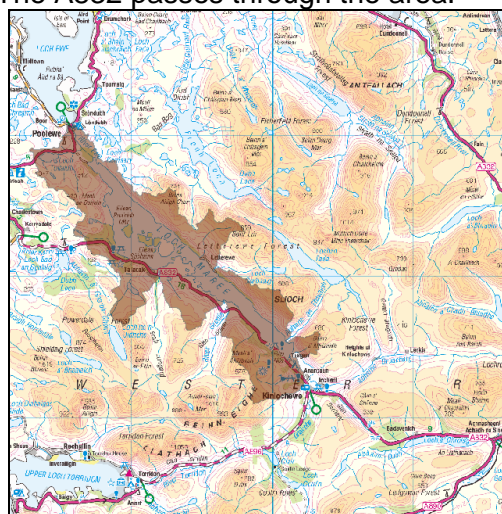
## Poolewe (Potentially Vulnerable Area 01/12)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Ewe

### Background

This Potentially Vulnerable Area is approximately 125km<sup>2</sup>. It is located around Loch Maree (shown below). It is a mainly rural area but includes the communities of Poolewe and Talladale.

The A832 passes through the area.

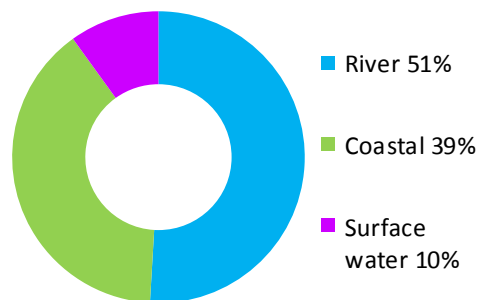


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Loch Maree is the main water body in the Potentially Vulnerable Area. There are several small rivers draining into the loch and the River Ewe which connects Loch Maree to the coast at Loch Ewe.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are approximately £28,000 with the majority caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

The A832 is subject to river flooding near Talladale and in Poolewe. The road is also at risk of coastal flooding just to the north of Poolewe. A few isolated properties are at risk of river flooding from small watercourses, particularly where their flow may be restricted by culverts and bridges.

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.

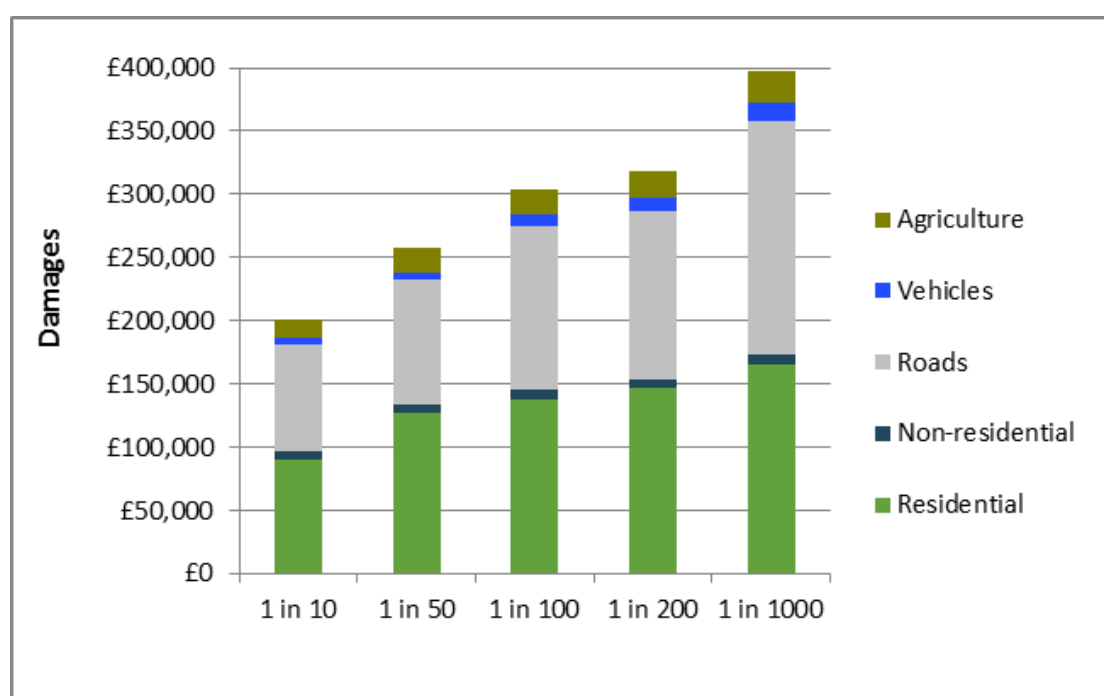
Roads potentially affected by flooding include the A832. Four designated cultural heritage sites and extensive areas of environmental importance are at risk within this area. The sites affected include Special Areas of Conservation, Special Protection Areas, and Sites of Special Scientific Interest at Beinn Eighe, Talladale Gorge, Loch Maree Islands, and Ardlair / Letterewe.

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 roads.

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 60)	<10	<10	<10
Non-residential properties (total 40)	<10	<10	<10
People	<10	10	10
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at 20 locations	Roads at 20 locations	Roads at 20 locations
Environmental designated areas (km <sup>2</sup> )	88	88	89
Designated cultural heritage sites	4	4	4
Agricultural land (km <sup>2</sup> )	0.8	1	2

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

## History of flooding

There is no record of large floods in this Potentially Vulnerable Area.

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

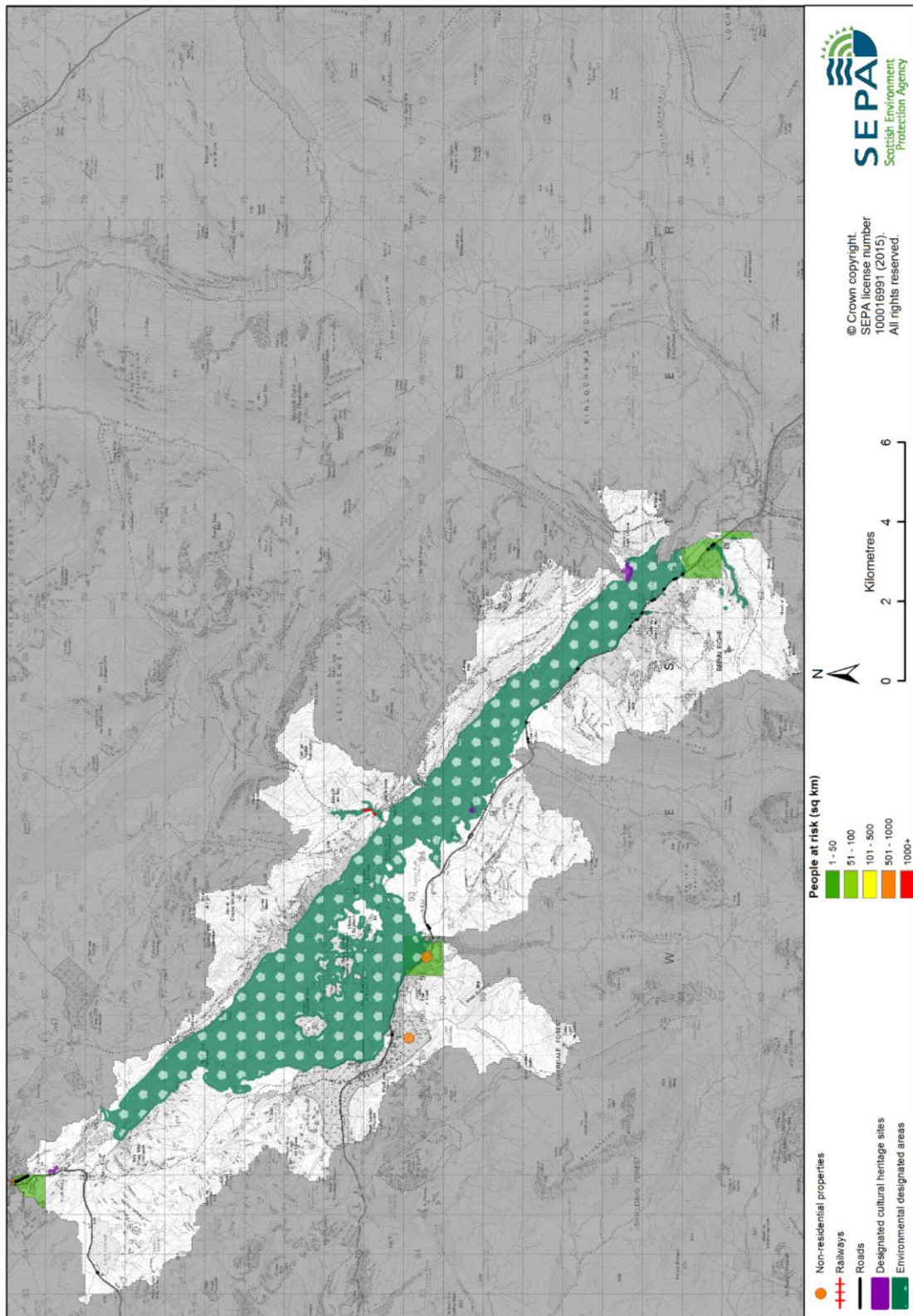


Figure 3: Impacts of flooding

## Objectives to manage flooding in Potentially Vulnerable Area 01/12

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 Poolewe Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £28,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £28,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/12

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 Poolewe Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Wester Ross' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		



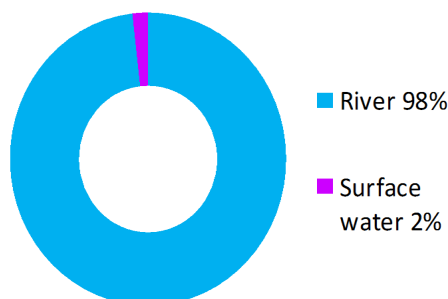
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Kinlochewe (Potentially Vulnerable Area 01/13)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Ewe

### Summary of flooding impacts



### At risk of flooding

- 10 residential properties
- 10 non-residential properties
- £61,000 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>	<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>	<i>Maintain flood warning</i>	Awareness raising	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	Flood forecasting	Self help	Maintenance	Planning policies

Actions

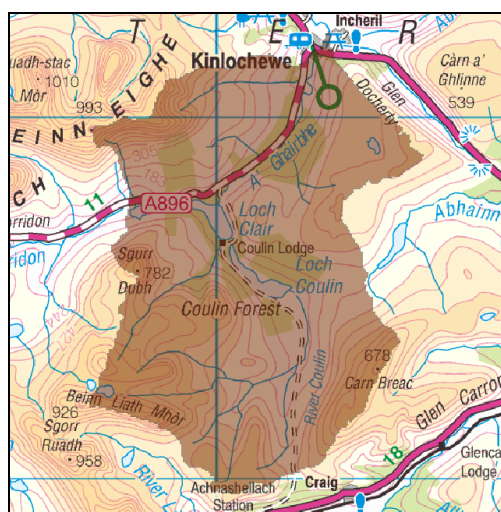
# Kinlochewe (Potentially Vulnerable Area 01/13)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Ewe

## Background

This Potentially Vulnerable Area is approximately 76km<sup>2</sup>. It is located to the south east of Loch Maree (shown below). It covers part of Kinlochewe and the mainly rural area to the south.

The A896 road runs through the area.

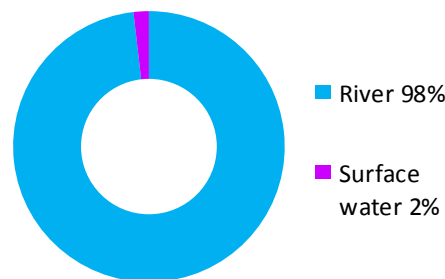


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The main river in the area is the River Coulin. There are also several smaller watercourses and lochs in the area, including Loch Clair and Loch Coulin.

There are approximately 10 residential and 10 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £61,000 with the majority caused by river flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

River flooding is primarily focused on the A832 road and properties in Kinlochewe.

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.

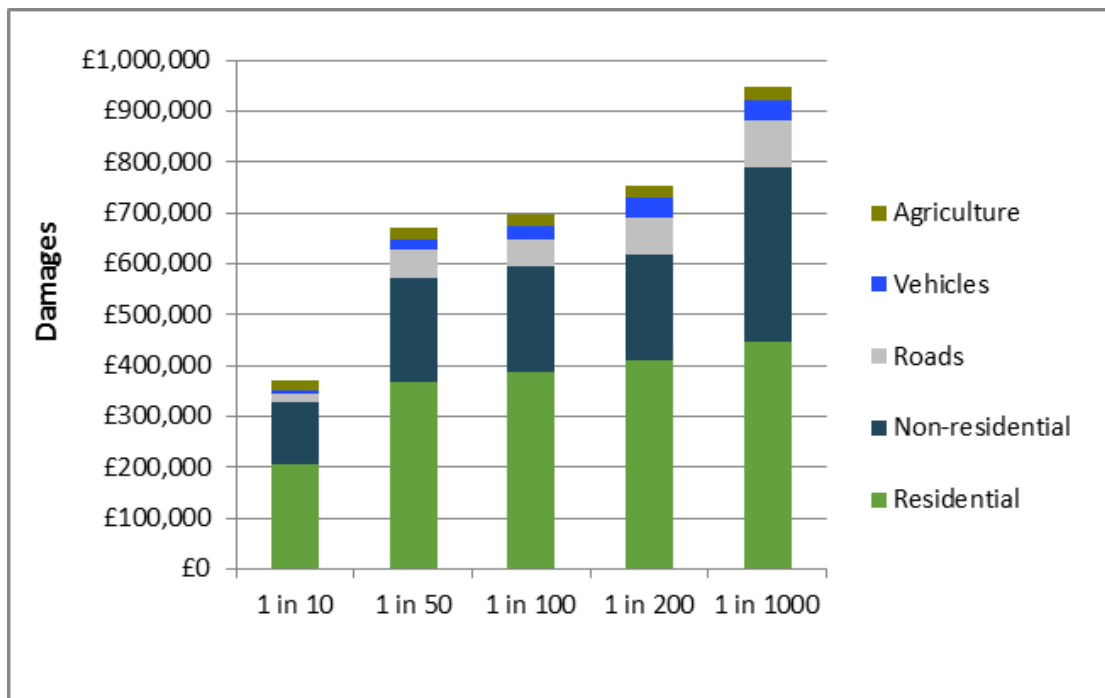
The A896 and A832 roads are at risk of being flooded. Small areas of environmental importance are also at risk within this area. These include Special Areas of Conservation, Special Protection Areas and Sites of Special Scientific Interest at Beinn Eighe, Coulin Pinewoods, Torridon Forest and the Loch Maree Complex.

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 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 20)	<10	10	10
Non-residential properties (total 20)	<10	10	10
People	10	20	20
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at <10 locations	Roads at <10 locations	Roads at <10 locations
Environmental designated areas (km <sup>2</sup> )	0.8	0.9	1
Designated cultural heritage sites	0	0	0
Agricultural land (km <sup>2</sup> )	1	2	2

**Table 1:** Summary of flooding impacts<sup>1</sup>

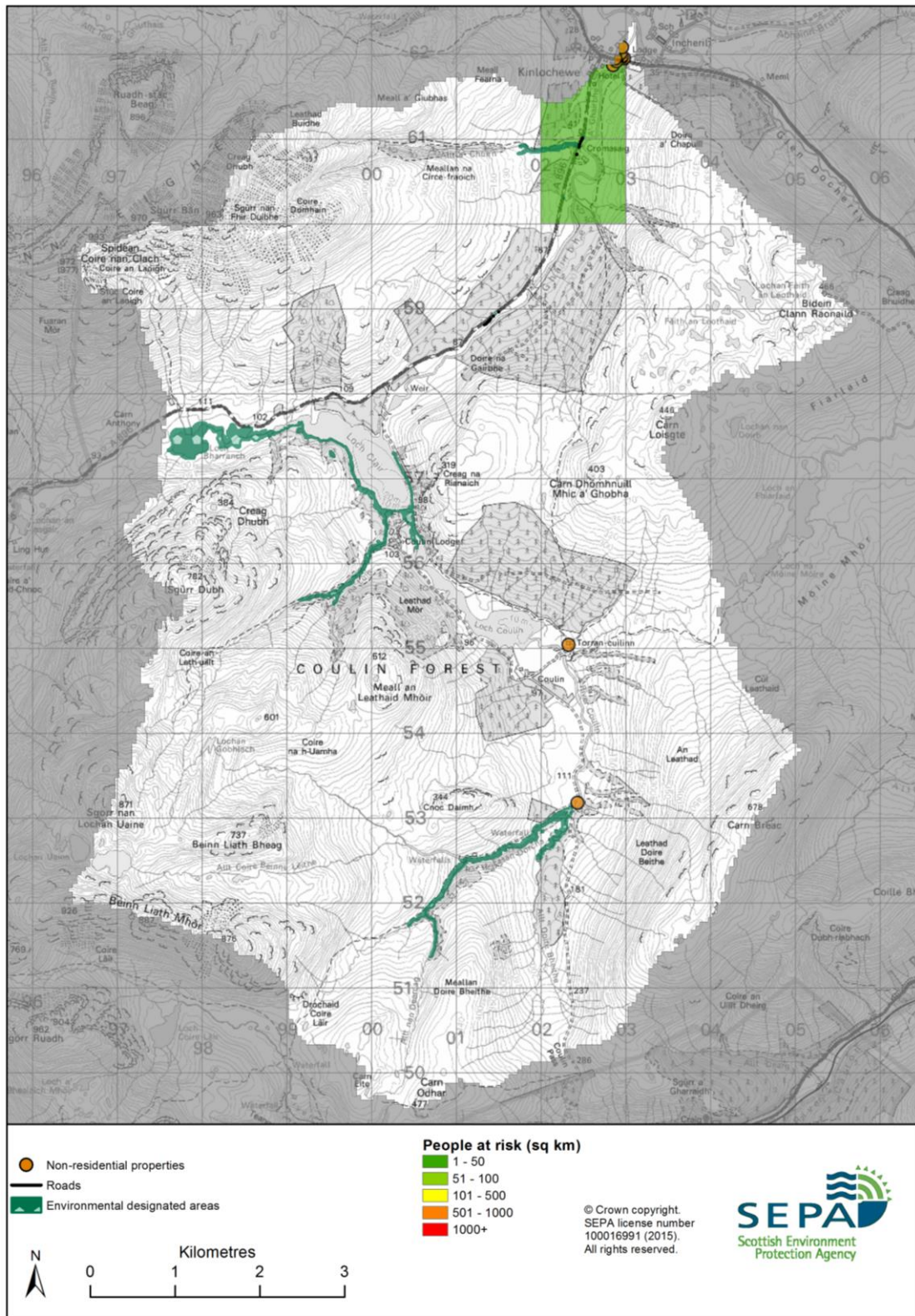


**Figure 2:** Damages by flood likelihood

## History of flooding

There are no large floods recorded in this Potentially Vulnerable Area.

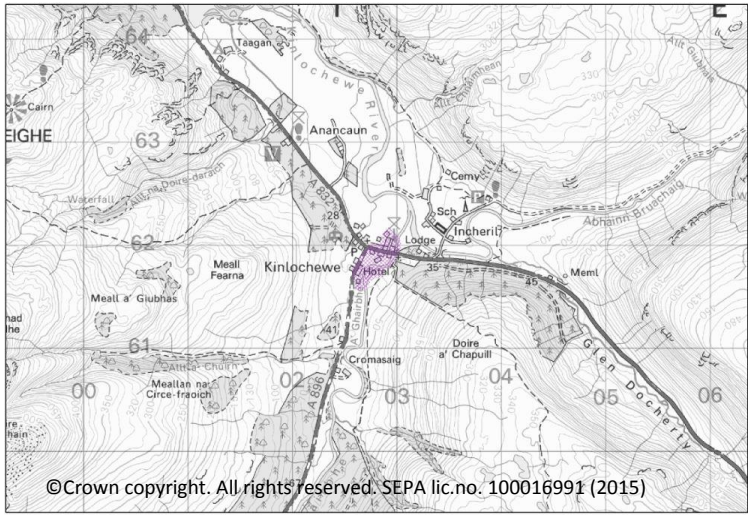
<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



**Figure 3: Impacts of flooding**

## Objectives to manage flooding in Potentially Vulnerable Area 01/13

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 Kinlochewe Potentially Vulnerable Area.

Reduce flood risk in Kinlochewe from the A'Ghairbhe river	
Indicators:	Target area:
<ul style="list-style-type: none"> <li>£42,000 Annual Average Damages from residential properties</li> </ul>	
Objective ID: 101301	

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>10 residential properties</li> <li>£61,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>10 residential properties</li> <li>£61,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/13

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 Kinlochewe Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<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	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

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1013010005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Kinlochewe from the A'Ghairbhe river (101301)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:		Within local authority:
	<b>122 of 168</b>		<b>13 of 23</b>
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A study is required to further investigate the feasibility of a flood protection scheme for Kinlochewe, focusing on direct defences, the use of a control structure at Loch Clair to increase storage upstream, natural flood management including runoff control, large woody debris and boulders in tributaries (river or floodplain restoration), sediment management and consideration of property level protection for any residual risk. Other actions may also be considered to develop the most sustainable range of options. The study should look to confirm the extent and size of defences required and the business case for flood protection works.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 14 residential and nine non-residential properties at risk of flooding in this location, with potential damages avoided of up to £1.8 million.		
<b>Social:</b>	Approximately 31 people may directly benefit from flood protection works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Works may also reduce disruption to the wider community from the surrounding areas through reduced flooding to roads including A832. There are potential visual and access impacts for the		

<b>Social:</b>	community, reducing their connection to the watercourse. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	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. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on habitats and changes to channel morphology. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the Loch Maree Special Area of Conservation. Works would be located outside (and downstream) of the Beinn Eighe Site of Special Scientific Interest. There are unlikely to be impacts on the Loch Maree Special Protection Area due to the distance from the location of actions.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Wester Ross' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		



<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

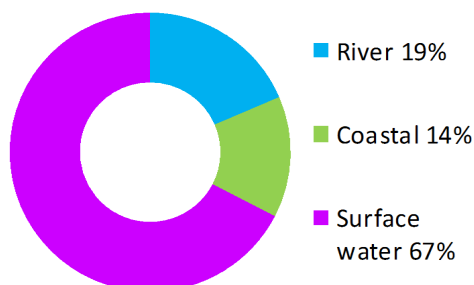
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

# Dingwall and Strathpeffer (Potentially Vulnerable Area 01/14)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Cromarty coastal

## Summary of flooding impacts



### At risk of flooding

- 90 residential properties
- 90 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.

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

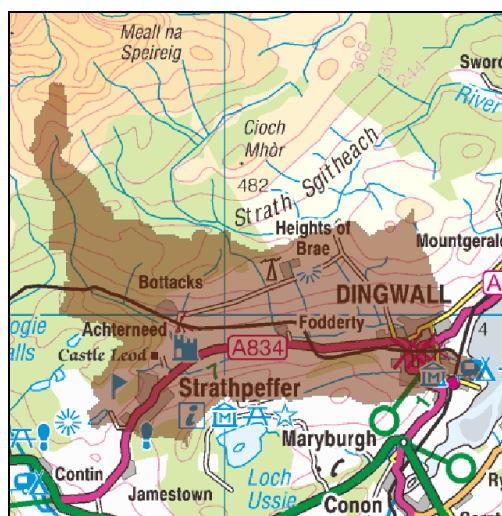
Actions

# Dingwall and Strathpeffer (Potentially Vulnerable Area 01/14)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Cromarty coastal

## Background

This Potentially Vulnerable Area is approximately 38km<sup>2</sup>. It includes the towns of Dingwall and Strathpeffer as well as the surrounding rural area (shown below). The A834 and A862 pass through.

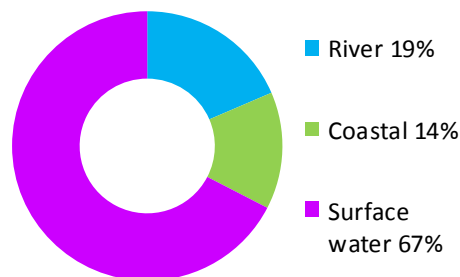


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The main river flowing through is the River Peffery.

There are approximately 90 residential and 90 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £310,000 with the majority caused by surface water flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

Notable areas of surface water flood risk are in Dingwall, Blairninch and in Strathpeffer. River flood risk is primarily associated with the River Peffery again in Strathpeffer, Blairninch and Dingwall. There is coastal flood risk associated with the tidal section of the River Peffery and a further risk of coastal flooding in the southern parts of Dingwall to the east of the railway line, in the vicinity of the hospital and rifle range.

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. Two schools and a hospital are at risk of flooding. Roads at risk of flooding include the A834 (which links Dingwall with Ullapool and Kyle of Lochalsh) and the A862. The Wick to Inverness railway is at risk of flooding in several locations.

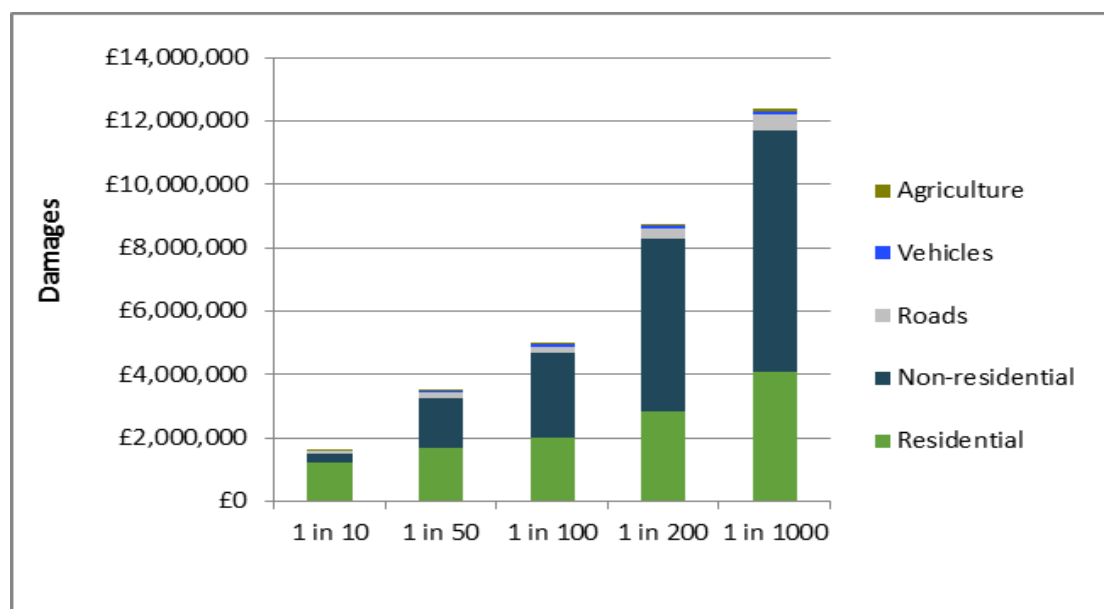
Four designated cultural heritage sites and a small area of the Cromarty Firth Special Protection Area and Site of Special Scientific Interest are also at risk.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential properties, followed by damages to residential properties.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 2,700)	50	90	130
Non-residential properties (total 620)	20	90	130
People	100	200	290
Community facilities	0	<10 Includes; educational buildings and healthcare facilities	<10 Includes; educational buildings, healthcare facilities and emergency services
Utilities assets	<10	10	10
Transport links (excluding minor roads)	Roads at 40 locations Rail at 20 locations	Roads at 80 locations Rail at 30 locations	Roads at 90 locations Rail at 30 locations
Environmental designated areas (km <sup>2</sup> )	<0.1	<0.1	<0.1
Designated cultural heritage sites	4	4	4
Agricultural land (km <sup>2</sup> )	1	1	2

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

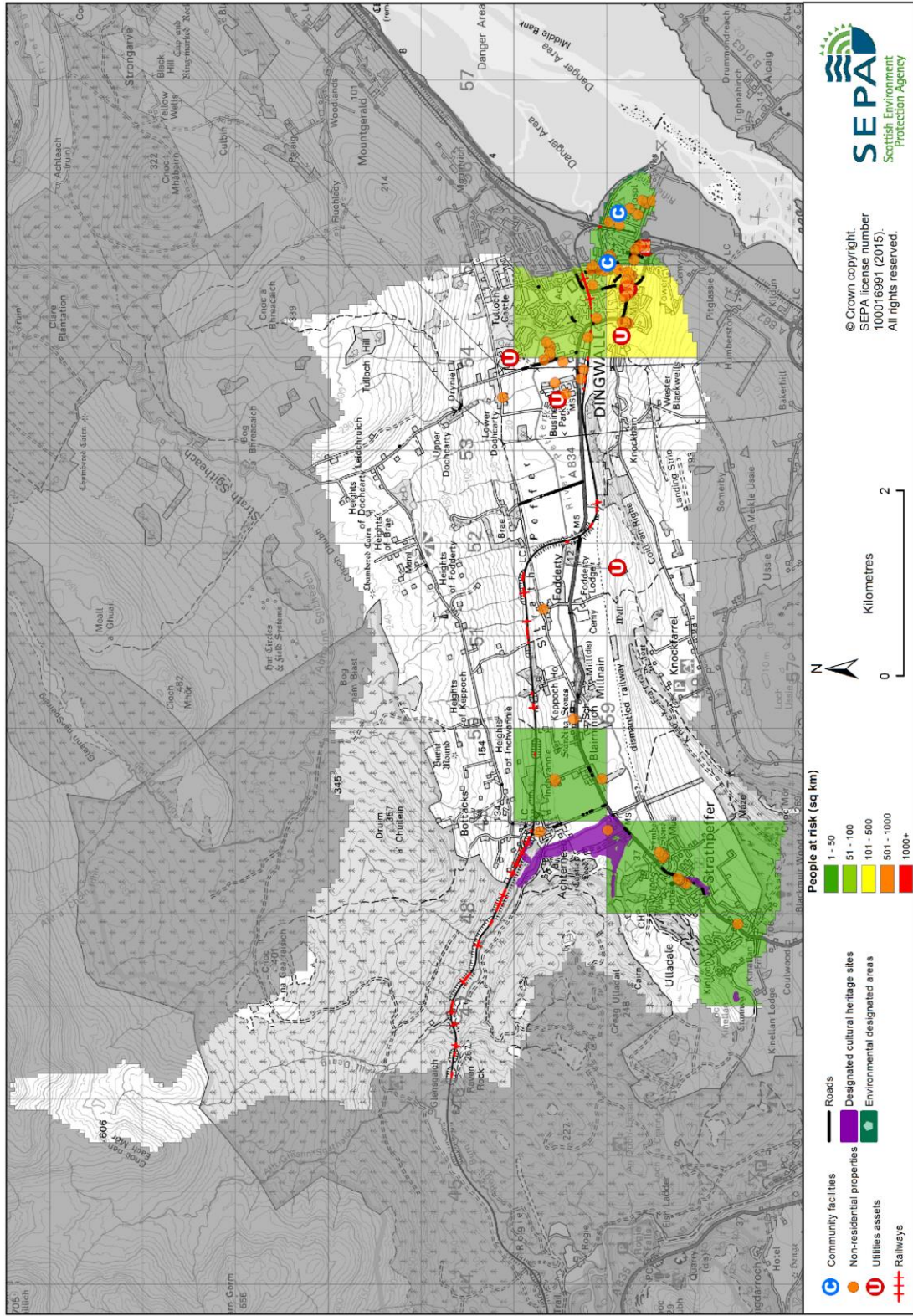


Figure 3: Impacts of flooding

## History of flooding

Since 2001 there have been seven reported instances of flooding caused by surface water, river and groundwater. Properties on Burns Crescent have a history of flooding from the River Peffery. Recorded floods include:

- December 2013: the River Peffery overtopped in Strathpeffer;
- October 2012: the River Peffery overtopped and flooded properties along the A834 in Blairninich and Fodderty;
- October 2006: Significant flooding to property due to exceptionally heavy rainfall and the Knockbain Burn bursting its banks. The River Peffery was close to the underside of the bridge on Tulloch Street and there was a landslide on Mitchell Hill.
- November 2005: A road flooded due to capacity and blockage issues at culverts and the breaching of the river bank at a cattle access point;
- 1982: Flooding affecting properties, businesses and an electricity substation;
- 1947 and 1977: Flooding affecting properties and;
- 1895: A combined river and coastal flood affected roads and properties;
- 1829: The River Peffery overflowed its banks at Tulloch near Dingwall, and the Burn of Dingwall flooded the west end of the Burgh.

## Objectives to manage flooding in Potentially Vulnerable Area 01/14

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 Dingwall and Strathpeffer Potentially Vulnerable Area.

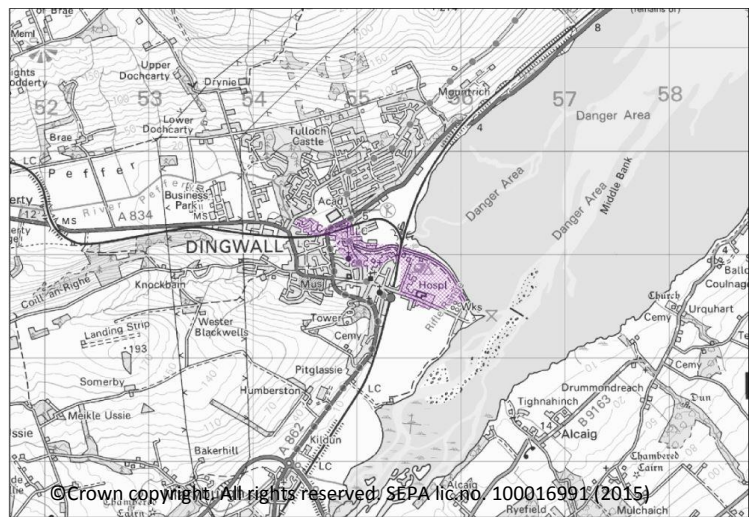
### Reduce flood risk in Dingwall from the River Peffery

Indicators:

- 170 people
- £54,000 Annual Average Damages from residential properties
- £48,000 Annual Average Damages from non-residential properties
- 2 educational buildings

Objective ID: 101401

Target area:



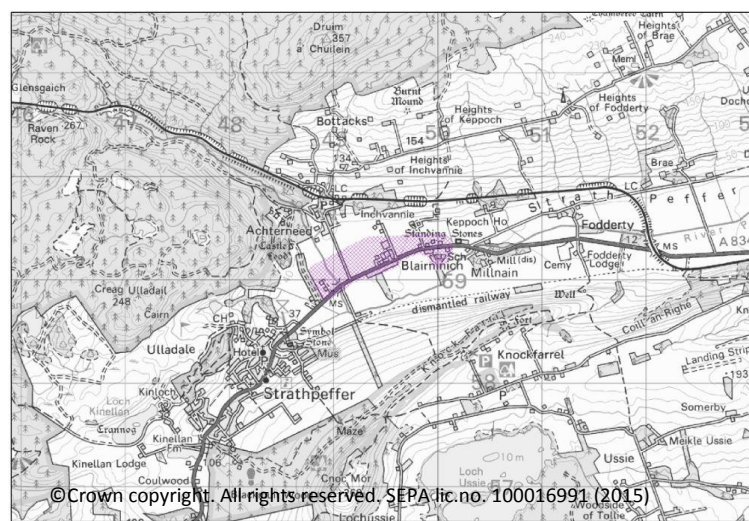
### Reduce flood risk in Blairninch from the River Peffery

Indicators:

- 20 people
- £30,000 Annual Average Damages from residential properties

Objective ID: 101402

Target area:



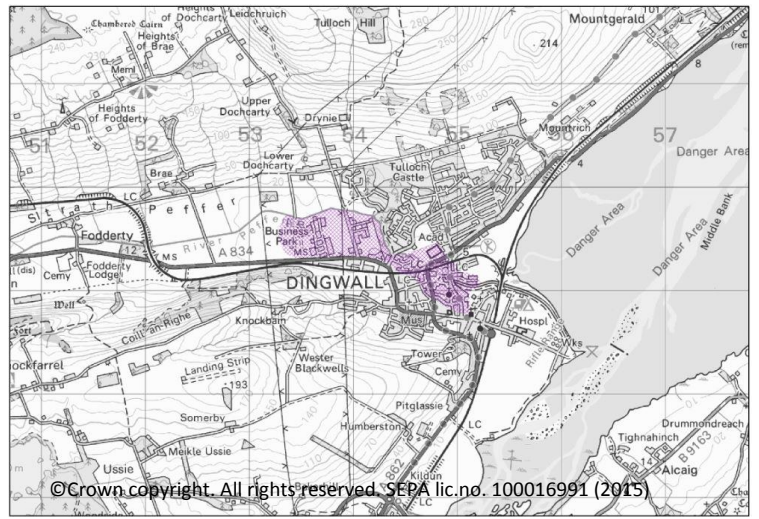


## Reduce risk in Dingwall from coastal flooding

Indicators:

Target area:

- £2,700 Annual Average Damages from residential properties
- £36,000 Annual Average Damages from non-residential properties
- 1 educational building



Objective ID: 101403

Target area	Objective	ID	Indicators within PVA
Dingwall and Strathpeffer	Reduce risk from surface water flooding in Dingwall and Strathpeffer	101407	* See note below
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 90 residential properties</li> <li>• £310,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 90 residential properties</li> <li>• £310,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/14 there are 60 residential properties at risk and Annual Average Damages of £210,000.

## Actions to manage flooding in Potentially Vulnerable Area 01/14

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 Dingwall and Strathpeffer Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<i>Natural flood management works</i>	<b>New flood warning</b>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<b>Flood protection study</b>	<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

<b>Action (ID):</b>	<b>NEW FLOOD WARNING</b> (1000020010)		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>post 2021</b>
<b>Description:</b>	The area under consideration includes properties in Dingwall affected by flooding from the River Peffery. Full scoping will be required before a flood warning service can be developed and implemented in this area and to determine appropriate timescales for delivery.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY</b> (1014010005)		
<b>Objective (ID):</b>	Reduce risk in Dingwall from coastal flooding (101403) Reduce flood risk in Blairninich from the River Peffery (101402) Reduce flood risk in Dingwall from the River Peffery (101401)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National: <b>119 of 168</b>	Within local authority: <b>11 of 23</b>	
<b>Status:</b>	<b>Ongoing</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	The study will include flood risk from the River Peffery in Blairninich and Dingwall in addition to coastal flooding in the estuary of the River Peffery in Dingwall. It should primarily focus on direct defences (flood walls), natural flood management (including storage, runoff control,		

	river or floodplain restoration, sediment management) and consideration of property level protection for any residual risk. Other actions may also be considered in order to develop the most sustainable range of options.
Potential impacts	
<b>Economic:</b>	The study could benefit 61 residential and 28 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £3.3 million.
<b>Social:</b>	Approximately 134 people may directly benefit from flood protection works. Dingwall has a higher than average proportion of vulnerable residents. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. There are potential visual and access impacts for the community, reducing their connection to the watercourse. There may be benefits to roads (including A834 and A862) and the railway line, decreasing disruption to the wider community. In addition two utility sites (energy production/electricity) may also benefit. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	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. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on designated sites, habitats and changes to channel morphology which could affect the quality status of the river. There may also be impacts on sediment and fish populations and passage. There is potential to impact on the Dingwall conservation area and a cultural heritage site. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the Cromarty Firth Special Protection Area. There may be impacts on the Cromarty Firth Site of Special Scientific Interest depending on how close to the shoreline the defences are located. The physical condition of the River Peffery (water body ID 20147) 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.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (1014070018)</b>		
<b>Objective (ID):</b>	Reduce risk from surface water flooding in Dingwall and Strathpeffer (101407)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Ongoing</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.
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<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (1014010017)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Dingwall from the River Peffery (101401)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	The Dingwall Flood Protection Scheme (existing flood embankments along the River Peffery in Dingwall) should be maintained to provide continued flood protection to Dingwall from the River Peffery including coastal flooding in the estuary of the River Peffery.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Cromarty Firth' flood warning area which is part of the Moray Firth coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Easter Ross and Great Glen' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

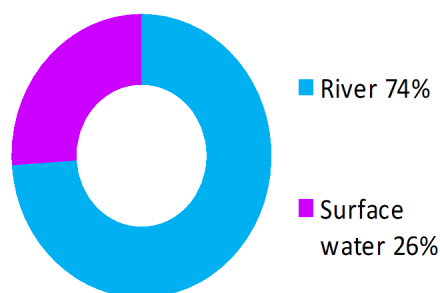
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>The Highland Council has a flood monitor on the Knockbain Burn in Dingwall. The flood monitor provides early warning of increasing water depths, which could lead to flooding.</p>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Contin and Garve (Potentially Vulnerable Area 01/15)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Cromarty coastal

### Summary of flooding impacts



#### At risk of flooding

- 30 residential properties
- <10 non-residential properties
- £59,000 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>	Site protection plans
Flood protection study	<i>Natural flood management study</i>	Maintain flood warning	Awareness raising	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

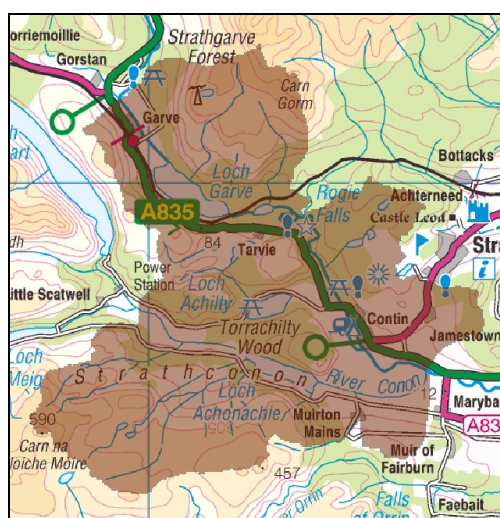


## Contin and Garve (Potentially Vulnerable Area 01/15)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Conon

### Background

This Potentially Vulnerable Area is located to the north west of Inverness. It includes Contin, Garve and the surrounding, mainly rural area (shown below). It is approximately 85km<sup>2</sup>.

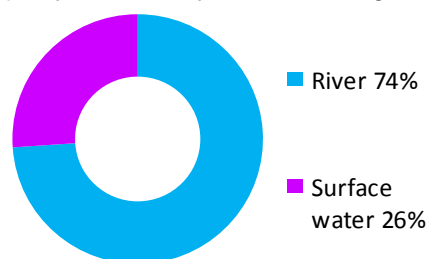


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The A834 and A835 pass through the area.

There are approximately 30 residential properties and fewer than 10 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £59,000 with the majority caused by river flooding.



**Figure 1:** Annual Average Damages by flood source

### Summary of flooding impacts

River flood risk is from the Black Water in Contin which affects some residential and non-residential properties in the south of the village. Some properties in Garve and Strath Garve are also at risk from the Black Water.

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.

Strathgarve Primary School has a low likelihood of being flooded by the Black Water. Roads affected by flooding include the A835, which is the major route linking Ullapool with Inverness, and the A834 which links the communities of Strathpeffer with Contin. Several locations along the railway line from Dingwall to the Kyle of Lochalsh are also at risk.

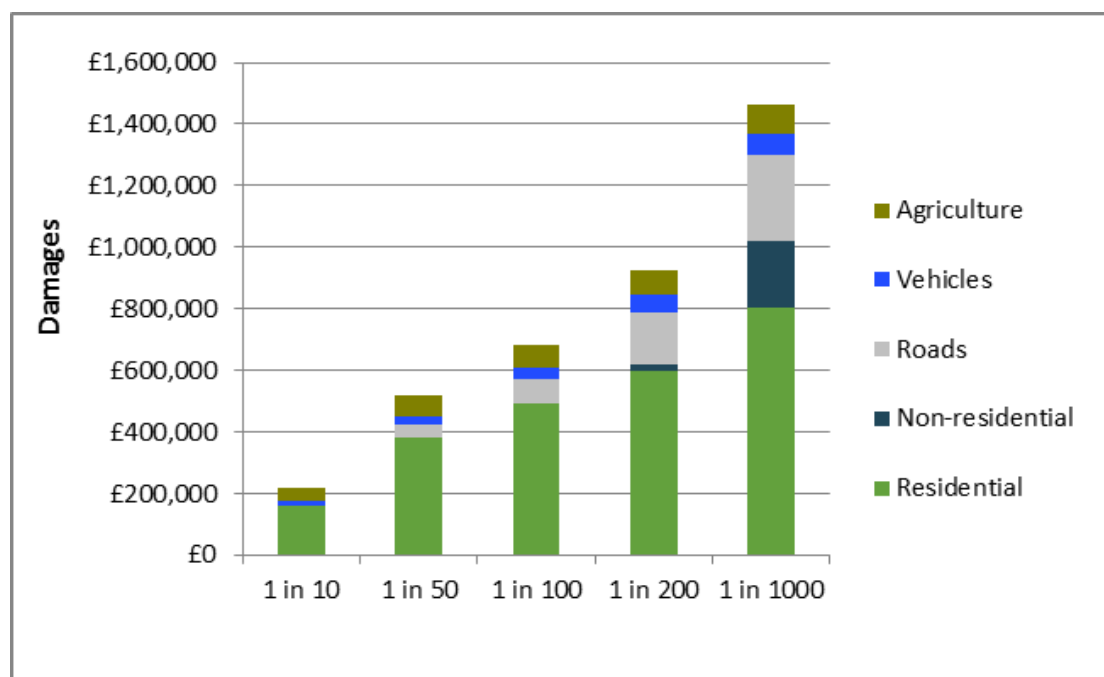
Seven designated cultural heritage sites and small areas of environmental importance are at risk. These include Glen Affric to Strathconon Special Protection Area, Conon Islands Special Area of Conservations and the Lower River Conon Site of Special Scientific Interest.

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 roads.

The location of the impacts of flooding is shown in Figure 3.

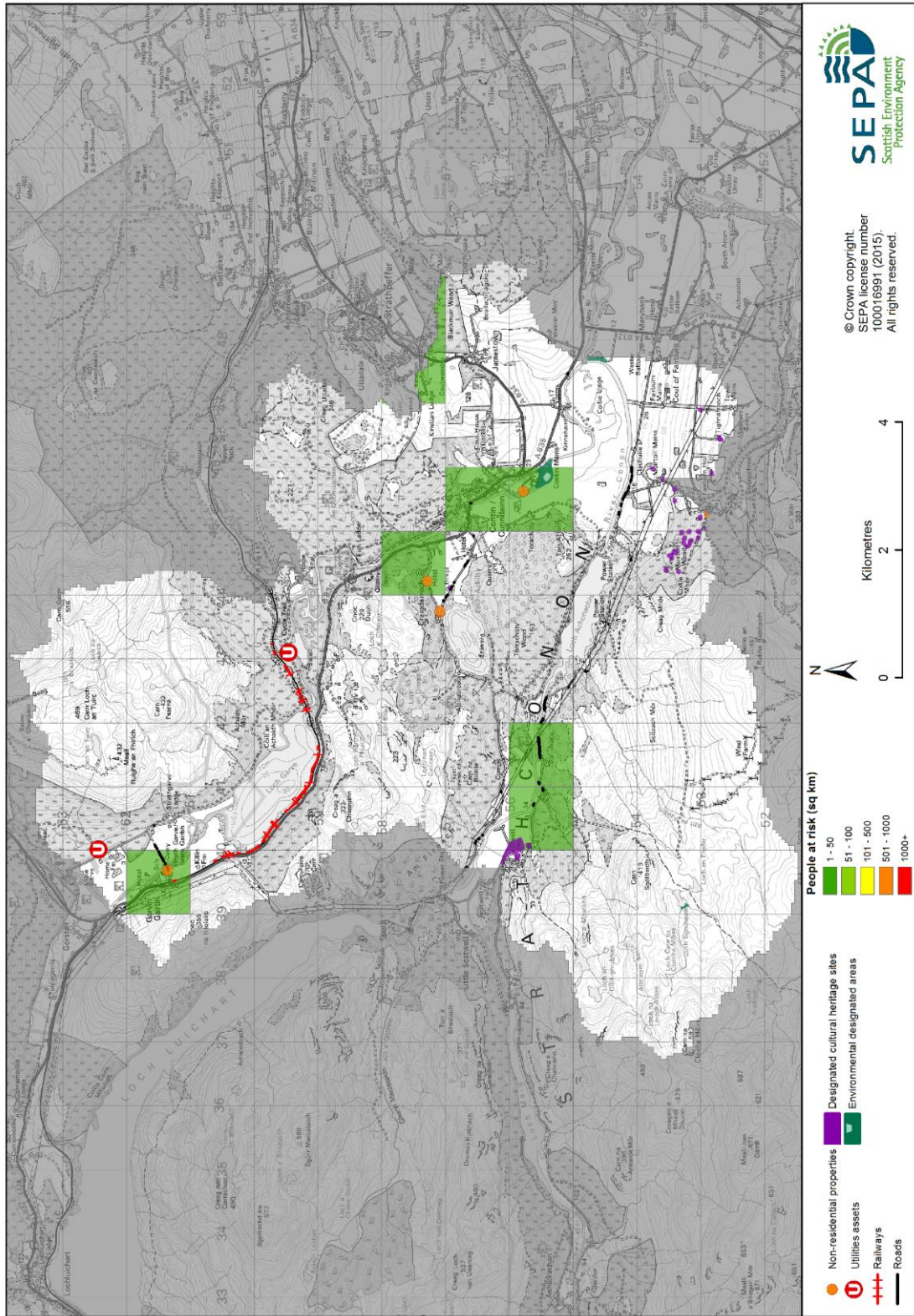
	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 390)	<10	30	30
Non-residential properties (total 80)	<10	<10	<10
People	20	60	70
Community facilities	0	0	<10 Educational buildings
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 30 locations Rail at <10 locations	Roads at 40 locations Rail at 10 locations	Roads at 40 locations Rail at 10 locations
Environmental designated areas (km <sup>2</sup> )	0.1	0.1	0.1
Designated cultural heritage sites	6	7	7
Agricultural land (km <sup>2</sup> )	2	4	4

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



**Figure 3: Impacts of flooding**

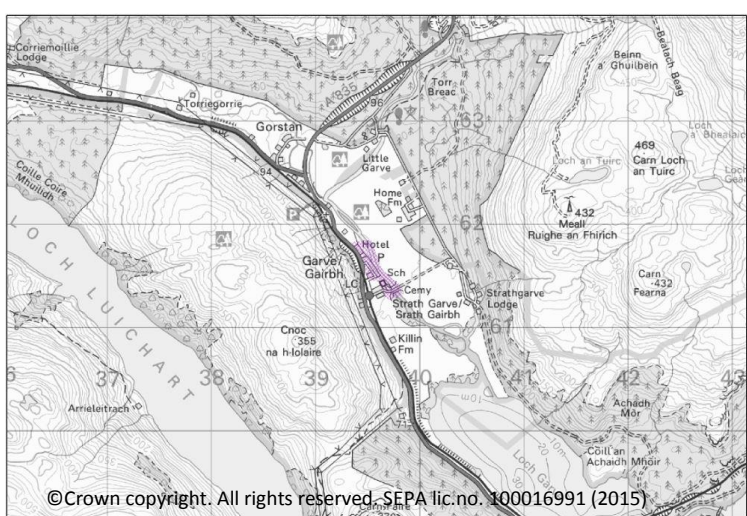
## History of flooding

The most recent recorded flood was in 2002. The embankments at Cromie and Scatwell, which protect the valley floor, are recorded to have been breached on numerous occasions including 1849, 1892, 1922, 1928, 1950, 1962, 1966, 1974, 1981 and 1983.

Heavy rain and snowmelt affecting Loch Garve and the Black Water caused flooding in 1888 and 1892. Damage was caused to roads, properties, and fields, as well as washing away the railway line at Loch Garve over a considerable distance. The school was flooded by the Black Water in 1966, 1983 and 1989 which suggests that the likelihood of flooding identified in the flood maps is underestimated.

## Objectives to manage flooding in Potentially Vulnerable Area 01/15

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 Contin and Garve Potentially Vulnerable Area.

Reduce flood risk in Garve from the Black Water	
Indicators:	Target area:
<ul style="list-style-type: none"> <li>20 people</li> <li>£24,000 Annual Average Damages from residential properties</li> <li>1 educational building</li> </ul>	 <p style="font-size: small; text-align: center;">©Crown copyright. All rights reserved. SEPA lic.no. 100016991 (2015)</p>
Objective ID: 101501	

Target area	Objective	ID	Indicators within PVA
Contin and Garve	Reduce the physical or disruption risk related to the transport network for roads	1302	<ul style="list-style-type: none"> <li>7 locations with a total length of 290m</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>30 residential properties</li> <li>£59,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>30 residential properties</li> <li>£59,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/15

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1302021)</b>		
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for roads (1302)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A835.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1015010005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Garve from the Black Water (101501)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>138 of 168</b>	<b>17 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A study is required to further investigate the feasibility of a flood protection scheme for Garve, focusing on direct defences, modification of conveyance, and consideration of property level protection for residual risk. Other actions may also be considered to develop the most sustainable range of options. The study should look to confirm the extent and size of defences required and the business case for flood protection works.		

Potential impacts	
<b>Economic:</b>	The study could benefit 11 residential and one non-residential properties at risk of flooding in this location, with potential damages avoided of up to £780,000.
<b>Social:</b>	Approximately 24 people may directly benefit from flood protection works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Local roads may also benefit from reduced flood risk. The school is at low risk of flooding but may benefit from any flood protection works. There are potential visual and access impacts for the community, reducing their connection to the watercourse. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on habitats and changes to channel morphology. There are no environmentally designated sites nearby which could be impacted by flood protection works.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will be seeking to incorporate additional surface water hazard mapping information into the flood maps to improve understanding of flood risk. Approximately 2,100km <sup>2</sup> of improved data is currently available within this Local Plan District.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain: the 'Contin' and 'Garve' flood warning areas, which warn of flooding to properties and roads, the 'Moy Bridge' flood warning area, which warns of potential flooding to the A832; and the 'Scatwell' flood warning area, which warns of flooding to low lying agricultural land. All four are part of the Conon Valley flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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. The Potentially Vulnerable Area is within the 'Easter Ross and Great Glen' flood alert area.		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		



<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>SITE PROTECTION PLANS (1015010015)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Garve from the Black Water (101501)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	<p>Site protection plans are developed to identify whether normal operation of a facility can be maintained during a flood. This may be due to existing protection or resilience of the facility or the network. A site protection plan for the school should be developed.</p>		

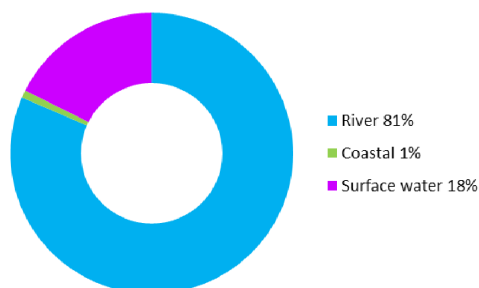
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Conon Bridge and Muir of Ord (Potentially Vulnerable Area 01/16)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Conon

### Summary of flooding impacts



#### At risk of flooding

- 60 residential properties
- 10 non-residential properties
- £250,000 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>	<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	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

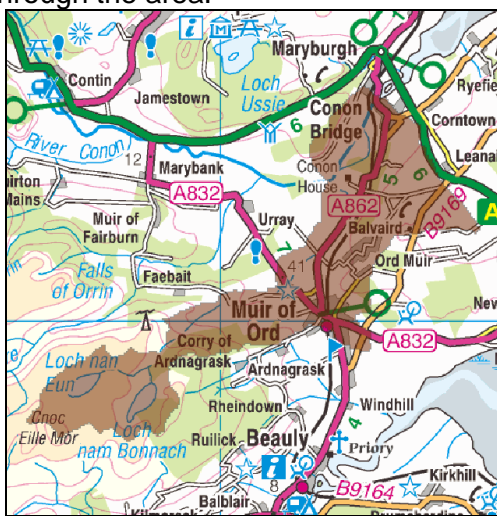
# Conon Bridge and Muir of Ord (Potentially Vulnerable Area 01/16)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Conon

## Background

This Potentially Vulnerable Area is approximately 27km<sup>2</sup>. It includes the Muir of Ord and Conon Bridge as well as adjacent mainly rural areas (shown below).

The A862, A832 and B9169 pass through the area.

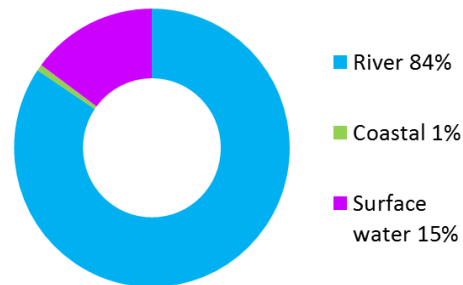


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The River Conon is the largest river in the area. Conon Bridge benefits from a flood protection scheme which was constructed in 1990.

There are approximately 60 residential and 10 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £250,000 with the majority caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

## Summary of flooding impacts

Some parts of Conon Bridge remain at risk of river flooding (Eil Burn) and there is flood risk in Muir of Ord from Loch Ord. The outfall of Loch Ord however is via a culvert which has not been adequately modelled in the assessment of flood risk in this area. As a result it is likely that the number of properties at risk and the damages from river flooding are overestimated.

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.

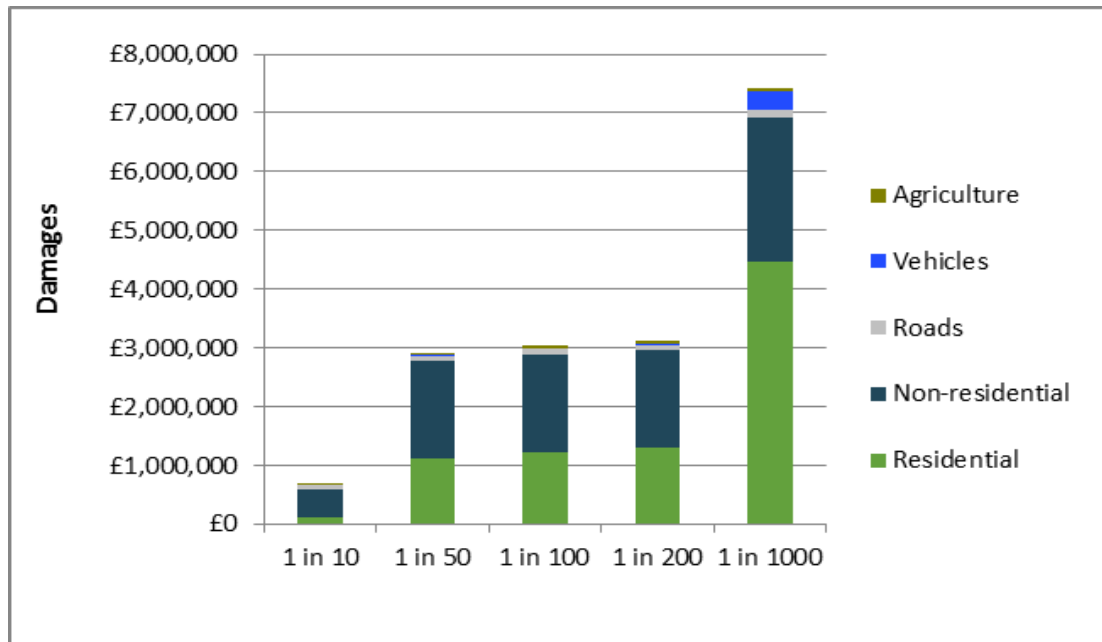
Roads potentially affected by flooding include the A862, which links the communities between Beaully and Dingwall. The Wick to Inverness railway line is at a risk of flooding in several locations. Three designated cultural heritage and small areas of environmental importance are at risk. These include the Conon Islands Special Area of Conservation and Lower River Conon Site of Special Scientific Interest.

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 of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 1,800)	<10	60	130
Non-residential properties (total 190)	<10	10	30
People	10	120	290
Community facilities	0	0	0
Utilities assets	<10	10	10
Transport links (excluding minor roads)	Roads at 30 locations Rail at 20 locations	Roads at 50 locations Rail at 20 locations	Roads at 60 locations Rail at 20 locations
Environmental designated areas (km <sup>2</sup> )	0.7	0.9	1
Designated cultural heritage sites	3	3	3
Agricultural land (km <sup>2</sup> )	<1	1	1

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

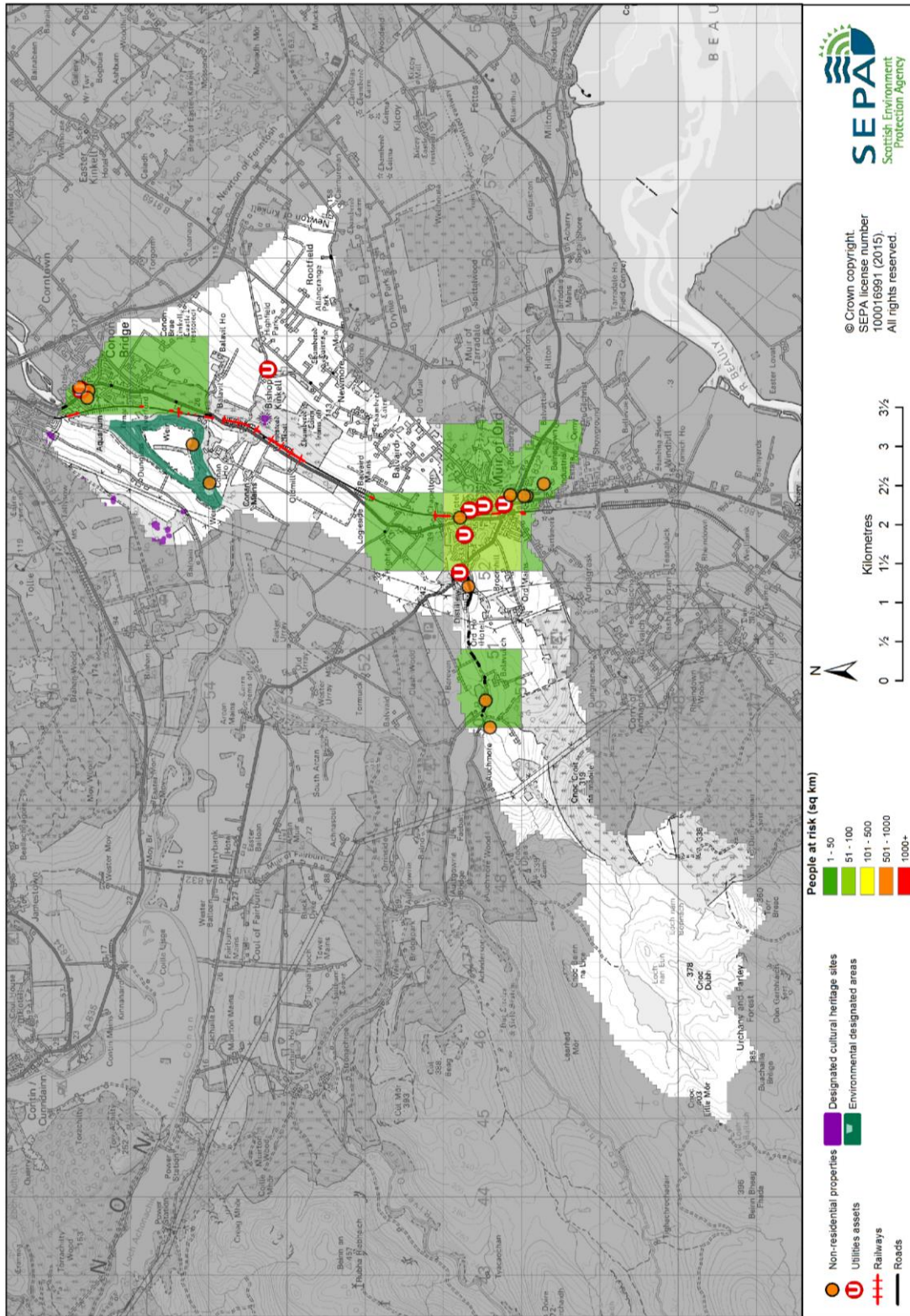


Figure 3: Impacts of flooding

## History of flooding

The earliest recorded flood in this Potentially Vulnerable Area was in 1789 when the River Grudie caused severe flooding to buildings and farmland. Major flooding caused by the Conon occurred in 1829, 1849, 1852, 1892, 1903, 1962 and 1966. In more recent times, flooding occurred in 1983, 1984, 1989 due to embankment breaching, and in 1990, 2001 and 2002 from the Eil Burn.

## Objectives to manage flooding in Potentially Vulnerable Area 01/16

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 Conon Bridge and Muir of Ord Potentially Vulnerable Area.

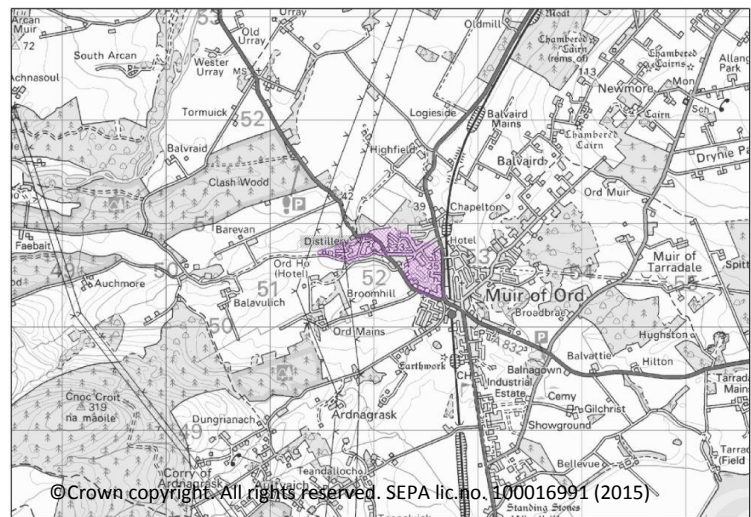
### Reduce flood risk in Muir of Ord from the Allt Fionnaidh / Logie Burn and Ord Loch

Indicators:

- 50 people
- £61,000 Annual Average Damages from residential properties
- £140,000 Annual Average Damages from non-residential properties

Objective ID: 101601

Target area:



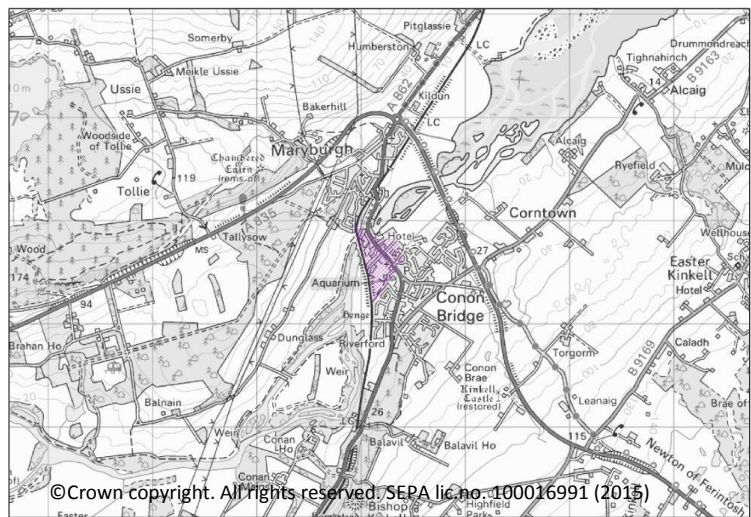
### Maintain the River Conon Flood Protection Scheme in Conon Bridge and accept existing levels of flood risk from the River Conon and Eil Burn

Indicators:

- £9,100 Annual Average Damages from residential properties
- £2,200 Annual Average Damages from non-residential properties

Objective ID: 101602

Target area:





Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 60 residential properties</li> <li>• £250,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 60 residential properties</li> <li>• £250,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/16

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 Conon Bridge and Muir of Ord Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<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	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

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1016010005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Muir of Ord from the Allt Fionnaidh / Logie Burn and Ord Loch (101601)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:		Within local authority:
	<b>69 of 168</b>		<b>5 of 23</b>
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A hydraulic study is required to further improve the understanding of flood risk in this area. Currently the flood risk for Muir of Ord is thought to be overestimated due to difficulties in modelling how the Ord Loch interacts with the surrounding watercourses. Improvements to the modelling are required to confirm the extent of flood risk in Muir of Ord and the surrounding rural areas. The improvements to the modelling should focus on Ord Loch and how it interacts with the surrounding watercourses. As a result of the overestimation of flood risk in the area, the study will be carried out in cycle 2.		
<b>Potential impacts</b>			
<b>Economic:</b>	The economic benefits will be confirmed once the hydraulic study has been carried out.		
<b>Social:</b>	The social benefits, including number of people at risk, will be confirmed once the hydraulic study has been carried out.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There are no environmentally designated sites nearby which could be impacted by		

**Environmental:** future flood protection works.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will be seeking to incorporate additional surface water hazard mapping information into the flood maps to improve understanding of flood risk. Approximately 2,100km <sup>2</sup> of improved data is currently available within this Local Plan District.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (1016020017)</b>		
<b>Objective (ID):</b>	Maintain the River Conon Flood Protection Scheme in Conon Bridge and accept existing levels of flood risk from the River Conon and Eil Burn (101602)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	The Conon Bridge Flood Prevention Scheme was completed in 1990 and extended after 2006 to provide a 1 in 100 year standard of protection. The scheme provides protection to the community at Conon Bridge from the River Conon and the Eil Burn. This should continue to be maintained to ensure the current protection level continues for properties in Conon Bridge.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Easter Ross and Great Glen' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

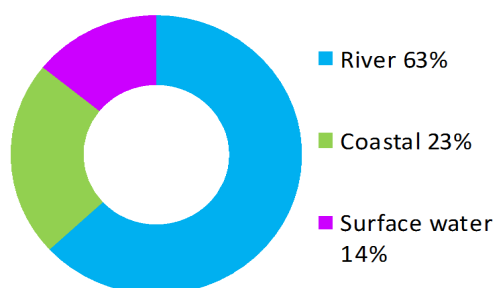
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Providing an emergency response to 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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

# Nairn West and Ardersier (Potentially Vulnerable Area 01/17)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Inverness coastal

## Summary of flooding impacts



### At risk of flooding

- 30 residential properties
- 30 non-residential properties
- £73,000 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	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

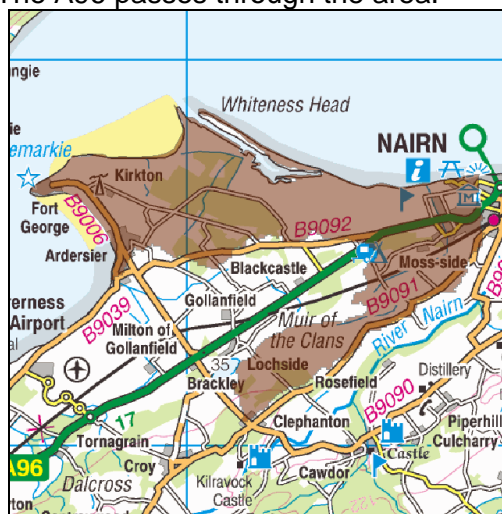
# Nairn West and Ardersier (Potentially Vulnerable Area 01/17)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Inverness coastal

## Background

This Potentially Vulnerable Area is approximately 32km<sup>2</sup>. It is located on the Moray Firth and includes the western part of Nairn as well as Kirkton and Ardersier (shown below).

The A96 passes through the area.

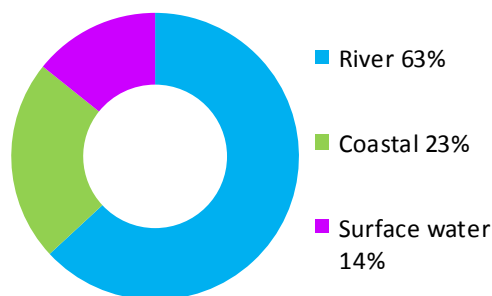


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The River Nairn lies to the east and the main river in the area is the Alton Burn.

There are approximately 30 residential and 30 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £73,000 with the majority caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

## Summary of flooding impacts

The seafront of Ardersier is at risk of coastal flooding. Flooding from wave action is not fully represented in the assessment of flood risk in this area and it is likely that the number of properties at risk and the damages from coastal flooding are underestimated. River flood risk is from the Alton Burn which affects properties and agricultural land to the west of Nairn.

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 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.

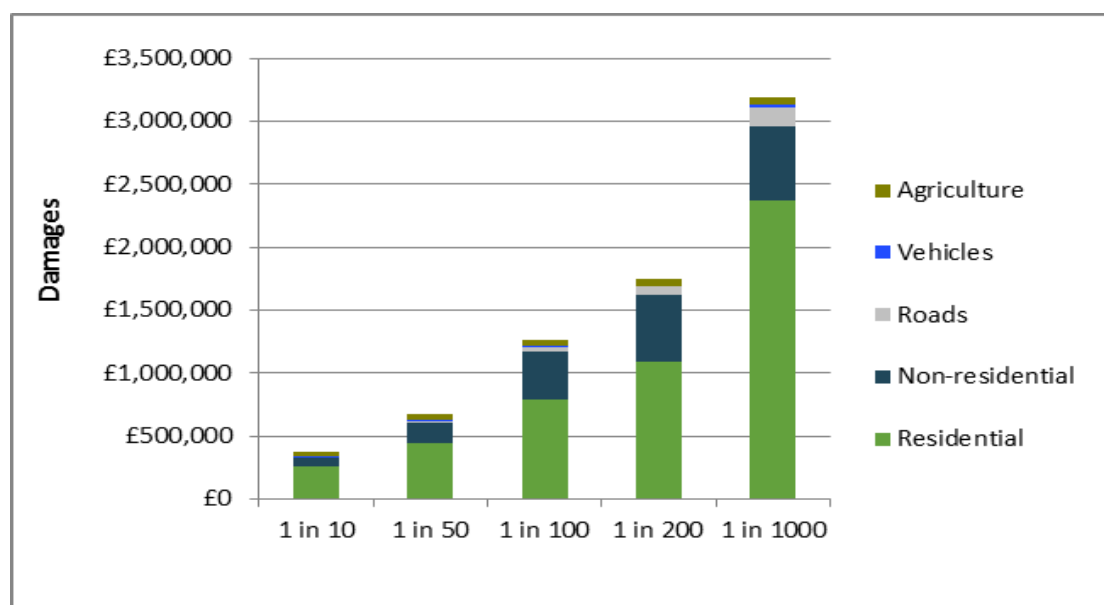
Minor roads on the western side of Nairn and the Nairn to Inverness railway line are at risk of flooding. Seven designated cultural heritage sites and areas of environmental importance are at risk. These include the Inner Moray Firth Special

Protection Area, Whiteness Head Site of Special Scientific Interest (SSSI) and Kildrummie Kames SSSI.

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 of flooding is shown in Figure 3.

	1 in10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 2,000)	<10	30	80
Non-residential properties (total 120)	<10	30	30
People	10	70	170
Community facilities	0	0	<10 Healthcare facilities
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 50 locations Rail at 10 locations	Roads at 80 locations Rail at 10 locations	Roads at 90 locations Rail at 10 locations
Environmental designated areas (km <sup>2</sup> )	1	1	1
Designated cultural heritage sites	5	7	8
Agricultural land (km <sup>2</sup> )	2	3	3

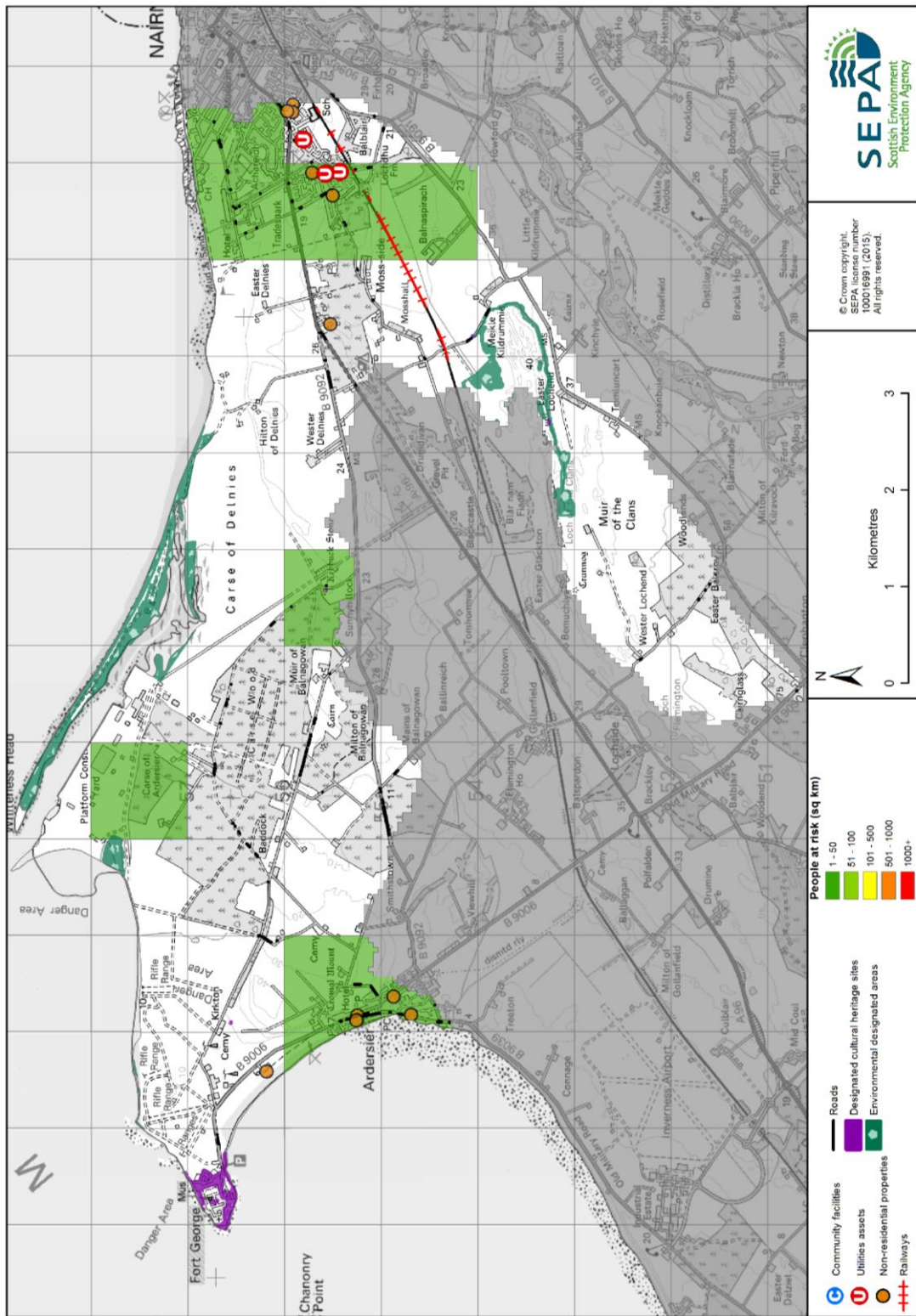
**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources





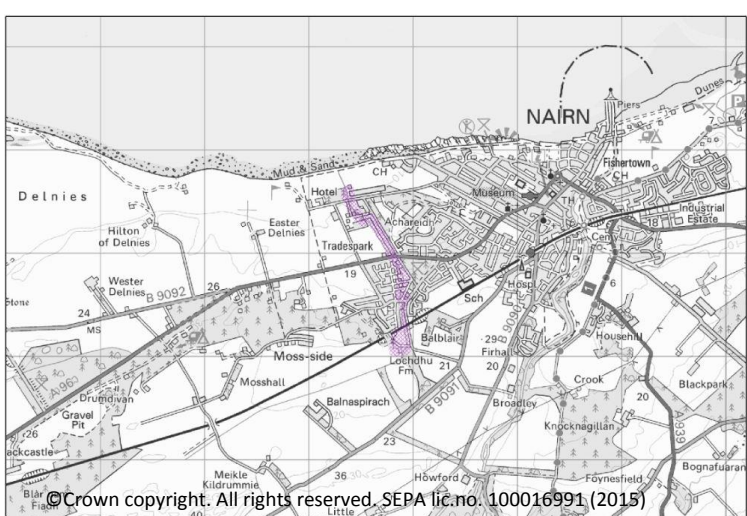
**Figure 3: Impacts of flooding**

## History of flooding

The only flood recorded in this Potentially Vulnerable Area was in January 2005, when flooding peaked at high tide, submerging drainage outfalls in Ardersier.

## Objectives to manage flooding in Potentially Vulnerable Area 01/17

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 Nairn West and Ardersier Potentially Vulnerable Area.

Reduce flood risk in Nairn West from the Alton Burn	
Indicators:	Target area:
<ul style="list-style-type: none"> <li>£11,000 Annual Average Damages from residential properties</li> </ul>	 <p style="font-size: small; text-align: center;">© Crown copyright. All rights reserved. SEPA lic.no. 100016991 (2015)</p>
Objective ID: 101701	

Target area	Objective	ID	Indicators within PVA
Nairn West and Ardersier	Reduce the physical risk, or disruption risk, related to areas of the A96 at risk of flooding	1303	<ul style="list-style-type: none"> <li>4 locations on the A96 with a total length of 30m</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>30 residential properties</li> <li>£73,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>30 residential properties</li> <li>£73,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/17

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 Nairn West and Ardersier 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	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1303021)</b>		
<b>Objective (ID):</b>	Reduce the physical risk, or disruption risk, related to areas of the A96 at risk of flooding (1303)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2028-2033</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A96.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1017010005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Nairn West from the Alton Burn (101701)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>152 of 168</b>	<b>20 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A study of the Alton Burn is required to further investigate the feasibility of a flood protection scheme for Nairn West, focusing on improving road bridges to improve conveyance, and consideration of property level protection for residual risk. Other actions may also be considered to develop the most sustainable range of options. The study should look to confirm the feasibility of improving the road structures and the impact on flood risk, and the business case for		

	flood protection works. Surveys of the road structures may be required.
Potential impacts	
<b>Economic:</b>	The flood protection study should confirm the economic impacts and number of properties at risk. Potential damages avoided of up to £490,000.
<b>Social:</b>	The flood protection study should confirm the number of people at risk. Nairn has a higher than average proportion of vulnerable residents. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. There could be benefits to an energy production/electricity utility site and the railway line. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on habitats and changes to channel morphology. There may be opportunities to improve conditions at structures and culverts through the design of improvement works i.e. creating more natural beds.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Ardersier to Nairn' flood warning area which is part of the Moray Firth coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Findhorn, Nairn, Moray and Speyside' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

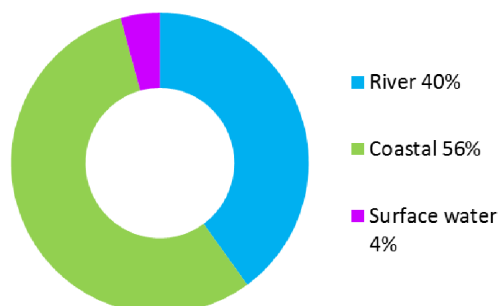
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Providing an emergency response to 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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Nairn Central (Potentially Vulnerable Area 01/18)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Moray coastal

### Summary of flooding impacts



### At risk of flooding

- 350 residential properties
- 30 non-residential properties
- £340,000 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	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

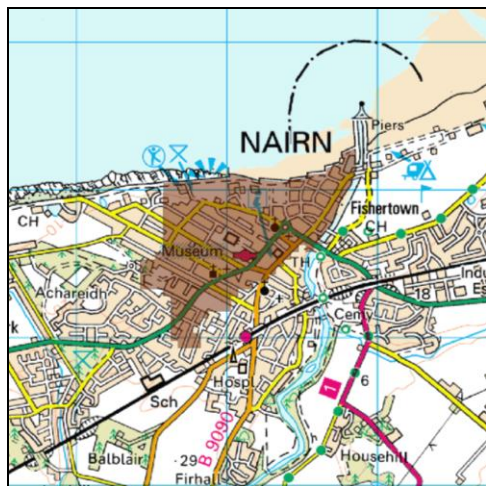


## Nairn Central (Potentially Vulnerable Area 01/18)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Moray coastal

### Background

This Potentially Vulnerable Area covers the urban area in the centre of Nairn (shown below). It is approximately 2km<sup>2</sup>.

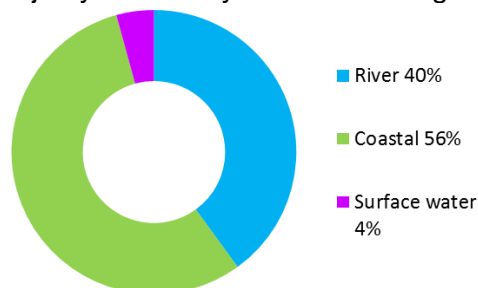


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The A96 road passes through the area and the River Nairn flows along its eastern boundary.

There are approximately 350 residential properties and 30 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £340,000 with the majority caused by coastal flooding.



**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

Nairn, in particular the Fishertown area, is at risk of coastal flooding including, tidal flooding in the lower reaches of the River Nairn. Nairn is also at risk of flooding from the River Nairn and from the combined effects of high river flows and high sea levels.

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 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.

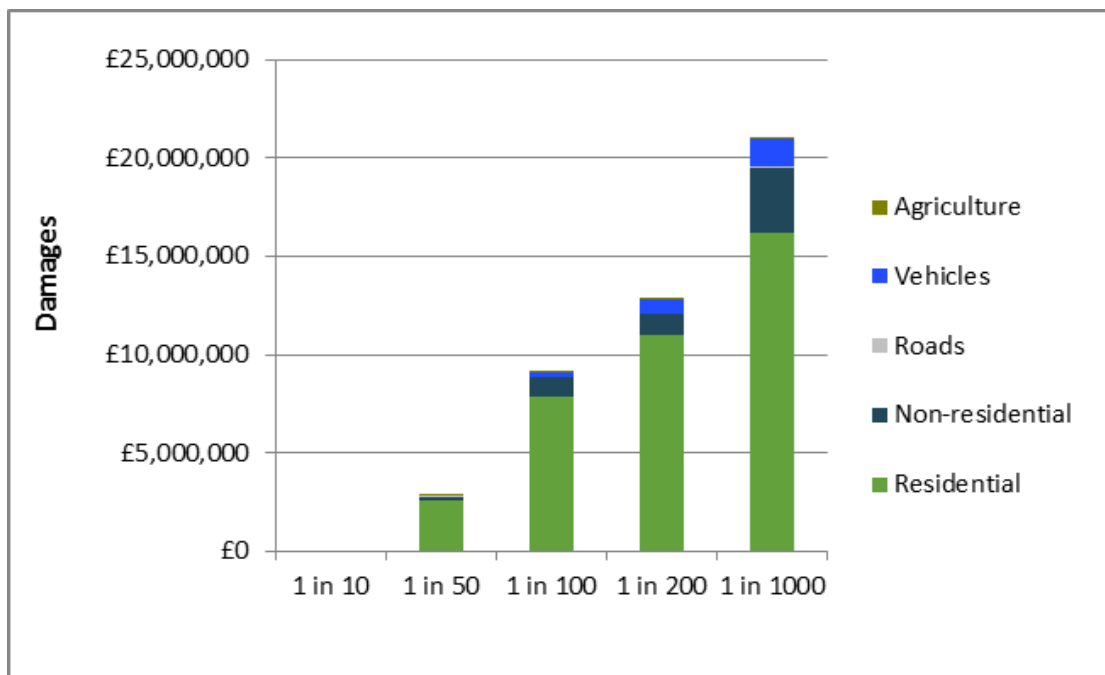
Roads affected by flooding include the A96 which is the major route between Inverness and Aberdeen.

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.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 1,200)	<10	350	470
Non-residential properties (total 200)	<10	30	40
People	<10	780	1,000
Community facilities	0	0	0
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	Roads at <10 locations	Roads at 30 locations	Roads at 30 locations
Environmental designated areas (km <sup>2</sup> )	0	0	0
Designated cultural heritage sites	0	0	0
Agricultural land (km <sup>2</sup> )	0	<0.1	<0.1

**Table 1:** Summary of flooding impacts<sup>1</sup>

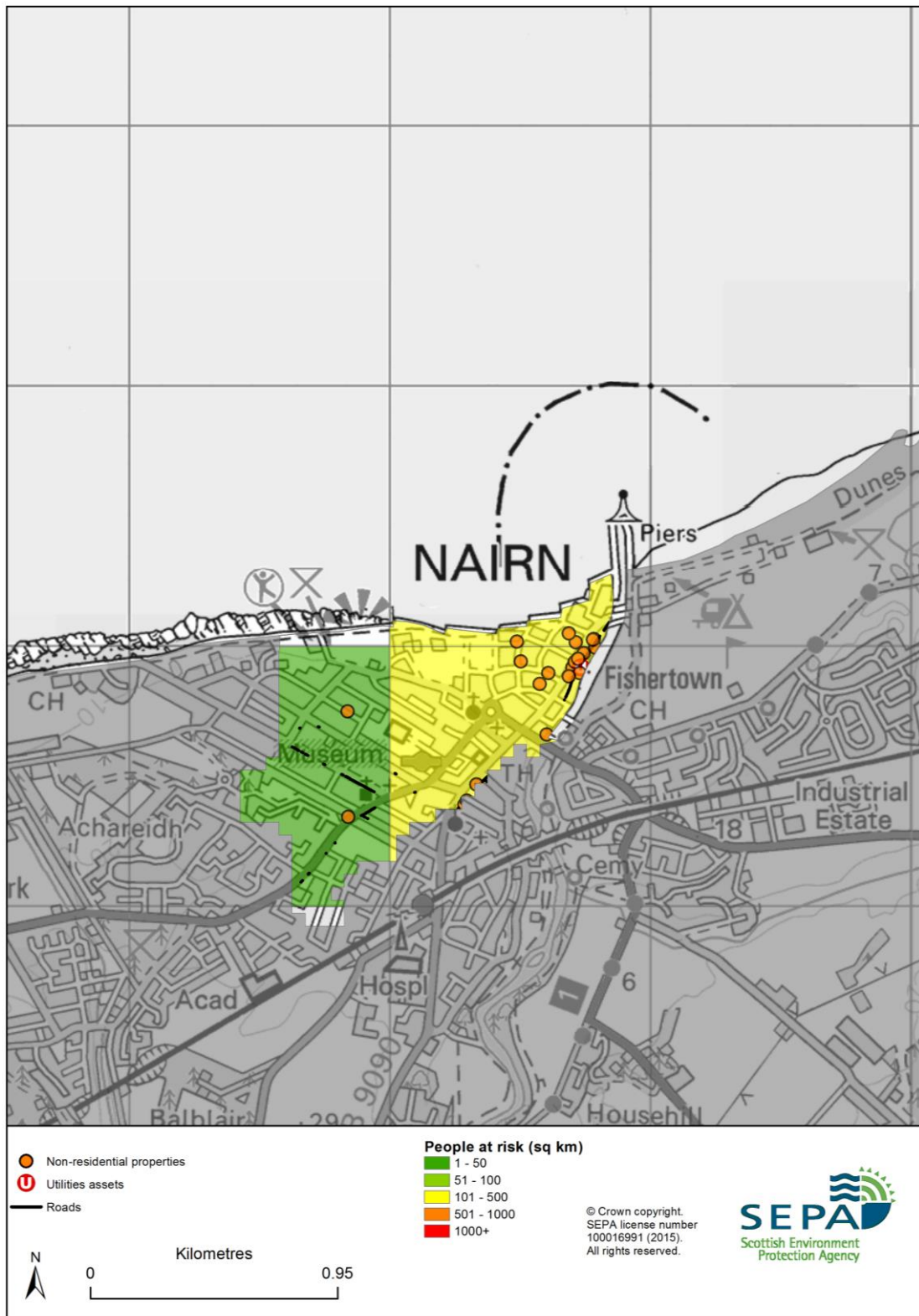


**Figure 2:** Damages by flood likelihood

## History of flooding

River flooding occurred in December 1999. In January 2005 a combined river and tidal flood threatened several properties, however no damage was recorded.

<sup>1</sup> 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 01/18

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 Nairn Central Potentially Vulnerable Area.

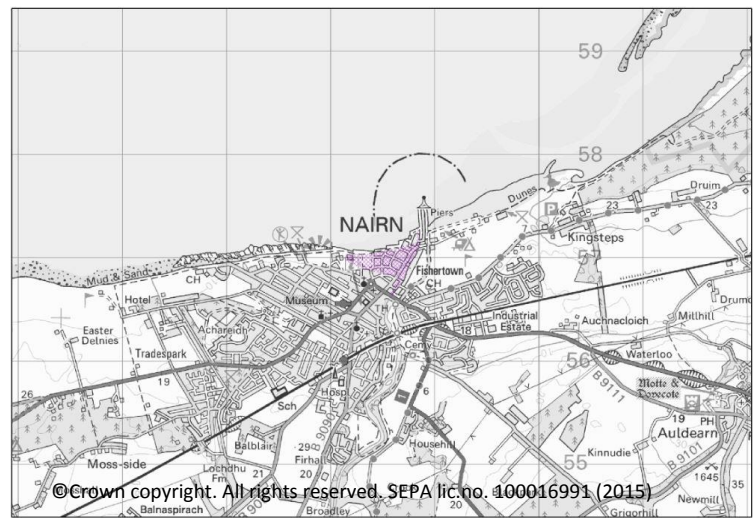
### Reduce flood risk in Nairn Central from the River Nairn

Indicators:

- 500 people
- £100,000 Annual Average Damages from residential properties
- £6,000 Annual Average Damages from non-residential properties

Objective ID: 101801

Target area:



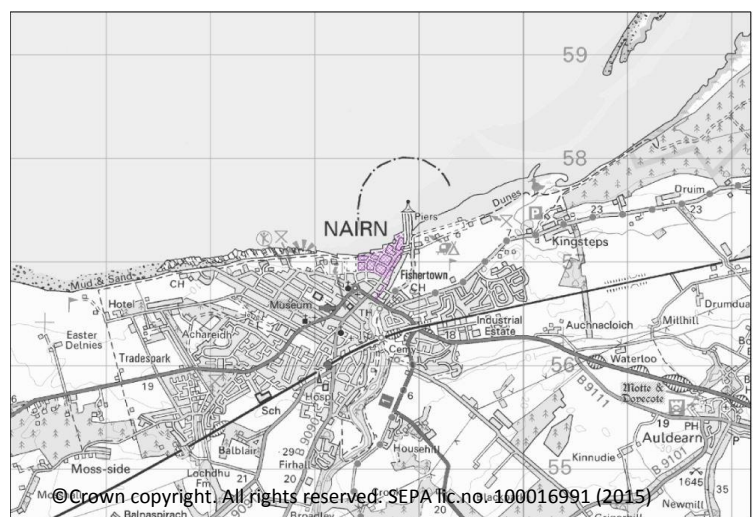
### Reduce risk in Nairn Central from coastal flooding

Indicators:

- 260 people
- £170,000 Annual Average Damages from residential properties
- £5,300 Annual Average Damages from non-residential properties

Objective ID: 101802

Target area:



Target area	Objective	ID	Indicators within PVA
Nairn central	Reduce the physical risk, or disruption risk, related to areas of the A96 at risk of flooding	1304	<ul style="list-style-type: none"> <li>• 20m of road at 1 location of the A96</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 350 residential properties</li> <li>• £340,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 350 residential properties</li> <li>• £340,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/18

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 Nairn Central 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	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1304021)</b>		
<b>Objective (ID):</b>	Reduce the physical risk, or disruption risk, related to areas of the A96 at risk of flooding (1304)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2028-2033</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A96.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1018010005)</b>		
<b>Objective (ID):</b>	Reduce risk in Nairn Central from coastal flooding (101802) Reduce flood risk in Nairn Central from the River Nairn (101801)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National: <b>49 of 168</b>	Within local authority: <b>2 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A study is required to focus on direct defences to provide protection from river and coastal flooding. Other actions may also be considered in order to develop the most sustainable range of options.		
<b>Potential impacts</b>			

<b>Economic:</b>	The study could benefit 344 residential and 24 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £7.7 million.
<b>Social:</b>	Approximately 757 people may directly benefit from flood protection works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. There may also be benefits to local roads and an energy production/electricity utility site, which may reduce disruption to the wider community. There are potential visual and access impacts for the community, reducing their connection to the watercourse. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on habitats and changes to channel morphology. There may be impacts on the Nairn Fishertown conservation area. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the Moray Firth Special Area of Conservation.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will be seeking to incorporate additional surface water hazard mapping information into the flood maps to improve understanding of flood risk. Approximately 2,100km <sup>2</sup> of improved data is currently available within this Local Plan District.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Ardersier to Nairn' flood warning area which is part of the Moray Firth coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Findhorn, Nairn, Moray and Speyside' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		



<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

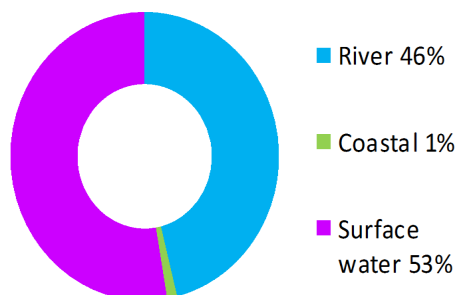
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Inverness Airport (Potentially Vulnerable Area 01/19)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Inverness coastal

### Summary of flooding impacts



### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £16,000 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

# Inverness Airport (Potentially Vulnerable Area 01/19)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Inverness coastal

## Background

This Potentially Vulnerable Area is approximately 20km<sup>2</sup>. It is located between Inverness and Nairn (shown below). It includes Inverness Airport, the industrial estate at Croy and the southern part of Ardersier.

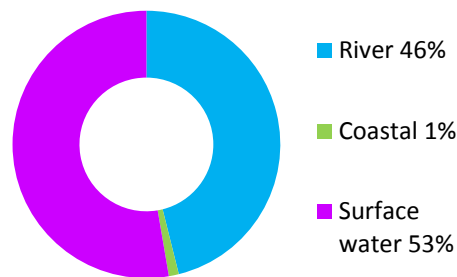


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The A96, B9006, B9039, B9090 and B9091 pass through the area.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are approximately £16,000 with the majority caused by surface water flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding

River and surface water flood risk are both focused on the site of the airport however the majority of the runways are elevated above flood levels. Surface water flooding also affects the industrial estate on the airport site.

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.

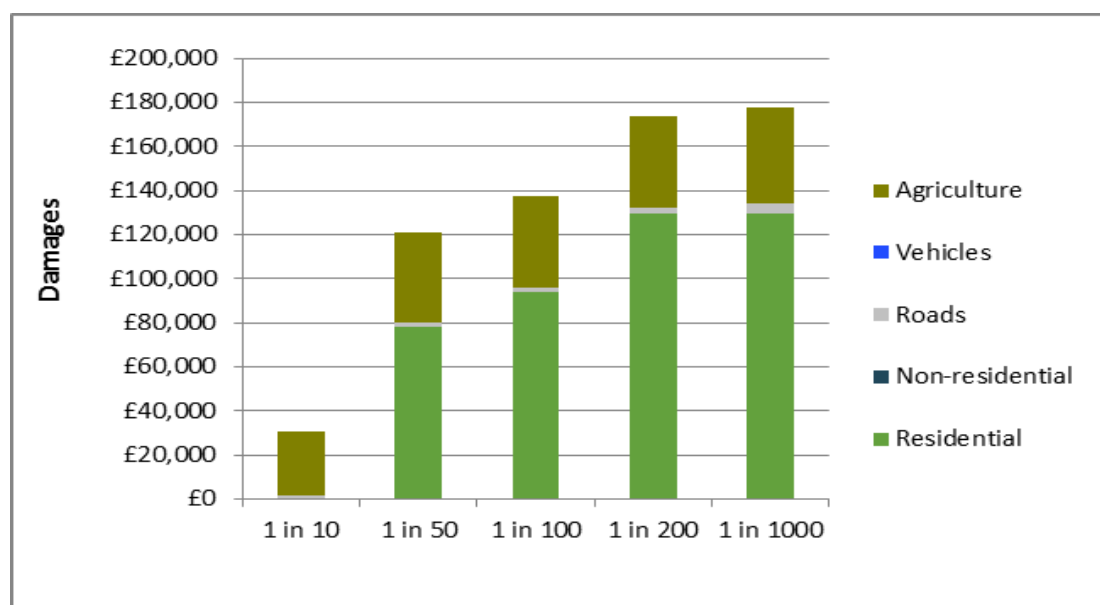
The risk of flooding to utilities in Table 1 does not include Scottish Water data. Scottish Water undertook a national assessment of above ground assets at medium likelihood of flooding (including water treatment works, wastewater treatment works, and pumping stations). Within this Potentially Vulnerable Area there is one asset identified as being at risk of flooding.

Roads potentially affected by flooding include the A96 which is the major route linking communities and towns between Inverness and Aberdeen. The Nairn to Inverness railway line and a small area of the runway at Inverness Airport have a risk of flooding. Drainage systems for the runways are however designed to avoid disruption to the airport and access routes are elevated. Areas of agricultural land and one designated cultural heritage site are also at risk.

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 agricultural land. The location of the impacts of flooding is shown in Figure 3.

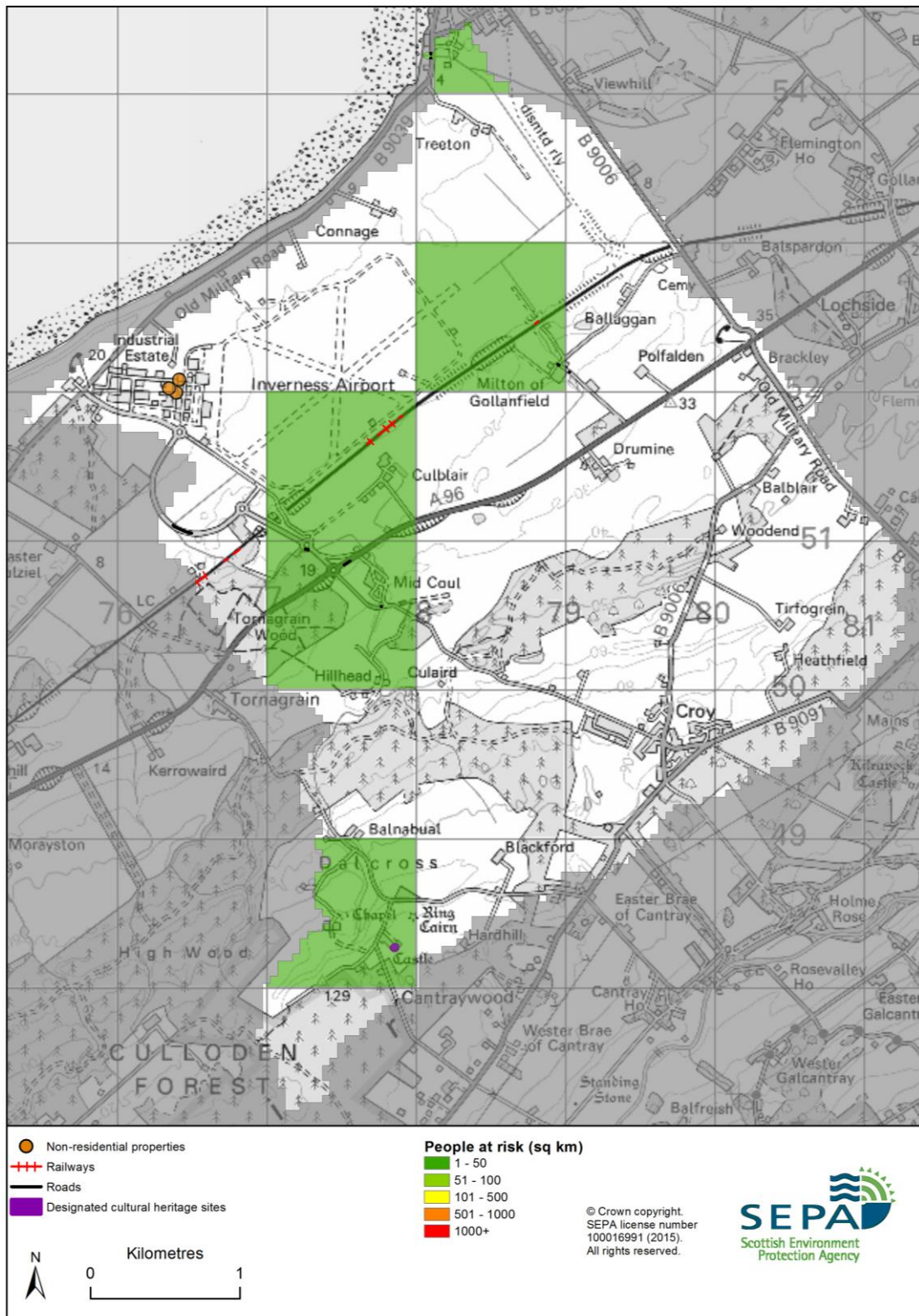
	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 310)	<10	<10	<10
Non-residential properties (total 70)	<10	<10	10
People	<10	20	20
Community facilities	0	0	0
Utilities assets	0	0	<10
Transport links (excluding minor roads)	Roads at 30 locations Rail at <10 locations <0.01km <sup>2</sup> of airport runway	Roads at 40 locations Rail at <10 locations <0.1km <sup>2</sup> of airport runway	Roads at 40 locations Rail at <10 locations <0.1km <sup>2</sup> of airport runway
Environmental designated areas (km <sup>2</sup> )	0	0	0
Designated cultural heritage sites	1	1	1
Agricultural land (km <sup>2</sup> )	1	2	2

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



**Figure 3: Impacts of flooding**

## History of flooding

- August 2005: Surface water flooding resulted in water ponding on the B9006 road, with vehicle waves causing damage to an adjacent private boundary wall.
- Flooding to the airport business park has been reported.

## Objectives to manage flooding in Potentially Vulnerable Area 01/19

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 Inverness Airport Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Inverness Airport	Reduce the physical risk, or disruption risk, related to areas of the A96 at risk of flooding	1305	<ul style="list-style-type: none"> <li>• 130m of road at 1 location of the A96</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £16,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £16,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/19

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 Inverness Airport 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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1305021)</b>		
<b>Objective (ID):</b>	Reduce the physical risk, or disruption risk, related to areas of the A96 at risk of flooding (1305)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2028-2033</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A96.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will be seeking to incorporate additional surface water hazard mapping information into the flood maps to improve understanding of flood risk. Approximately 2,100km <sup>2</sup> of improved data is currently available within this Local Plan District.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Findhorn, Nairn, Moray and Speyside' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>From 2016 SEPA will work towards raising awareness of flood risk through partnership activities with Transport Scotland and local infrastructure operators.</p> <p>Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

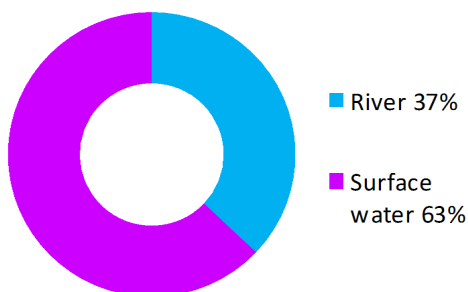
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

# Smithton and Culloden (Potentially Vulnerable Area 01/20)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Inverness coastal

## Summary of flooding impacts



### At risk of flooding

- 30 residential properties
- 10 non-residential properties
- £33,000 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>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	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

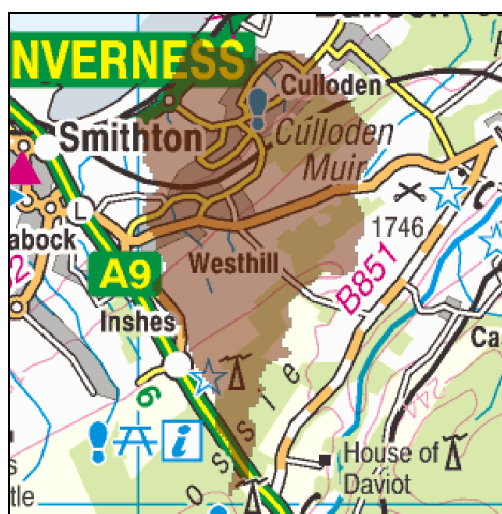
Actions

# Smithton and Culloden (Potentially Vulnerable Area 01/20)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Inverness coastal

## Background

This Potentially Vulnerable Area is approximately 14km<sup>2</sup>. It includes Smithton, Culloden and Westhill (shown below). The A96, A9 and B9006 pass through the area.

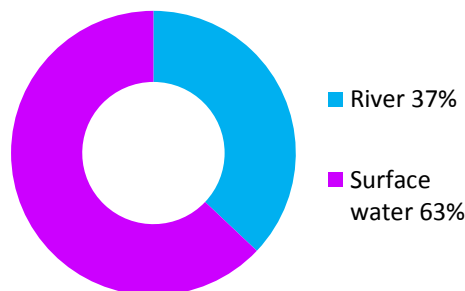


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There are a series of small rivers in this area. These generally flow north and discharge into the Moray Firth.

There are approximately 30 residential and 10 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £33,000 with the majority caused by surface water.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

Some of the smaller watercourses in Smithton and Culloden were not included in the assessment of river flooding due to their small catchment size. Flood risk from these burns is included in the assessment of surface water flooding. Considering historic flooding in Smithton and Culloden, it is likely that overall flood risk is currently underestimated.

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.

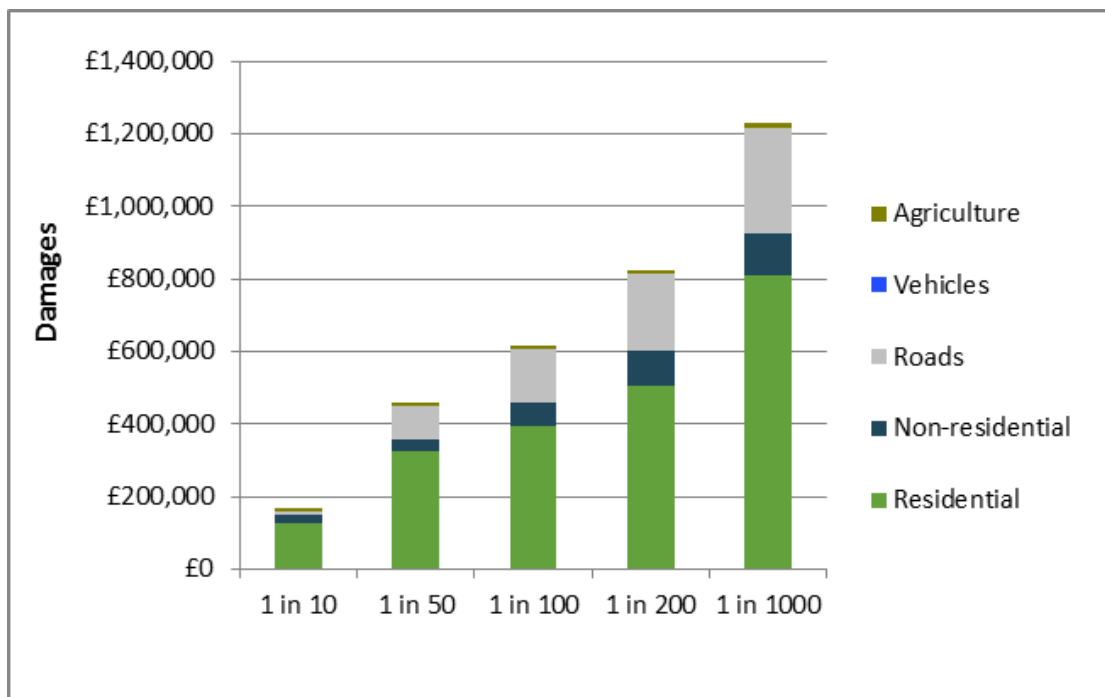
Roads, including the A96 and the A9, and both the Inverness to Aberdeen and the Inverness to Perth railway lines have a risk of flooding in several locations.

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 roads.

The location of the impacts of flooding is shown in Figure 3.

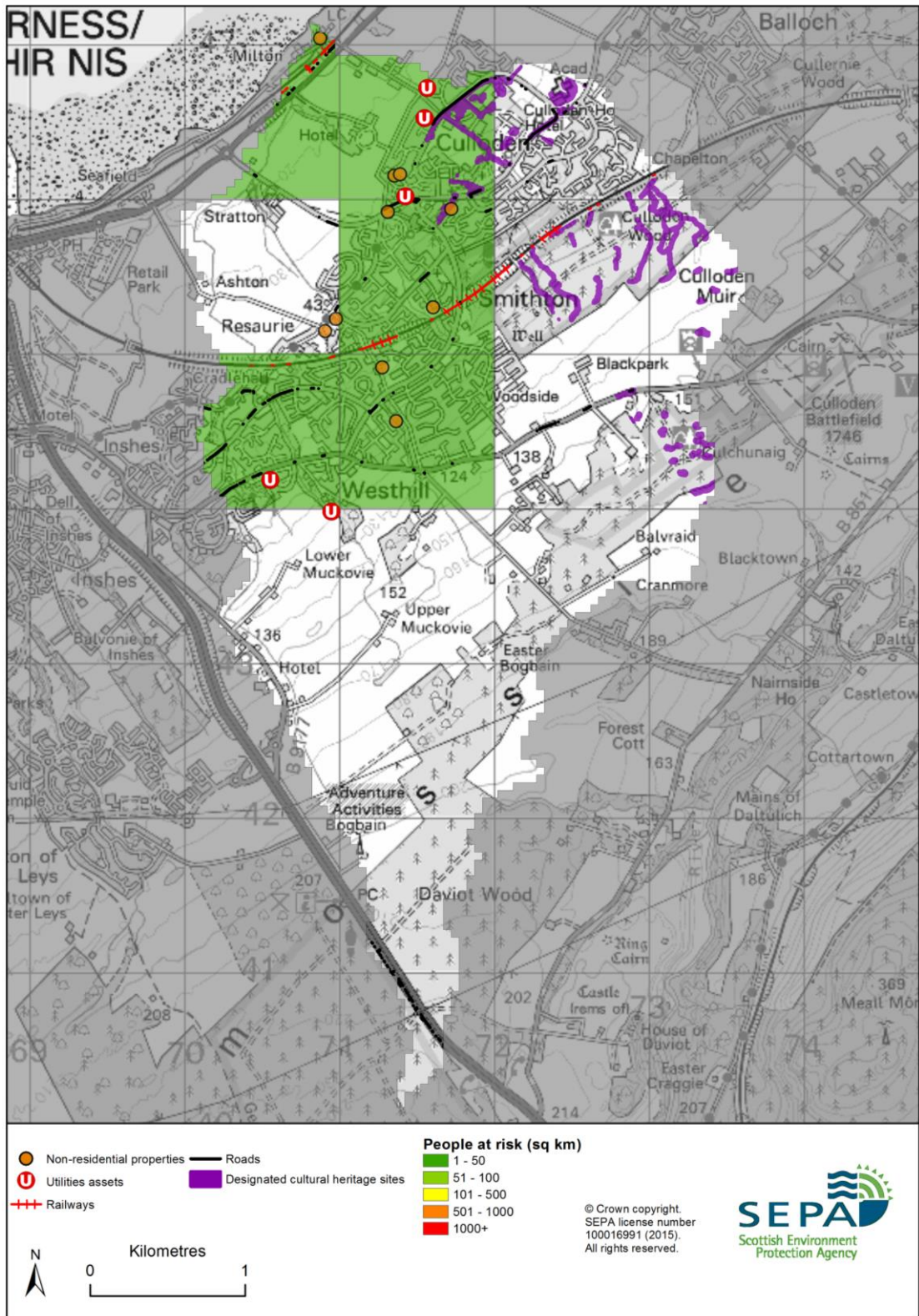
	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 4,600)	<10	30	40
Non-residential properties (total 180)	<10	10	10
People	20	60	80
Community facilities	0	0	0
Utilities assets	<10	<10	10
Transport links (excluding minor roads)	Roads at 40 locations Rail at 10 locations	Roads at 70 locations Rail at 10 locations	Roads at 80 locations Rail at 10 locations
Environmental designated areas (km <sup>2</sup> )	0	0	0
Designated cultural heritage sites	4	4	4
Agricultural land (km <sup>2</sup> )	0.1	0.1	0.2

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



**Figure 3: Impacts of flooding**



## History of flooding

There have been 12 recorded floods since 1993, including 2002, 2004, 2005, 2006, 2007 and 2011.

The sources of flooding include the Scretan Burn, a tributary of Cairnlaw Burn, a tributary of Culloden East Burn, Smithton Burn, Culloden Burn West, Culloden Burn South and Tower Burn. The flooding was exacerbated in many instances due to blockages of culverts with debris and gravel from bed and bank erosion during high flows.

## Objectives to manage flooding in Potentially Vulnerable Area 01/20

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 Smithton and Culloden Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Smithton and Culloden	Reduce risk from surface water flooding in Smithton and Culloden	102001	* See note below
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 30 residential properties</li> <li>• £33,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 30 residential properties</li> <li>• £33,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/20 there are 30 residential properties at risk and Annual Average Damages of £21,000.

## Actions to manage flooding in Potentially Vulnerable Area 01/20

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 Smithton and Culloden 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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1020010006)</b>		
<b>Objective (ID):</b>	Reduce risk from surface water flooding in Smithton and Culloden (102001)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:		Within local authority:
	<b>20 of 42</b>		<b>1 of 3</b>
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	The Smithton and Culloden Flood Protection Scheme is undergoing detailed design and consists of the replacement of culverts, sediment and debris management and temporary flood storage. The scheme will protect communities affected by flooding on a number of occasions in recent years and is being designed to a 1 in 200 year standard of protection including an allowance for climate change.		
<b>Potential impacts</b>			
<b>Economic:</b>	The proposed works would result in a potential reduction in flood risk to 132 residential properties and could potentially avoid damages of £19 million. The benefit cost ratio of the proposed works is 2.4.		
<b>Social:</b>	Approximately 290 people may directly benefit from the Smithton and Culloden Flood Protection Scheme. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people.		
<b>Environmental:</b>	Flood protection works can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. There is potential for impacts on habitats and changes to channel morphology. Opportunities to mitigate any environmental		

<b>Environmental:</b>	impacts should be identified as part of the study through the design and timing of works.
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<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (1020010018)</b>		
<b>Objective (ID):</b>	Reduce risk from surface water flooding in Smithton and Culloden (102001)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Ongoing</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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. 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.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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. The Potentially Vulnerable Area is within the 'Easter Ross and Great Glen' flood alert area.		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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. SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

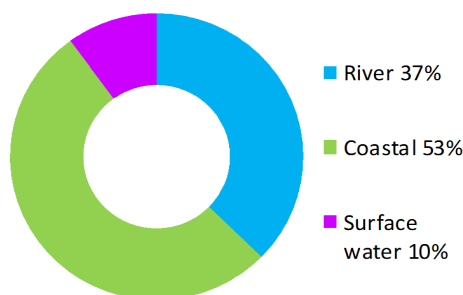
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>The Highland Council has two flood monitors in this area. One is on the Tower Burn and the other is on the Smithton Burn. Both monitors are in locations where culverts are prone to blockage. The flood monitors provide early warning of increasing water depths, which could lead to flooding.</p>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

# Inverness and the Great Glen (Potentially Vulnerable Area 01/21)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	River Ness Inverness coastal

## Summary of flooding impacts



### At risk of flooding

- 1,400 residential properties
- 380 non-residential properties
- £5.6 million 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>	Community flood action groups	<i>Property level protection scheme</i>	<i>Site protection plans</i>
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

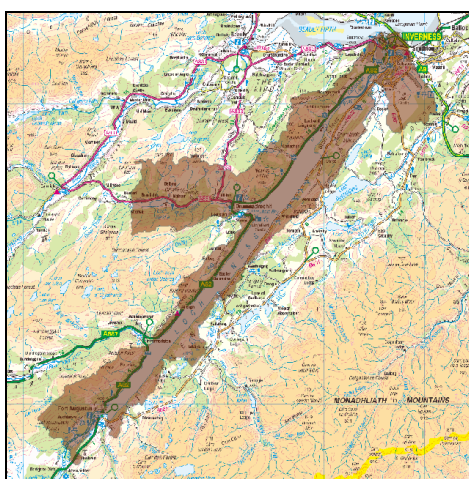
# Inverness and the Great Glen (Potentially Vulnerable Area 01/21)

Local Plan District	Local authority	Main catchments
Highland and Argyll	The Highland Council	River Ness, Inverness coastal

## Background

This Potentially Vulnerable Area is approximately 340km<sup>2</sup>. It covers the region between Inverness and Fort Augustus, including Drumnadrochit and the surrounding areas (shown below). The A887, A82, A831 and A833 pass through.

Loch Ness and the River Ness, flows from the north end of Loch Ness through Inverness.

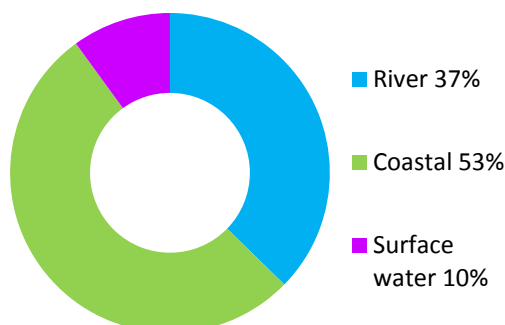


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The River Ness Flood Protection Scheme is located on the tidal section of the Ness and was completed in 2015. An estimated 800 residential and 190 non-residential properties benefit from this scheme. Further properties benefit from the Fort Augustus Flood Protection Scheme and the South West Inverness Flood Relief Channel.

There are approximately 1,400 residential and 380 non-properties at risk of flooding.

The Annual Average Damages are approximately £5.6 million with the majority caused by coastal flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

The River Ness (Tidal Section) Flood Protection Scheme 2015 and the South West Inverness Flood Relief Channel Flood Protection Scheme 2006 were designed for a 1 in 100 year flood plus an allowance for climate change. The Fort Augustus Flood Protection Scheme 1993 protects from a 1 in 25 year flood.

The assessment of flood risk presented in this report takes account of the protection provided by the schemes up to and including the design standard. No allowance is made for the residual benefits that the flood protection scheme provides for events which exceed this standard of protection. As a result the number of residential properties, non-residential properties and people reported to be at risk of river and coastal flooding in this area is considered to be overestimated. The Annual Average Damages from river and coastal flooding are also considered to be overestimated.



Coastal flood risk in the area is focussed on South Kessock and adjacent to the Muirtown Basin in Merkinch. There are areas of river flood risk in Inverness particularly those associated with the River Ness and the Mill Burn. River flood risk in Drumnadrochit is primarily from the River Enrich. There are areas of surface water flood risk spread throughout the area which is frequently associated with small, often culverted, watercourses in urban areas.

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 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 are seven assets identified as being at risk of flooding.

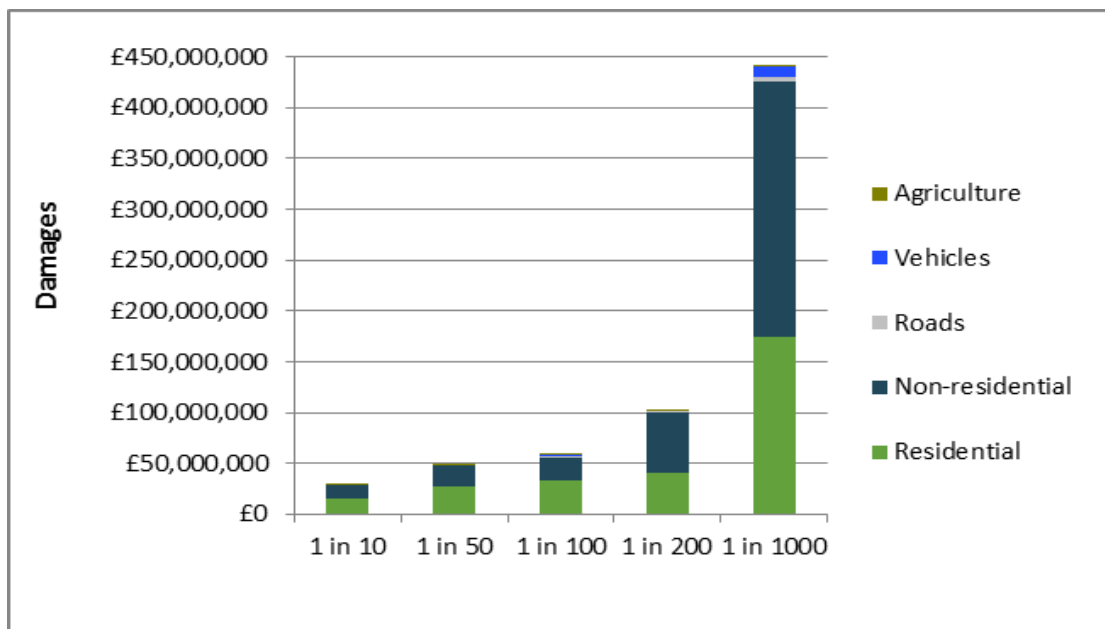
Roads at risk include the A82, A833, A831, B862 and B861. The Inverness to Aberdeen, Inverness to Perth, and Inverness to Wick railway lines are at risk of flooding in several locations. There are 46 designated cultural heritage sites, an area of environmental importance and agricultural land at risk.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to residential properties.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 24,000)	560	1,400	5,900
Non-residential properties (total 3,000)	120	380	1,300
People	1,200	3,100	13,000
Community facilities	0	<10 Includes; educational buildings and healthcare facilities	20 Includes; educational buildings, healthcare facilities and emergency services
Utilities assets	10	40	110
Transport links (excluding minor roads)	Roads at 270 locations Rail at <10 locations	Roads at 490 locations Rail at 10 locations	Roads at 730 locations Rail at 40 locations
Environmental designated areas (km <sup>2</sup> )	1	1	1
Designated cultural heritage sites	39	46	49
Agricultural land (km <sup>2</sup> )	3	4	4

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

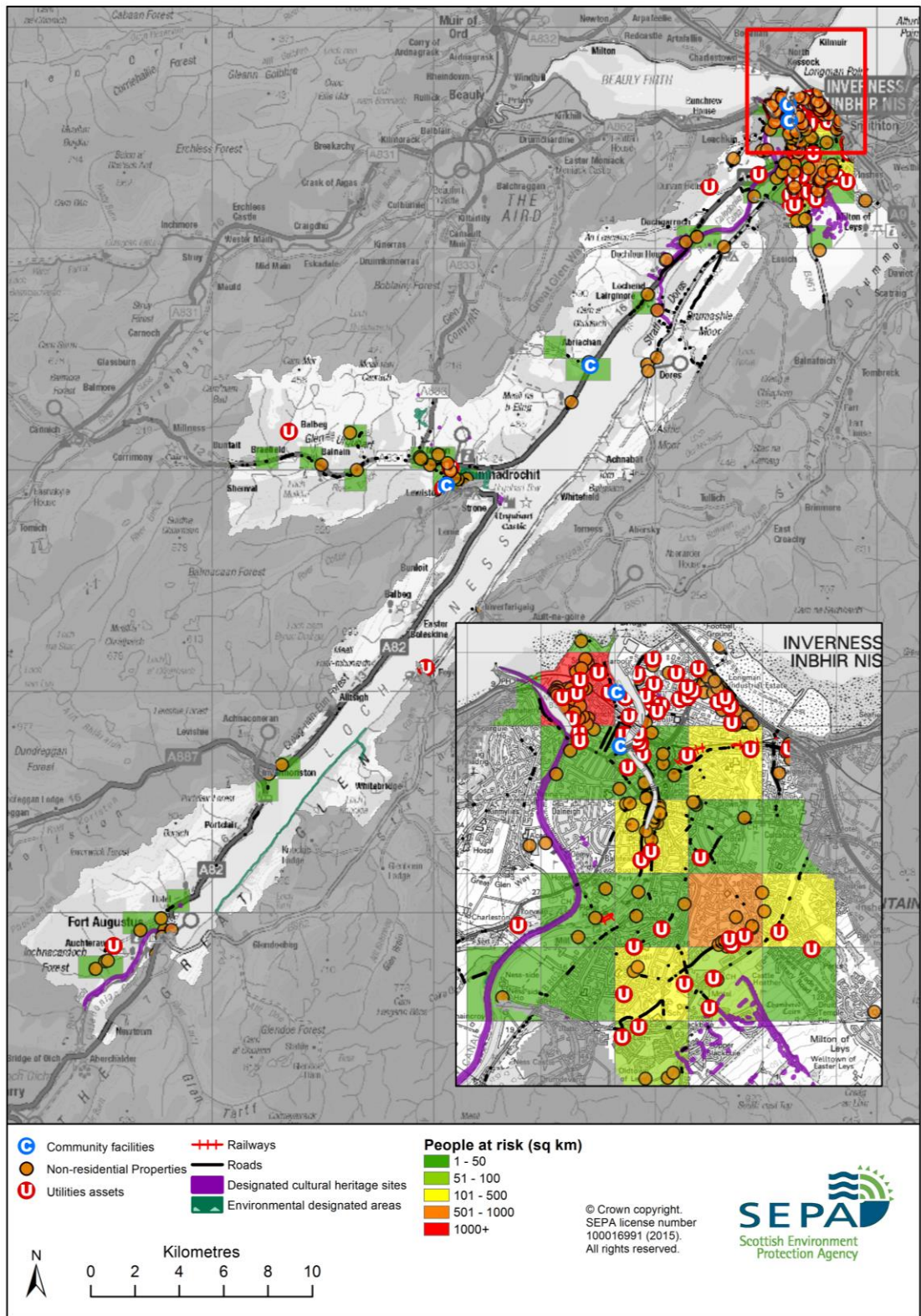


Figure 3: Impacts of flooding

## History of flooding

There have been numerous floods recorded in this Potentially Vulnerable Area.

### Inverness

The earliest recorded flood on the River Ness was in 1644. There are records of floods on the River Ness in 1815, 1834, 1845, 1846, 1856, 1860, 1863, 1868 (joint tidal event), 1869 (joint tidal event), 1873, 1874, 1875, 1878, 1880, 1886, 1892, 1894, 1895, 1903, 1928, 1949, 1956, 1962, 1966, 1989, 2005, 2006, 2007 and 2008.

The most damaging floods were in 1956 and 1989. Both were caused by the River Ness flooding in combination with high tides. These floods caused damages to property, roads and the railway line. The River Ness also flooded in 1990 and 2005 due to high river flows and high tides. The River Ness Flood Protection Scheme aims to reduce the risk during similar future events.

The Ault na Skiah system, which includes Lochardil Burn, Slackbuie Channel and other watercourses, had significant floods in 1989, 1997, 1998, 1999 and 2000. Damage was caused to property in Hilton, Lochardil, Castle Heather and Slackbuie areas of Inverness.

The Mill Burn had significant floods in 1989, 1997, 1998, 1999, 2000, 2006, 2011 and 2014. These floods caused damage to property in Old Edinburgh Road, Merlin Crescent, Falcon Avenue, Teal Avenue, Harris Road, Diriebught Road.

The Dell Burn flooded in 2002, mainly affecting the retail park.

### Drumnadrochit

The River Enrick in Glen Urquhart flooded in 1818 destroying three bridges, and again in 1829 along with the River Coiltie. A flood in 1892 destroyed five bridges on the River Enrick. Four bridges were lost in the 1950s and again in the early 1990s. There were floods in 1908, 1909, 1910, 1913, 1920, 1932 (including River Coiltie), 1950, 1956, 1990, 1993, 1994, 1997, 1999, 2000, 2006, and 2007. The Clunbeg bridge on the River Coiltie was also reported to be lost in the 1950s and 1990s. The 1990 flood also affected Kilmichael. Kilmichael was also reported to be affected by flooding in 2010, 2013 and 2015. Flooding has also been reported in Lewiston from the River Coiltie.

### Fort Augustus

Flooding occurred from the River Oich in 1849, 1966, 1989 and 1990. The flooding mainly affected the Riggs area of Fort Augustus.

## Objectives to manage flooding in Potentially Vulnerable Area 01/21

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 Inverness and the Great Glen Potentially Vulnerable Area.

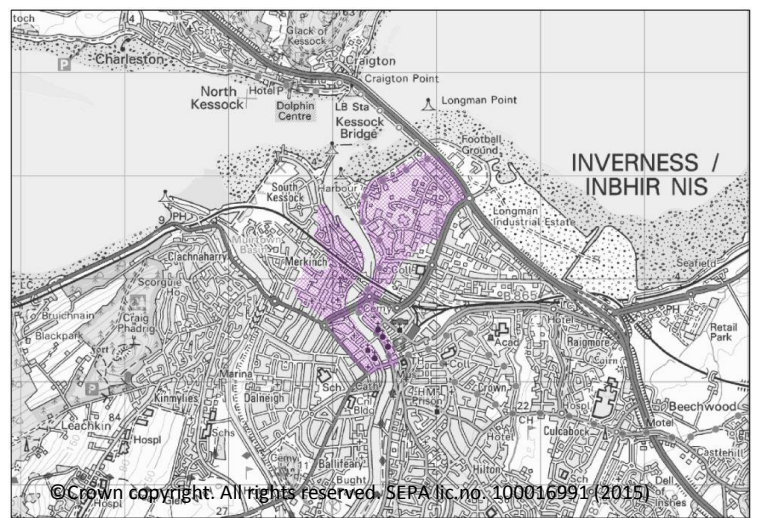
### Maintain the River Ness (Tidal) Flood Protection Scheme and accept existing levels of flood risk in the north of Inverness due to flooding from the River Ness, downstream of Ness Bridge, and the Moray Firth

Indicators:

Target area:

An estimated 790 residential properties and 200 non-residential properties will continue to be protected to a 1 in 100 year standard of protection (including an allowance for climate change)

Objective ID: 102101



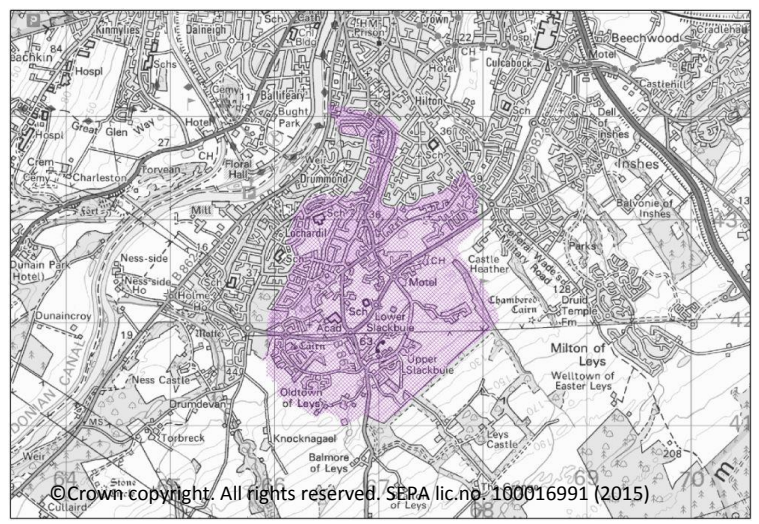
### Maintain the South West Inverness Flood Protection Scheme and accept existing levels of flood risk to properties in the south west of Inverness from various rivers

Indicators:

Target area:

An estimated 600 residential properties will continue to be protected to a 1 in 100 year standard of protection (including an allowance for climate change)

Objective ID: 102102



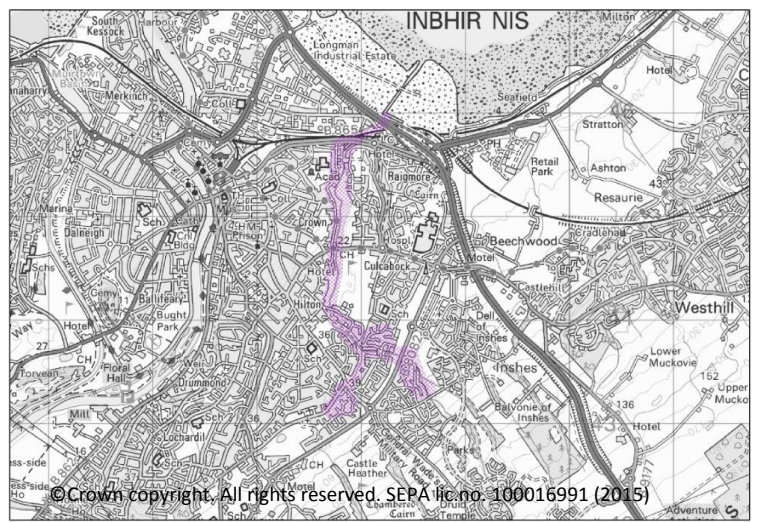
## Reduce flood risk in Inverness from the Mill Burn

Indicators:

Target area:

- 210 people
- £41,000 Annual Average Damages from residential properties
- £1,000 Annual Average Damages from non-residential properties

Objective ID: 102103



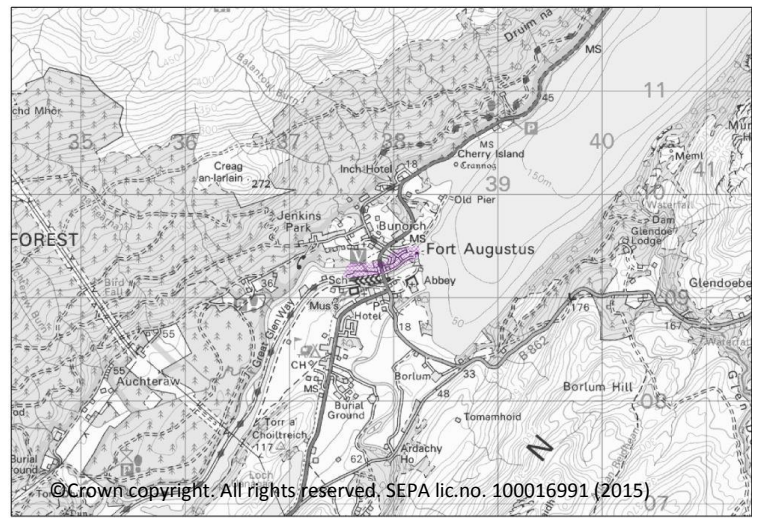
## Maintain the Fort Augustus Flood Protection Scheme and accept existing levels of flood risk in Fort Augustus

Indicators:

Target area:

An estimated 30 properties will continue to be protected to a 1 in 25 year standard of protection

Objective ID: 102104



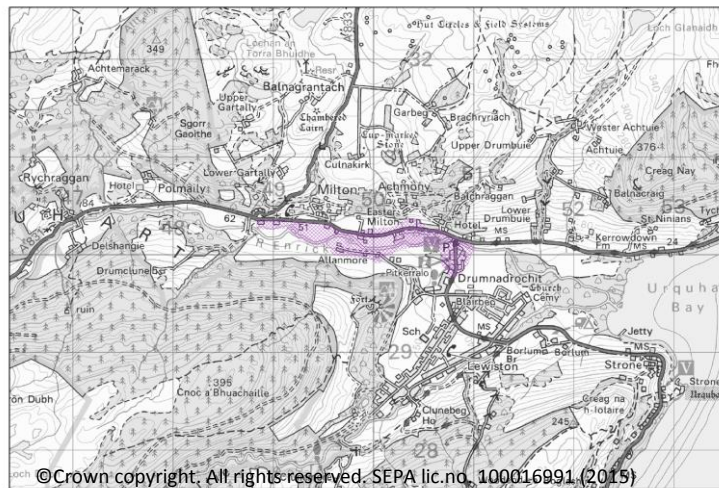
## Reduce flood risk in Drumnadrochit from the River Enrick

Indicators:

Target area:

- £46,000 Annual Average Damages from residential properties
- £850 Annual Average Damages from non-residential properties
- 1 emergency service

Objective ID: 102105



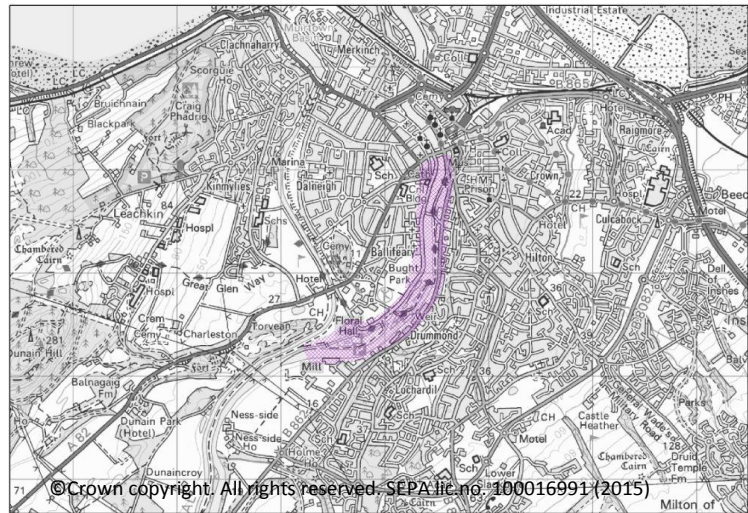
## Reduce flood risk in Inverness from the River Ness between Ness Bridge and Ness Islands

Indicators:

Target area:

- 250 people
- £98,000 Annual Average Damages from residential properties
- £65,000 Annual Average Damages from non-residential properties

Objective ID: 102106

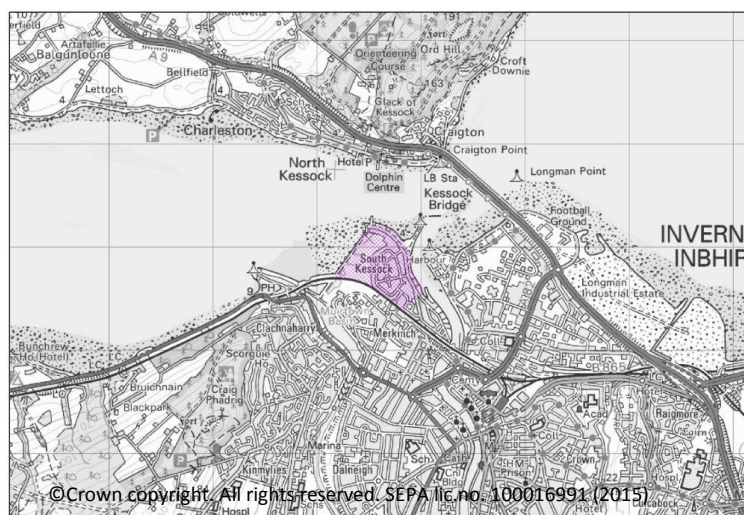


## Reduce risk in the South Kessock area of Inverness from coastal flooding

Indicators:

Target area:

- 930 people
- £830,000 Annual Average Damages from residential properties
- £73,000 Annual Average Damages from non-residential properties



Objective ID: 102107

Target area	Objective	ID	Indicators within PVA
Inverness	Reduce risk from surface water flooding in Inverness	102109	* See note below
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 1,400 residential properties</li> <li>• £5.6 million Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 1,400 residential properties</li> <li>• £5.6 million Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/21 there are 440 residential properties at risk and Annual Average Damages of £560,000.



## Actions to manage flooding in Potentially Vulnerable Area 01/21

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 Inverness and the Great Glen Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	<i>Natural flood management works</i>	<i>New flood warning</i>	Community flood action groups	<i>Property level protection scheme</i>	<i>Site protection plans</i>
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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1021050021)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Drumnadrochit from the River Enrick (102105)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:		Within local authority:
	<b>31 of 42</b>		<b>3 of 3</b>
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A flood protection scheme in the form of direct defences is under development for Drumnadrochit to reduce flood risk from the River Enrick. The scheme is being designed to a standard of 1 in 200 years. The scheme will be complemented by further investigations of the potential for natural flood management on the tributaries upstream of Drumnadrochit.		
<b>Potential impacts</b>			
<b>Economic:</b>	A flood protection scheme could reduce the impact of the flooding of 18 residential and 6 non-residential properties. Estimated damages avoided of £1 million could potentially be achieved. The benefit cost ratio of the proposed works is 1.44		
<b>Social:</b>	Approximately 40 people at risk of flooding may directly benefit from flood protection works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. There are potential visual and access impacts for the community, reducing their connection to the watercourse. An emergency services facility may also benefit from flood protection works, along with roads including a key transport route (the A831) and a telecommunications utility site which could reduce disruption to the wider community.		

<b>Environmental:</b>	Flood protection works can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. There is potential for impacts on habitats and changes to channel morphology. Opportunities to mitigate any environmental impacts should be identified as part of the study through the design and timing of works. To be in accord with the FRM Strategy, the responsible authority (and where applicable, the licensing authority) should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the North Inverness Lochs Special Protection Area and Urquhart Bay Wood Special Area of Conservation. The flood protection works would be located outside of the Urquhart Bay Wood Site of Special Scientific Interest and unlikely to have any significant impacts.
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<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1021030006)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Inverness from the Mill Burn (102103)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Flood protection works are under development to reduce flood risk from the Mill Burn. The works are likely to be designed to a 1 in 200 year standard of protection, including an allowance for climate change. The design is to be finalised and may include a combination of flood walls and sheet piling, embankments and a culvert upgrading. Progressing the scheme is subject to obtaining a satisfactory business case for the preferred design including economic and environmental factors.		
<b>Potential impacts</b>			
<b>Economic:</b>	The scheme could reduce flood risk to 275 residential properties, and avoid damages of £4 million. The benefit-cost ratio of the proposed works is 1.1.		
<b>Social:</b>	The development of flood protection works could potentially reduce risk to an estimated 605 people. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people.		
<b>Environmental:</b>	Flood protection works can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. There is potential for impacts on habitats and changes to channel morphology. Opportunities to mitigate any environmental impacts or should be identified as part of the study through the design and timing of works. Mill Burn (water body ID 20239) is located within the study area and has been identified by SEPA to be at less than good physical condition. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1021070005)</b>		
<b>Objective (ID):</b>	Reduce risk in the South Kessock area of Inverness from coastal flooding (102107)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>8 of 168</b>	<b>1 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A study is needed to assess the standard of protection of existing embankments and whether they need to be improved. The study should consider wave action and combined flooding from the River Ness and Moray Firth. The study should build on existing information available.		
<b>Potential impacts</b>			
<b>Economic:</b>	The flood protection study should consider how to improve flood protection to 422 residential and 24 non-residential properties. Potential damages avoided of up to £28 million could be achieved. It is likely that these damages avoided are over-estimated and the study should look to confirm the benefits provided by existing embankments.		
<b>Social:</b>	Improved understanding of the flood extents will confirm the number of properties at risk in South Kessock from coastal flooding along the western frontage of Inverness. Currently it is estimated that 930 people benefit from the existing embankments. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Negative impacts through disturbance to the local community during the construction phase should be considered.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the Moray Firth Special Area of Conservation and Inner Moray Firth Special Protection Area.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1021060005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Inverness from the River Ness between Ness Bridge and Ness Islands (102106)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>88 of 168</b>	<b>6 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>

<b>Description:</b>	The Upper Ness scheme was previously developed to Planning and Flood Prevention Order stage, but not progressed to construction due to public objections and a weak business case. It is recommended that the previously proposed scheme is reviewed. Other actions may also be considered to develop the most sustainable range of options.
<b>Potential impacts</b>	
<b>Economic:</b>	The business case for flood protection works will need to be developed further as part of the study to fully justify flood protection works. Flood protection works could reduce the impact of flooding to 113 residential and 49 non-residential properties, with potential damages avoided of up to £3.9 million.
<b>Social:</b>	Approximately 249 people may directly benefit from flood protection works. The communities of Inverness which may benefit from River Ness (Non-Tidal) Flood Prevention Scheme have a slightly higher than average proportion of vulnerable residents. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. There may also be benefits for local roads and an energy production/electricity utility site, which may reduce disruption to the wider community. In addition there may be reduced flooding to amenities, including public open spaces and the miniature railway. There are potential visual and access impacts for the community, reducing their connection to the watercourse. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on habitats and changes to channel morphology. There is potential for impacts on the Inverness Riverside conservation area. The flood protection works would be outside of the Torvean Landforms Site of Special Scientific Interest, and there are unlikely to be any significant impacts. The physical condition of the River Ness (water body ID 23394) 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.

<b>Action (ID):</b>	<b>NATURAL FLOOD MANAGEMENT STUDY (1021050003)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Drumnadrochit from the River Enrick (102105)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A study is recommended to investigate options for the use of natural flood management actions to help reduce flood risk for Drumnadrochit in high likelihood floods. The study should build on the work previously carried out by the Glen Urquhart Land Use Partnership and should cover the full range of runoff control		

	measures, the use of floodplain and riparian woodland, and large woody debris and boulders in the tributaries of the River Enrick to slow their flow (river or floodplain restoration action), and sediment management. Other natural flood management actions may also be considered in order to develop the most sustainable range of options. The study should look to confirm the extent and type of measures required and the business case for natural flood management works. This study should be complimentary to the flood protection works in Drumnadrochit to ensure a coordinated response to the flood risk is developed.
<b>Potential impacts</b>	
<b>Economic:</b>	There are seven residential properties at high risk of flooding. It is not possible to estimate the potential benefits of natural flood management actions at this stage and the potential benefits should be identified as part of the study.
<b>Social:</b>	Approximately 15 people at high risk of flooding may directly benefit from natural flood management works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. In addition roads, including the A831, may also benefit from reduced flood risk, reducing disruption to the wider community. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	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. Opportunities to mitigate any environmental impacts may include design and timing of works. Natural flood management actions are likely to improve the ecological quality of the river, helping to restore it to a more natural state. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the North Inverness Lochs Special Protection Area and Urquhart Bay Wood Special Area of Conservation. There is potential for direct impacts on the Dubh Lochs Site of Special Scientific Interest. The area of potential for runoff reduction is known as the Balmacaan Forest however there is currently no woodland there; there may be historical significance to its clearance and therefore potential for impacts from this action.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (1021090018)</b>		
<b>Objective (ID):</b>	Reduce risk from surface water flooding in Inverness (102109)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Ongoing</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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. 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.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will be seeking to incorporate additional surface water hazard mapping information into the flood maps to improve understanding of flood risk. Approximately 2,100km <sup>2</sup> of improved data is currently available within this Local Plan District.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (1021010017)</b>		
<b>Objective (ID):</b>	Maintain the River Ness (Tidal) Flood Protection Scheme and accept existing levels of flood risk in the north of Inverness due to flooding from the River Ness, downstream of Ness Bridge, and the Moray Firth (102101)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	The River Ness (Tidal) Scheme was completed in 2015. The scheme provides protection to infrastructure, property and the community in the tidal section of the River Ness in Inverness. The scheme should be maintained to ensure the current level of protection continues.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (1021020017)</b>		
<b>Objective (ID):</b>	Maintain the South West Inverness Flood Protection Scheme and accept existing levels of flood risk to properties in the south west of Inverness from various rivers (102102)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	The South West Inverness Flood Relief Channel was completed in 2006. The scheme provides protection to infrastructure, property and the community in South West Inverness and should be maintained to ensure the current level of protection continues.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (1021040017)</b>		
<b>Objective (ID):</b>	Maintain the Fort Augustus Flood Protection Scheme and accept existing levels of flood risk in Fort Augustus (102104)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	The Fort Augustus Flood Prevention Scheme on the River Oich was completed in 1994. The scheme provides protection to infrastructure, property and the community in Fort Augustus and should be maintained to ensure the current level of protection continues.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Continue to maintain the 'Drumnadrochit', 'Glen Urquhart', 'Invermoriston', 'Ness-side' and 'The Riggs, Fort Augustus' flood warning areas which are part of the Ness river flood warning scheme and provide warnings to low lying land, roads and properties.</p> <p>Continue to maintain the 'Inverness City (Ness Bridge to Friars Bridge)', which takes into account river and tidal interactions, and the 'Inverness Harbour and South Kessock' flood warning areas. Both are part of the Moray Firth coastal flood warning scheme.</p>		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Easter Ross and Great Glen' flood alert area.</p>		

<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (1021050012)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Drumnadrochit from the River Enrick (102105)		
<b>Delivery lead:</b>	Community		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>The Glen Urquhart Land Use Partnership (GULUP) is a voluntary, non-profit, community-led limited company which has been in existence for over ten years. It seeks to give the local community a voice in determining and sustainably developing the long term economic and environmental goals for the area (including flood risk) and will work in partnership with any interested organizations to this end.</p>		



<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

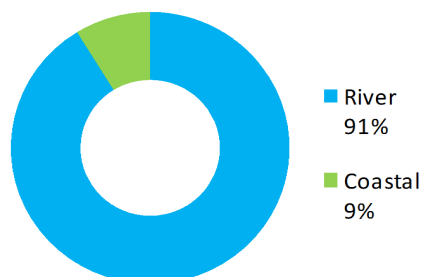
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>The Highland Council has a flood monitor on the River Ness at Greg Street Bridge to provide early warning of potential flooding.</p>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Lochailort (Potentially Vulnerable Area 01/22)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Ardnamurchan coastal

### Summary of flooding impacts



#### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £14,000 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

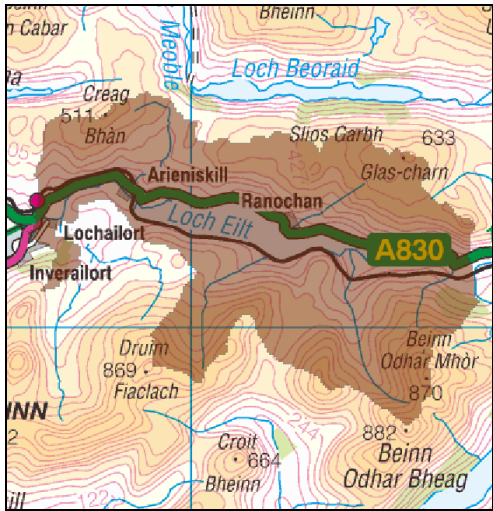
# Lochailort (Potentially Vulnerable Area 01/22)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Ardnamurchan coastal

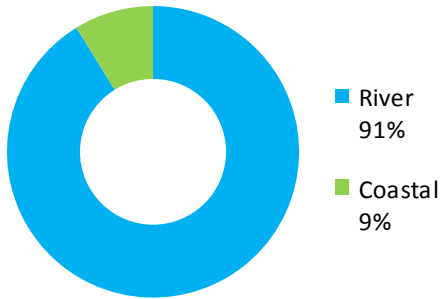
## Background

This Potentially Vulnerable Area covers the mainly rural area surrounding Loch Eilt, including Lochailort, Arieniskill and Ranochan (shown below). It is approximately 38km<sup>2</sup>.

The main river in the area is the River Ailort which connects Loch Eilt to the sea at Loch Ailort. There are fewer than 10 residential and non-residential properties at risk of flooding.



The Annual Average Damages are approximately £14,000 with the majority caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

## Summary of flooding impacts

Loch Eilt is fed by multiple tributaries, which drain the steep hillsides surrounding the loch. The tributaries with the greatest flood risk are the Allt Raineachan, Allt Easain, and the Allt a Bhuidhe Choire. In addition, Lochailort is at risk of flooding from the River Ailort.

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.

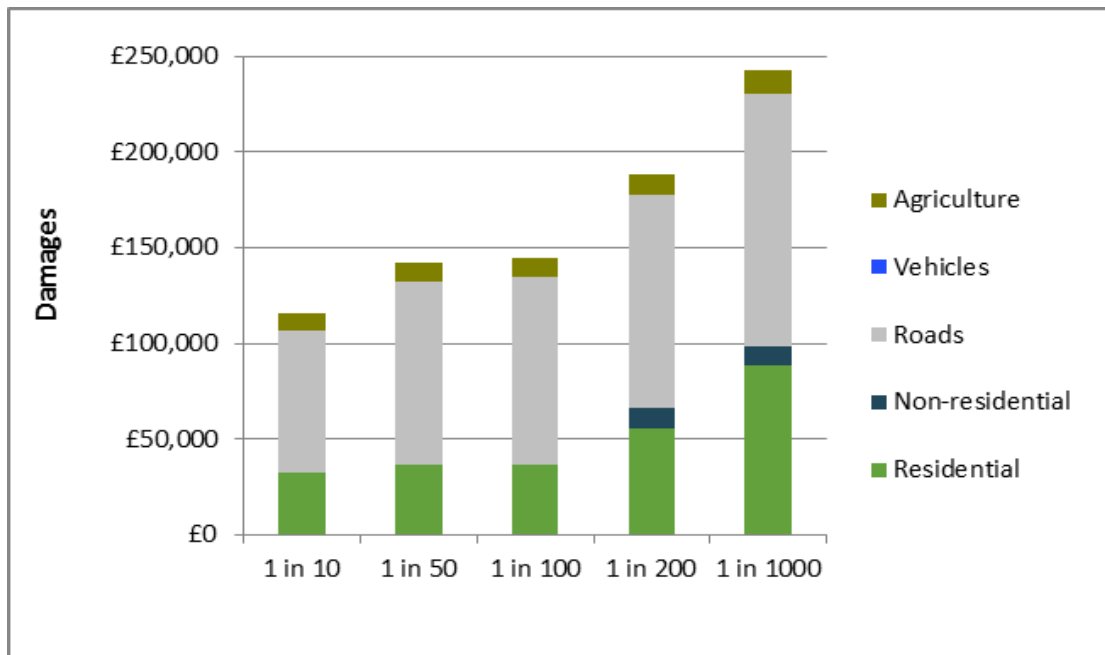
The A830 and A861 roads and parts of the Fort William to Mallaig railway are at risk of flooding. Small areas of the Moidart and Ardgour Site of Special Scientific Interest are also at risk.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to roads and residential properties.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 20)	<10	<10	<10
Non-residential properties (total <10)	<10	<10	<10
People	<10	<10	<10
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 10 locations Rail at 10 locations	Roads at 10 locations Rail at 10 locations	Roads at 10 locations Rail at 10 locations
Environmental designated areas (km <sup>2</sup> )	0.5	0.6	0.6
Designated cultural heritage sites	0	0	0
Agricultural land (km <sup>2</sup> )	0.5	0.6	0.7

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

## History of flooding

There are records of sporadic floods to Lochailort prior to the construction of the A861.

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

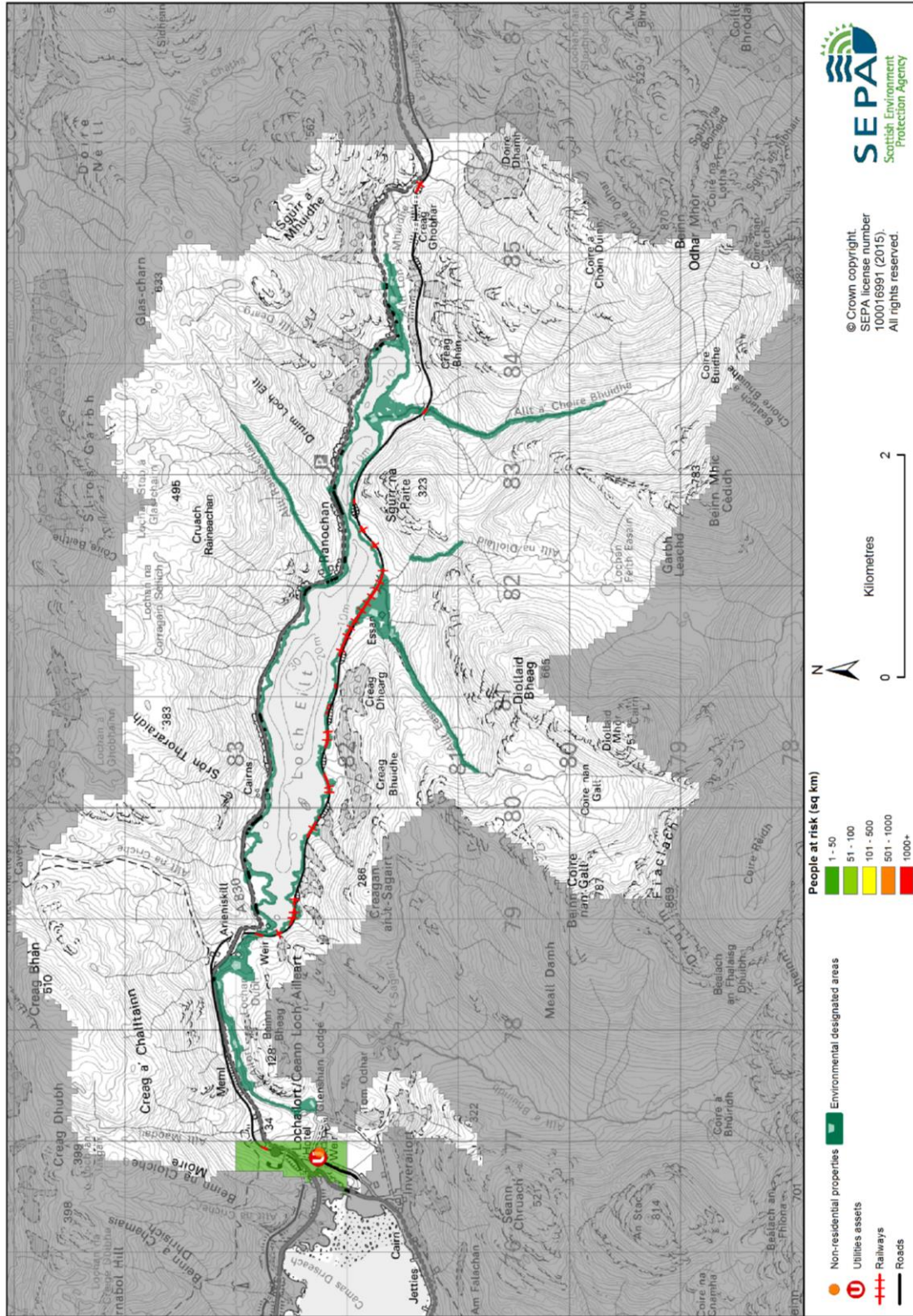


Figure 3: Impacts of flooding

## Objectives to manage flooding in Potentially Vulnerable Area 01/22

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 Lochailort Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Lochailort	Reduce the physical or disruption risk related to the transport network for roads	1306	<ul style="list-style-type: none"> <li>• 3 locations on the A830 with a total length of 410m</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £14,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £14,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/22

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 Lochailort Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1306021)</b>		
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for roads (1306)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A830.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Skye and Lochaber' flood alert area.</p>		



<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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 communities and promote Floodline using most the appropriate mix of methods for the area. These could include direct mailings, education activities, participation in local events and relevant flooding messages in the media. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

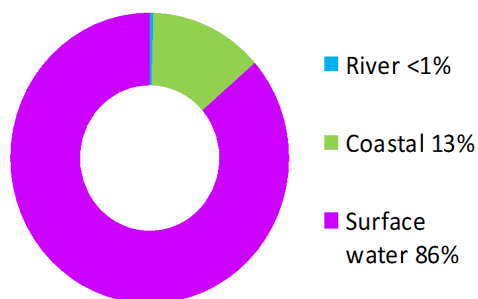
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Corpach (Potentially Vulnerable Area 01/23)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Ardgour coastal

### Summary of flooding impacts



### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £94,000 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

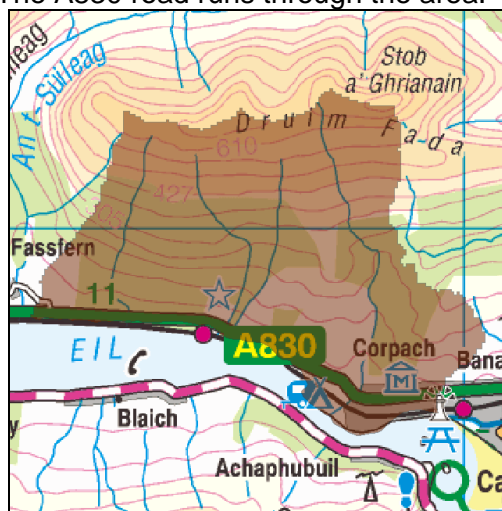
## Corpach (Potentially Vulnerable Area 01/23)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Ardgour coastal

### Background

This Potentially Vulnerable Area is located on the north shore of Loch Eil and includes the west part of Corpach (shown below). It is approximately 27km<sup>2</sup>.

The A830 road runs through the area.

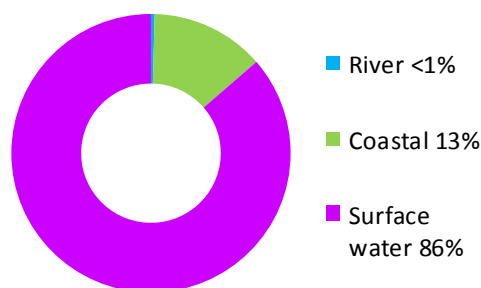


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The main river is the Allt Dogha.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are approximately £94,000 with the majority caused by surface water flooding.



**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

Coastal flood risk affects the frontage along Loch Eil in Corpach. Surface water flood risk also affects Corpach, the A830 road and sections of the Fort William to Mallaig railway line.

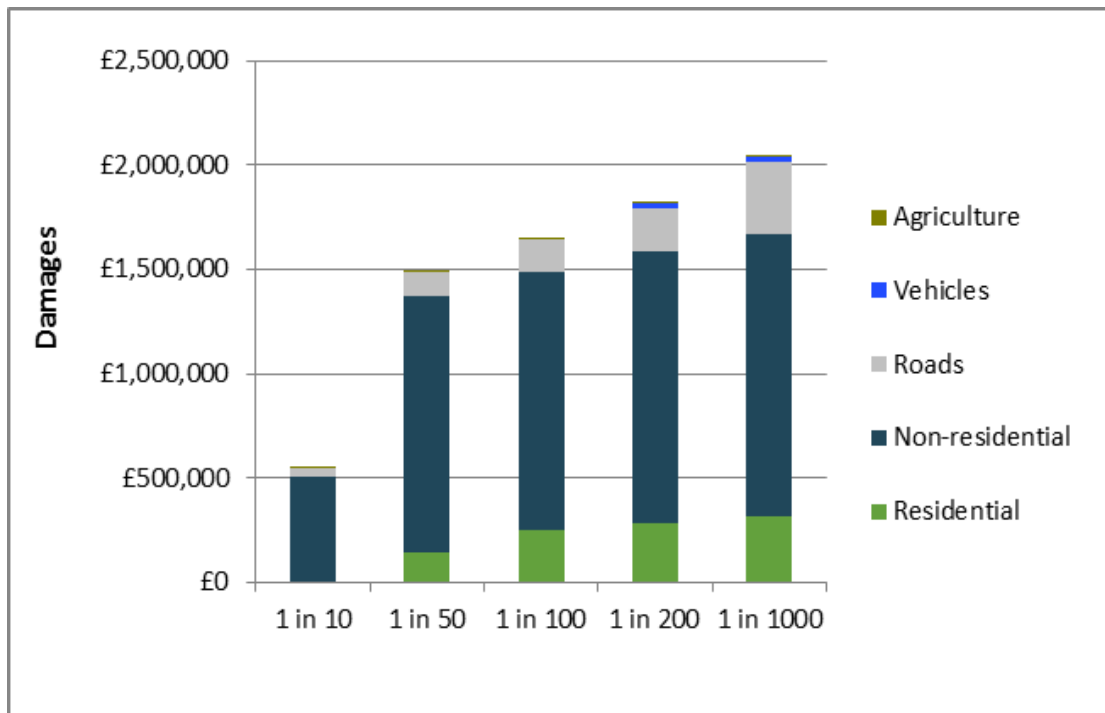
The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential properties.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 370)	<10	<10	<10
Non-residential properties (total 60)	<10	<10	<10
People	<10	10	10
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations Rail at 10 locations	Roads at 20 locations Rail at 20 locations	Roads at 20 locations Rail at 30 locations
Environmental designated areas (km <sup>2</sup> )	0	0	0
Designated cultural heritage sites	0	0	0
Agricultural land (km <sup>2</sup> )	0.1	0.1	0.2

**Table 1:** Summary of flooding impacts<sup>1</sup>

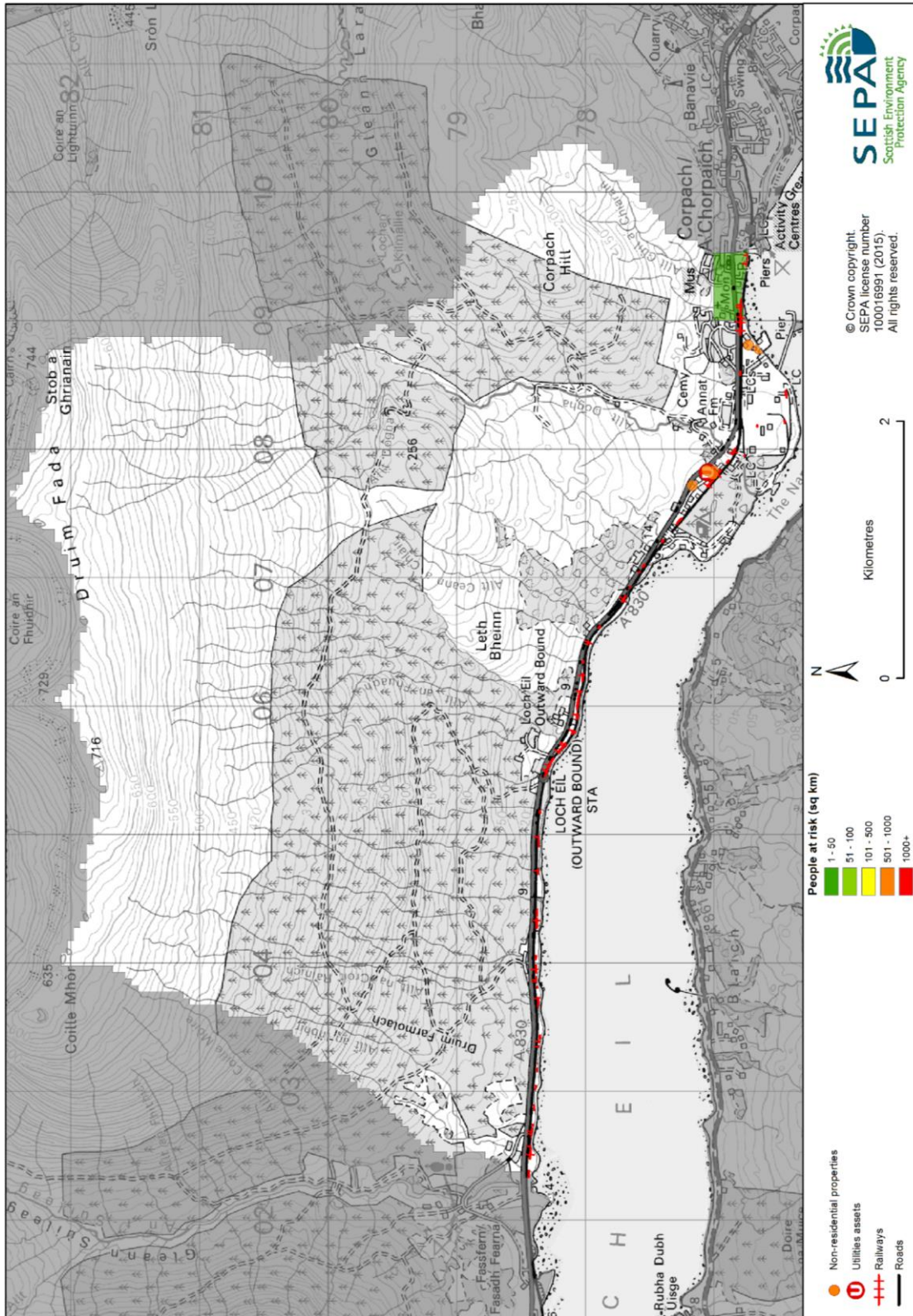


**Figure 2:** Damages by flood likelihood

## History of flooding

In January 2005 there was a storm surge on Loch Linnhe, which caused localised flooding. Minor river and surface water flooding occurred in 2001, 2009, and 2010 affecting roads but not property.

<sup>1</sup> 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 01/23

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 Corpach Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Corpach	Reduce the physical or disruption risk related to the transport network for roads	1307	<ul style="list-style-type: none"> <li>• 14 locations on the A830 with a total length of 440m</li> </ul>
Corpach	Reduce risk from surface water flooding in Corpach	102305	* See note below
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £94,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £94,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/23 there are <10 residential properties at risk and Annual Average Damages of £82,000.

## Actions to manage flooding in Potentially Vulnerable Area 01/23

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 Corpach 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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1307021)</b>		
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for roads (1307)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A830.		

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (1023050018)</b>		
<b>Objective (ID):</b>	Reduce risk from surface water flooding in Corpach (102305)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Ongoing</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		



<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Corpach and Caol' coastal flood warning area which is part of the Firth of Lorn and Loch Linnhe coastal flood warning scheme. This flood warning area also benefits properties in Lochybridge.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Skye and Lochaber' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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. SEPA will engage with communities and promote Floodline using most the appropriate mix of methods for the area. These could include direct mailings, education activities, participation in local events and relevant flooding messages in the media. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

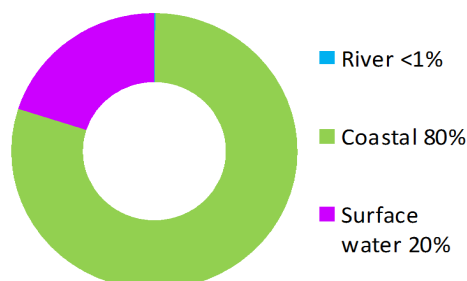
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Caol and Inverlochry (Potentially Vulnerable Area 01/24)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Fort William coastal

### Summary of flooding impacts



#### At risk of flooding

- 170 residential properties
- 40 non-residential properties
- £250,000 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

# Caol and Inverlochy (Potentially Vulnerable Area 01/24)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Fort William coastal

## Background

This Potentially Vulnerable Area is approximately 7km<sup>2</sup>. It is located immediately to the north of Fort William. It includes Banavie, Caol and east Corpach (shown below). The A830 and A82 pass through the area.

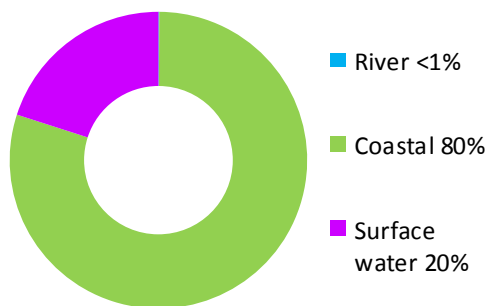


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The main watercourses are the River Lochy and the Caledonian Canal.

There are approximately 170 residential and 40 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £250,000 with the majority caused by coastal flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

Coastal flood risk affects the communities of Caol and Inverlochy including the tidal section of the River Lochy.

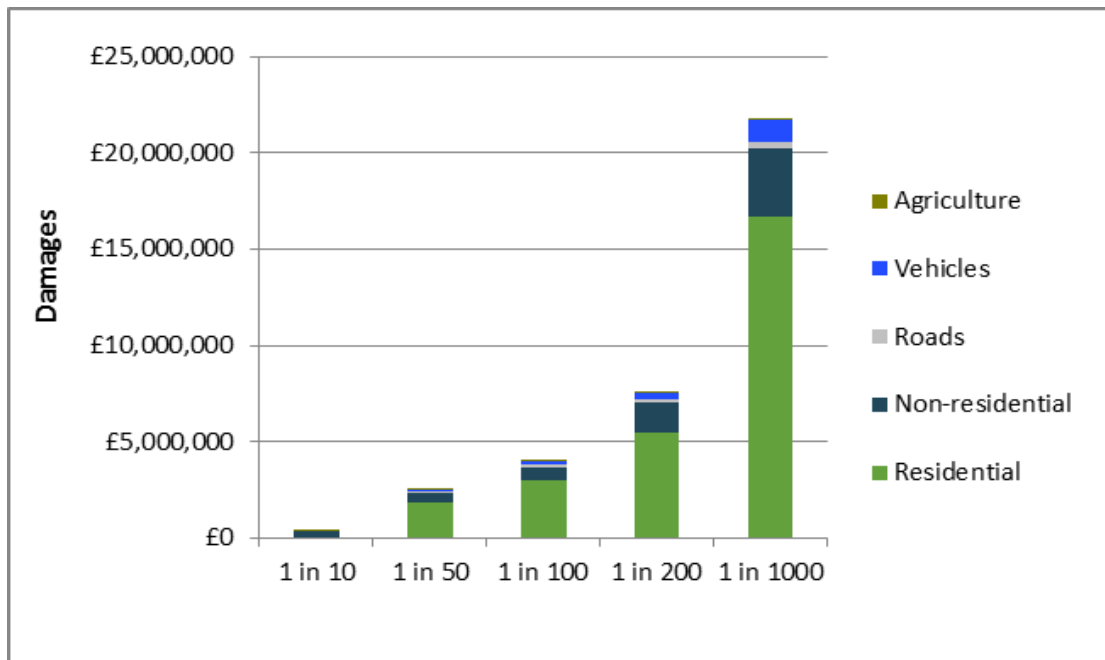
The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. A nursing home and a school are at risk of flooding. Roads potentially affected by flooding include the A830, B8004 and B8006. The Fort William to Mallaig and Fort William to Crianlarich railway lines are at risk of flooding in several locations. There are 14 designated cultural heritage sites at risk.

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.

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. The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 2,100)	<10	170	440
Non-residential properties (total 290)	20	40	70
People	<10	370	970
Community facilities	<10 Healthcare facilities	<10 Includes; healthcare facilities and educational buildings	<10 Includes; healthcare facilities, educational buildings and emergency services
Utilities assets	<10	10	10
Transport links (excluding minor roads)	Roads at 10 locations Rail at 30 locations	Roads at 30 locations Rail at 50 locations	Roads at 50 locations Rail at 70 locations
Environmental designated areas (km <sup>2</sup> )	0	0	0
Designated cultural heritage sites	13	14	15
Agricultural land (km <sup>2</sup> )	0.3	0.5	0.7

**Table 1:** Summary of flooding impacts<sup>1</sup>

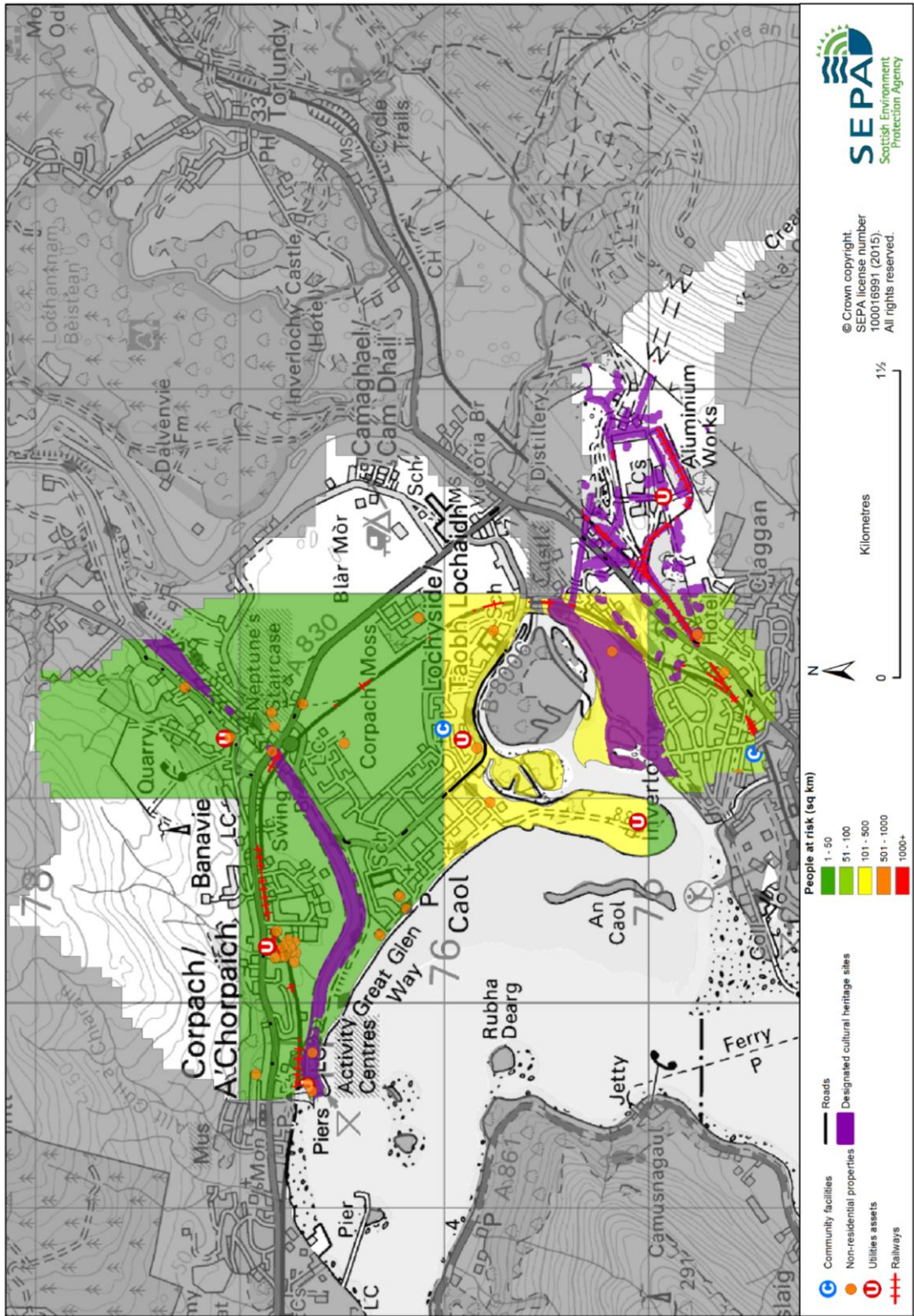


**Figure 2:** Damages by flood likelihood

## History of flooding

Since 2001 there have been five surface water floods. In January 2005 there was a storm surge on Loch Linnhe, which caused localised flooding.

<sup>1</sup> 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 01/24

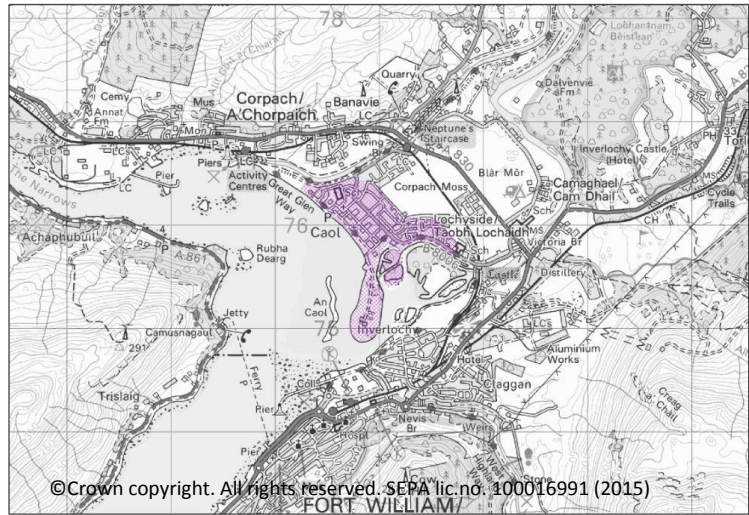
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

### Reduce flood risk in Caol from Loch Linnhe

Indicators:

- 340 people
- £150,000 Annual Average Damages from residential properties
- 1 educational building
- 1 nursing home
- 1 emergency service

Target area:



Objective ID: 102401



Target area	Objective	ID	Indicators within PVA
Caol and Inverlochy	Reduce risk from surface water flooding in Caol and Inverlochy	102407	* See note below
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 170 residential properties</li> <li>• £250,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 170 residential properties</li> <li>• £250,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/24 there are <10 residential properties at risk and Annual Average Damages of £51,000.

## Actions to manage flooding in Potentially Vulnerable Area 01/24

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 Caol and Inverloch 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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1024010006)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Caol from Loch Linnhe (102401)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:		Within local authority:
	<b>23 of 42</b>		<b>2 of 3</b>
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	The Caol Flood Protection Scheme is undergoing detailed design work with a 1 in 200 year standard of protection, including an allowance for climate change. The scheme includes sections of embankments, sheet piled and concrete retaining walls, and rock armour revetments along the embankment to reduce wave overtopping and protect against erosion.		
<b>Potential impacts</b>			
<b>Economic:</b>	The Caol Flood Protection Scheme could reduce flood risk to 274 residential and 23 non-residential properties, and avoid damages of £12.2 million. The benefit-cost ratio of the proposed works is 1.97.		
<b>Social:</b>	Approximately 600 people may directly benefit from the Caol Flood Protection Scheme. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. In addition two energy production/electricity utility sites and some sections of road (including B8006) may also benefit from this scheme. There are potential visual and access impacts for the community, reducing their connection to the loch and reducing the amenity value of the foreshore. Mitigation for these impacts will be considered during the detailed design, with the design of the scheme being sympathetic to the existing landscape.		

<b>Environmental:</b>	Flood protection works can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. There is potential for impacts on coastal habitats through increased erosion and disruption of natural processes, and impacts on landscape through disruption of views of the loch and foreshore. One scheduled monument may be affected by the works and the works will therefore require sensitive design. There are no nearby environmentally designated sites which could be impacted. The detailed design should consider how to avoid or minimise potential negative effects, and incorporate appropriate mitigation measures. An environmental impact assessment will be carried out during the detailed design, and provided as part of the planning application.
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<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (1024070018)</b>		
<b>Objective (ID):</b>	Reduce risk from surface water flooding in Caol and Inverlochry (102407)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Ongoing</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Continue to maintain the 'Corpach and Caol' coastal flood warning area which is part of the Firth of Lorn and Loch Linnhe coastal flood warning scheme. This flood warning area also benefits properties in Lochybridge.</p> <p>Continue to maintain the 'Lochybridge' flood warning area which is part of the Lochy river flood warning scheme. This flood warning area provides warnings for properties in Lochybridge as well as low lying farmland and access tracks along the River Lochy.</p>		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Skye and Lochaber' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>From 2016 SEPA will engage with communities and promote Floodline using most the appropriate mix of methods for the area. These could include direct mailings, education activities, participation in local events and relevant flooding messages in the media. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

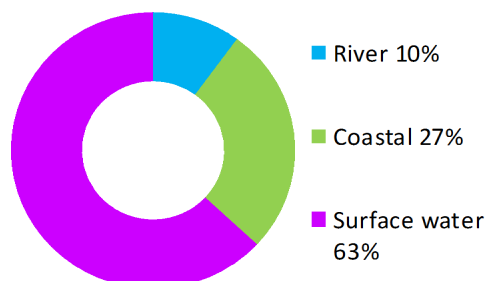
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Fort William (Potentially Vulnerable Area 01/25)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Appin coastal

### Summary of flooding impacts



### At risk of flooding

- 100 residential properties
- 80 non-residential properties
- £520,000 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

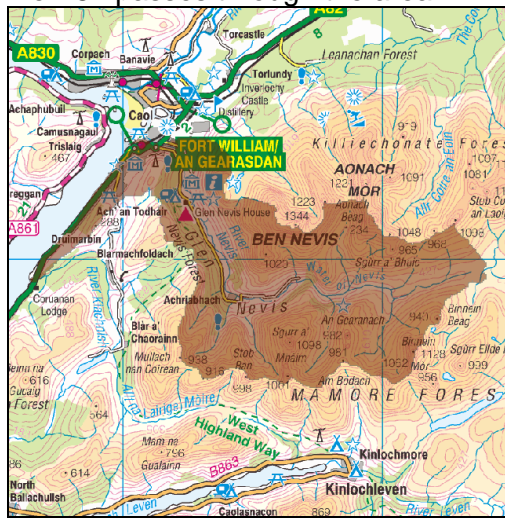
# Fort William (Potentially Vulnerable Area 01/25)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Appin coastal

## Background

This Potentially Vulnerable Area is approximately 75km<sup>2</sup>. It is located at the north east end of Loch Linnhe and includes Fort William (shown below).

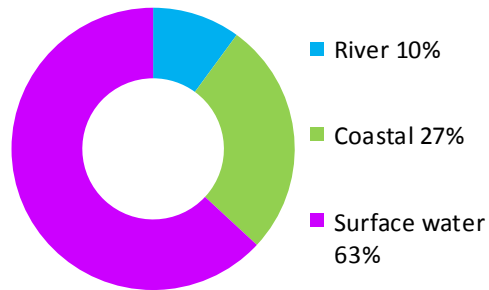
The A82 passes through the area.



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The main river in this area is the River Nevis and the Water of Nevis system. There are also several smaller tributaries. There are approximately 100 residential and 80 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £520,000 with the majority caused by surface water flooding.



**Figure 1: Annual Average Damages by flood source**

## Summary of flooding impacts

Coastal flood risk is from Loch Linnhe and mainly affects the northern part of Fort William around the pier. River flood risk is from the River Nevis particular in the lower reaches of the river. The main source of flood risk in Fort William however is from surface water flooding. Surface water flood risk affects the commercial centre of the town as well as the access roads.

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.

A school and the fire station are at risk of flooding. The A82 road and the Fort William to Crianlarich railway are at risk of flooding at several locations.

There are four designated cultural heritage sites and parts of the Ben Nevis Special Area of Conservation and Site of Special Scientific Interest at risk.

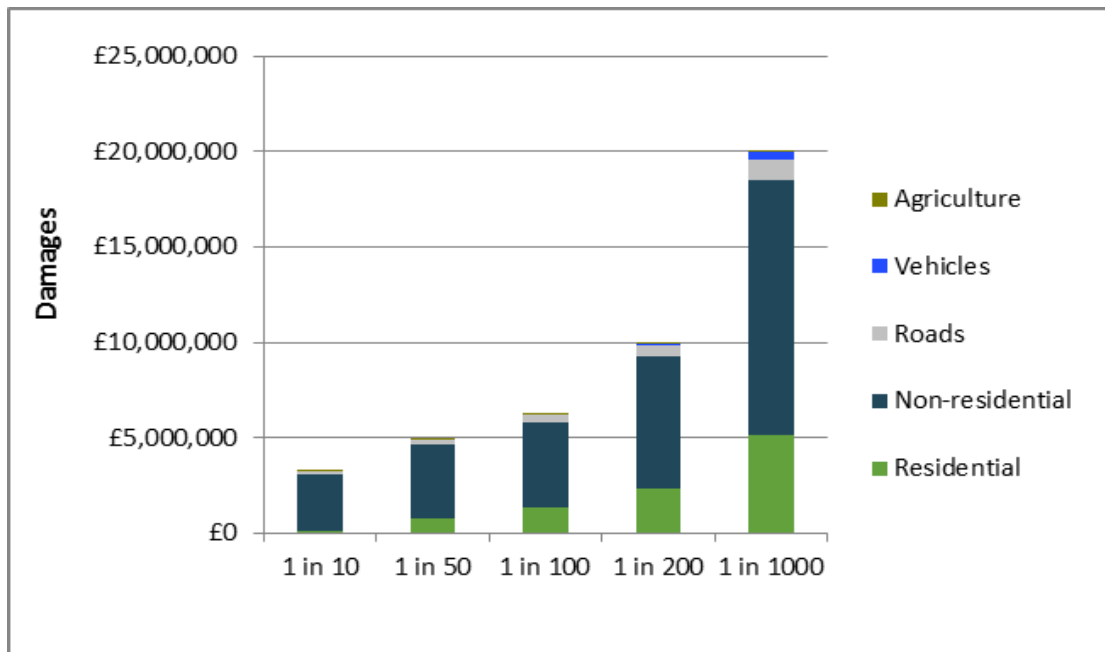
The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to residential properties.

The location of the impacts of flooding is shown in Figure 3.



	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 2,400)	<10	100	190
Non-residential properties (total 400)	30	80	120
People	20	210	420
Community facilities	0	<10 Includes; educational buildings and emergency services	<10 Includes; educational buildings and emergency services
Utilities assets	<10	<10	10
Transport links (excluding minor roads)	Roads at 30 locations Rail at 10 locations	Roads at 60 locations Rail at 10 locations	Roads at 60 locations Rail at 20 locations
Environmental designated areas (km <sup>2</sup> )	1	1	2
Designated cultural heritage sites	2	4	4
Agricultural land (km <sup>2</sup> )	1	2	2

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

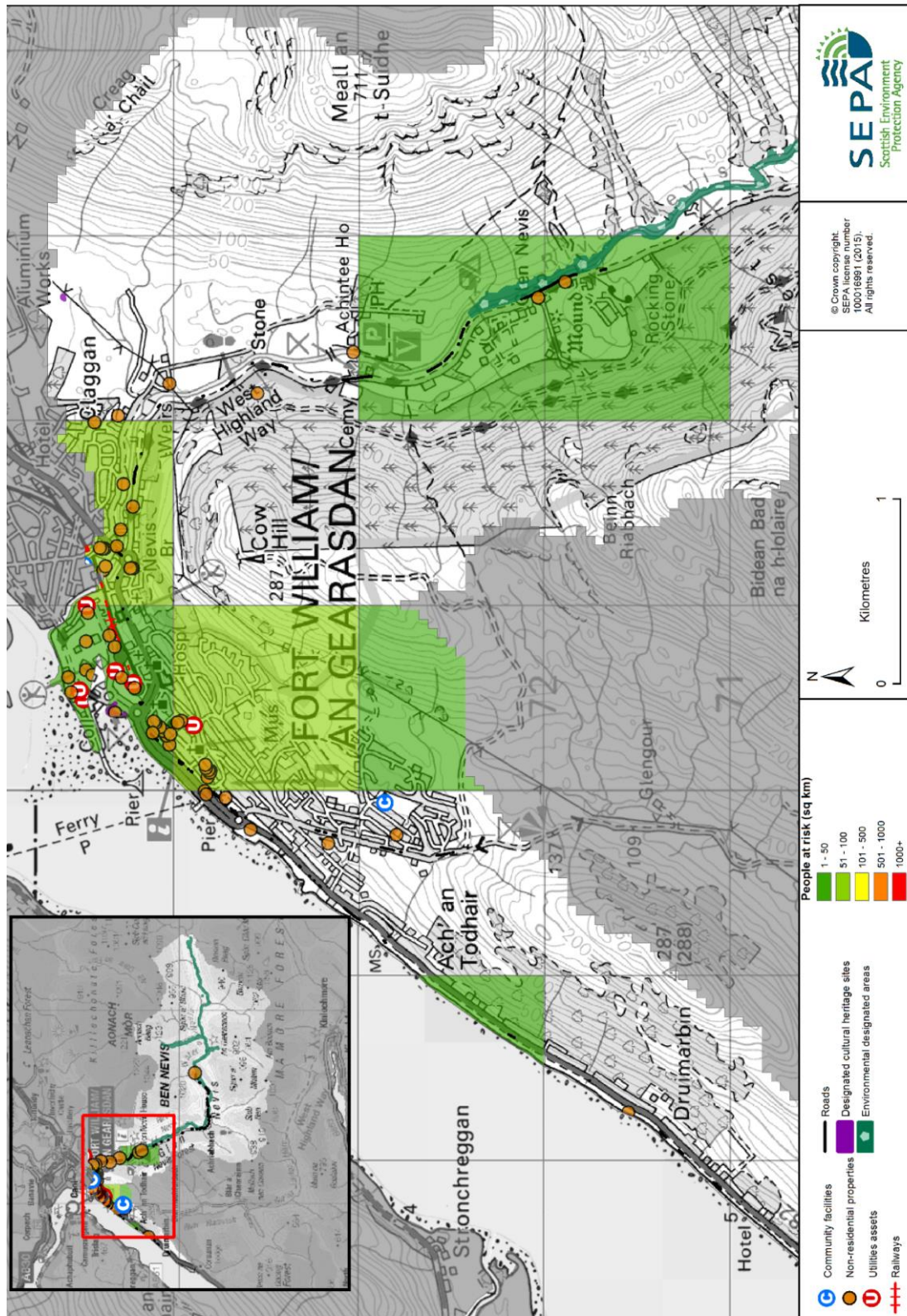


Figure 3: Impacts of flooding

## History of flooding

The earliest recorded flood was in 1873. There were 12 floods recorded between 1873 and 1989, including from the River Nevis. Many of these floods caused significant damage to the railway, roads, crops, and properties.

In October 1916 a surface water flood made the West Highland Railway impassable for several days due to numerous washouts, which completely isolated Fort William and destroyed many roads.

Since 2001 there have been five floods recorded. The October 2001 flood was due to blockages of culverts and gullies, with overflowing water affecting roads and properties. In January 2005 there was a storm surge on Loch Linnhe that caused flooding. In October 2009 a flood was recorded that affected properties, which was attributed to heavy rainfall and blocked culverts.

## Objectives to manage flooding in Potentially Vulnerable Area 01/25

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 Fort William Potentially Vulnerable Area.

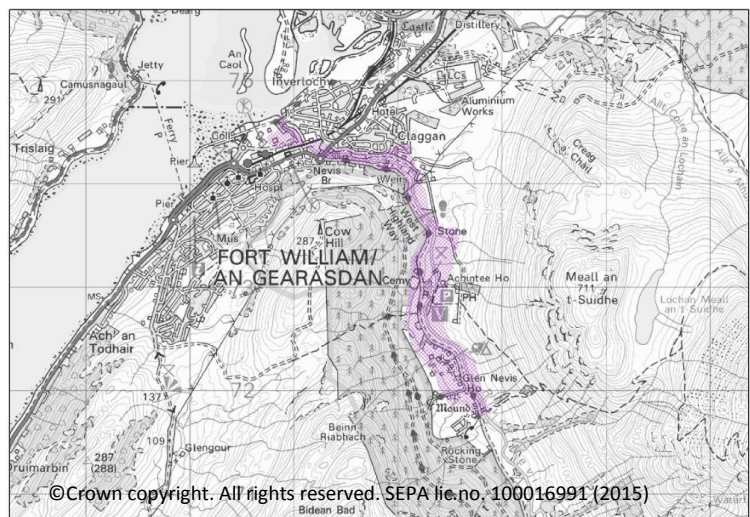
### Reduce flood risk in Fort William from the River Nevis

Indicators:

- 40 people
- £16,000 Annual Average Damages from residential properties

Objective ID: 102501

Target area:



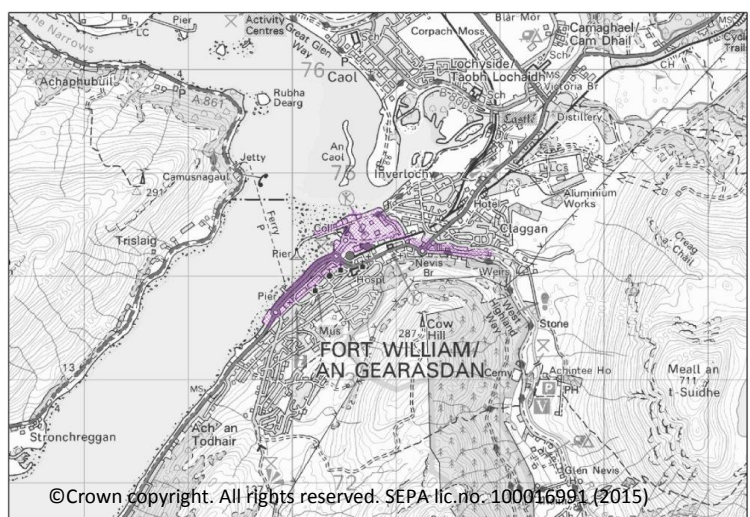
### Reduce coastal flood risk in Fort William from Loch Linnhe

Indicators:

- 110 people
- £110,000 Annual Average Damages from non-residential properties
- 1 school
- 1 emergency services building

Objective ID: 102502

Target area:



Target area	Objective	ID	Indicators within PVA
Fort William	Reduce the physical or disruption risk related to the transport network for roads	1308	<ul style="list-style-type: none"> <li>• 14 locations on the A82 with a total length of 130m</li> </ul>
Fort William	Reduce risk from surface water flooding in Fort William	102506	* See note below
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 100 residential properties</li> <li>• £520,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 100 residential properties</li> <li>• £520,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/25 there are 30 residential properties at risk and Annual Average Damages of £330,000.

## Actions to manage flooding in Potentially Vulnerable Area 01/25

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 Fort William 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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1308021)</b>		
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for roads (1308)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A82.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1025010005)</b>		
<b>Objective (ID):</b>	Reduce coastal flood risk in Fort William from Loch Linnhe (102502) Reduce flood risk in Fort William from the River Nevis (102501)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National: <b>90 of 168</b>	Within local authority: <b>8 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A flood protection study for the River Nevis and Loch Linnhe in Fort William should focus on direct defences, revetments and property level protection. Other actions may also be considered in order to develop the most sustainable range of options. The study should include the effect of high sea levels on flood risk in the River Nevis.		
<b>Potential impacts</b>			

<b>Economic:</b>	The study could benefit 64 residential and 37 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £4.1 million.
<b>Social:</b>	Approximately 141 people may directly benefit from flood protection works. Fort William has a higher than average proportion of vulnerable residents. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. There are potential visual and access impacts for the community, reducing their connection to the watercourse. Reduced flood risk to roads, including the A82, and the railway line and an energy production/electricity utility site may benefit the wider community. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on habitats and changes to channel morphology which could affect the quality status of the river. There may also be impacts on sediment and fish populations. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the Ben Nevis Special Area of Conservation. There is potential to directly impact on the Ben Nevis Site of Special Scientific Interest. Flood protection works would be outside of the Ach an Todhair Site of Special Scientific Interest, and there are unlikely to be any significant impacts. There is also potential to impact on two cultural heritage sites.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (1025060018)</b>		
<b>Objective (ID):</b>	Reduce risk from surface water flooding in Fort William (102506)		
<b>Delivery lead:</b>	The Highland Council		
<b>Status:</b>	<b>Ongoing</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Continue to maintain the 'Fort William' coastal flood warning area which is part of the Firth of Lorn and Loch Linnhe coastal flood warning scheme.</p> <p>Continue to maintain the 'Glen Nevis' flood warning area which is part of the Nevis river flood warning scheme. This flood warning area provides a flood warning for properties in Glen Nevis at risk of flooding, as well as the road.</p>		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Skye and Lochaber' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		



<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>From 2016 SEPA will engage with communities and promote Floodline using most the appropriate mix of methods for the area. These could include direct mailings, education activities, participation in local events and relevant flooding messages in the media.</p> <p>Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

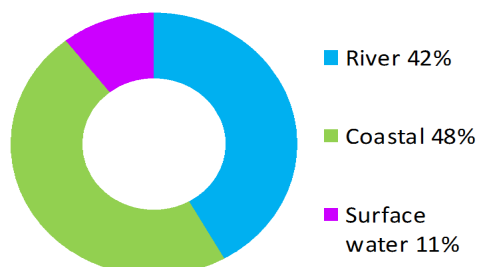
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>The Highland Council has two flood monitors in this area. One is on the watercourse behind the leisure centre and the other on the Allt Dhomhnuill an t-Siucair next to the police station. The flood monitors warn of rising water levels due to blockages.</p>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Sunart and Moidart (Potentially Vulnerable Area 01/26)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Ardnamurchan coastal

### Summary of flooding impacts



### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £69,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<i>Surface water plan/study</i>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

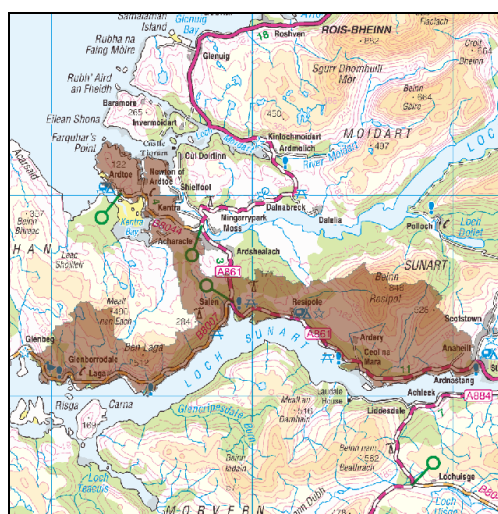
Actions

# Sunart and Moidart (Potentially Vulnerable Area 01/26)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Ardnamurchan coastal

## Background

This Potentially Vulnerable Area is approximately 79km<sup>2</sup>. It is located on the Ardnamurchan peninsula along the north east shore of Loch Sunart (shown below). The A861 and B8007 pass through the area.

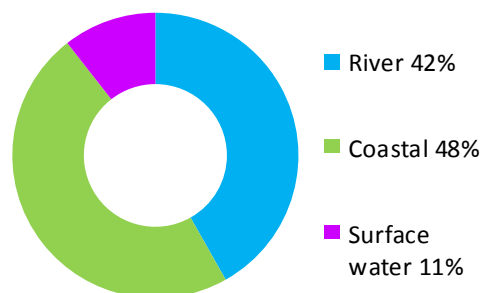


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There are no major rivers in this area. However, there are several smaller rivers such as the Dig Bhan and the Allt Camas a Choirce.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are approximately £69,000 with the majority caused by coastal and river flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

Coastal flood risk is limited to short sections of coastline and mainly affects roads. River flood risk is limited to localised areas generally close to the outlets of the rivers, for example around Glenborrowdale.

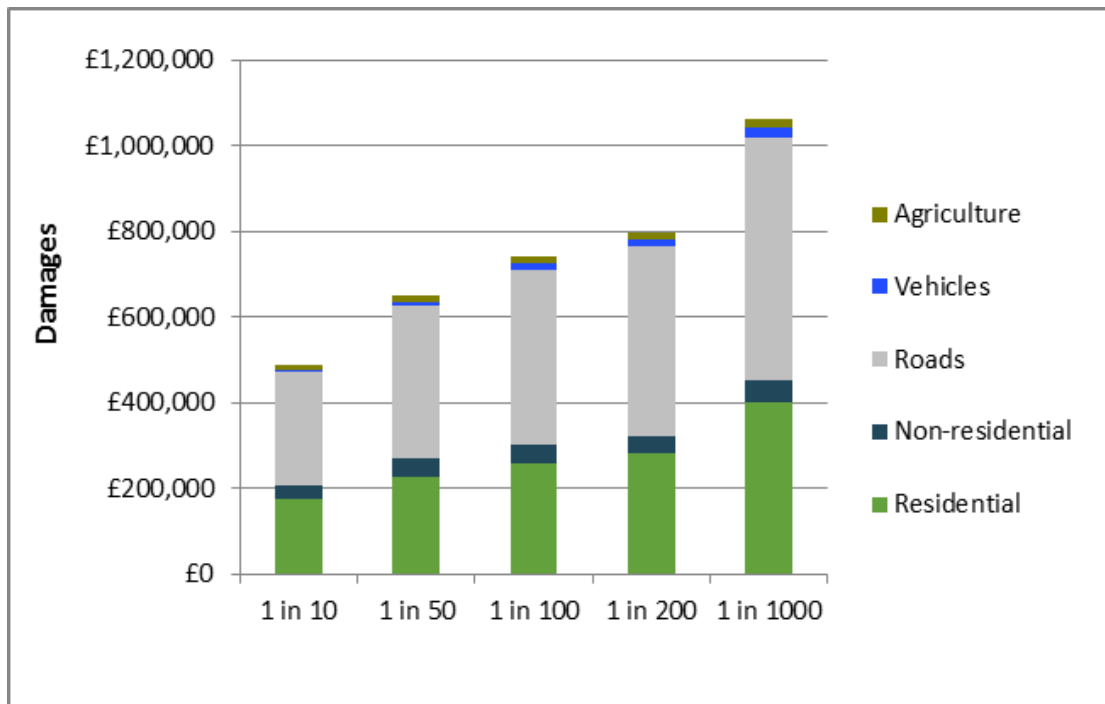
The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

Roads potentially affected by flooding include the A861, B8044 and B8007. One designated cultural heritage site and areas of environmental importance are at risk. These include Special Areas of Conservation, Special Protection Areas, and Sites of Special Scientific Interest at Clais Moss and Kenra Moss, and Sound of Arisaig.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to roads and residential properties. The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 230)	<10	<10	10
Non-residential properties (total 80)	<10	<10	<10
People	10	20	20
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at 50 locations	Roads at 60 locations	Roads at 60 locations
Environmental designated areas (km <sup>2</sup> )	1	2	2
Designated cultural heritage sites	1	1	1
Agricultural land (km <sup>2</sup> )	0.7	0.9	1

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

## History of flooding

Five floods have been recorded since 2001. In January 2001 blocked culverts and overflowing burns threatened properties in Glenborrodale.

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

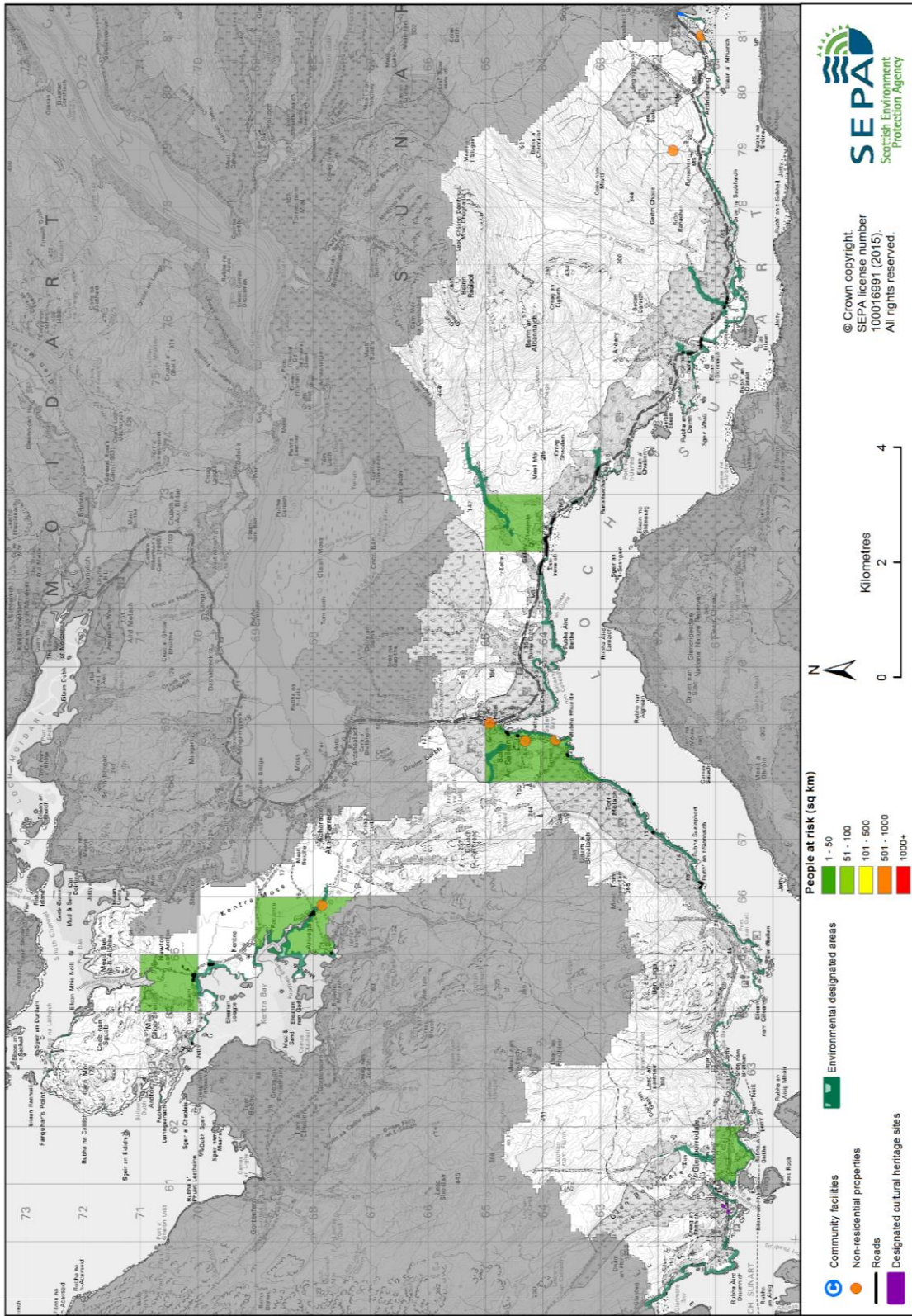


Figure 3: Impacts of flooding

## Objectives to manage flooding in Potentially Vulnerable Area 01/26

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 Sunart and Moidart Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £69,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £69,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/26

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 Sunart and Moidart Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Skye and Lochaber' flood alert area.</p>		



<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

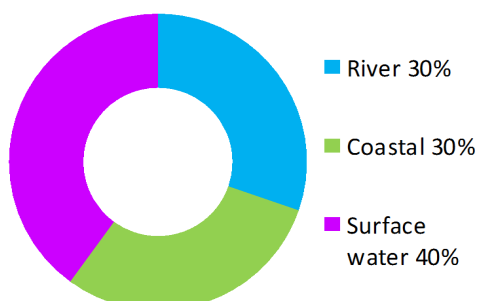
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## South Ballachulish (Potentially Vulnerable Area 01/27)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Appin coastal

### Summary of flooding impacts



### At risk of flooding

- 20 residential properties
- 40 non-residential properties
- £130,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<i>Surface water plan/study</i>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

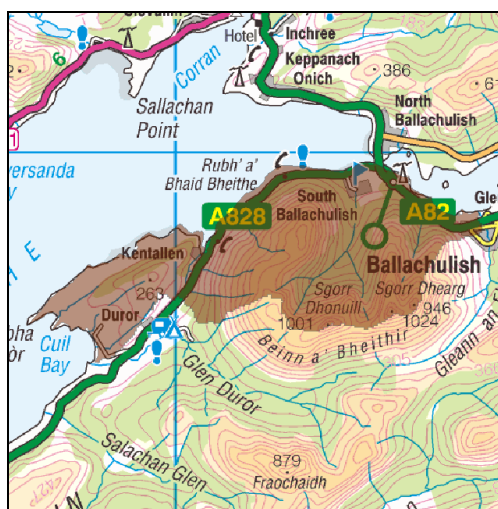
Actions

## South Ballachulish (Potentially Vulnerable Area 01/27)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Appin coastal

### Background

This Potentially Vulnerable Area is located on the eastern shore of Loch Linnhe and covers South Ballachulish, Kentallen and part of Ballachulish (shown below). It is approximately 29km<sup>2</sup>.

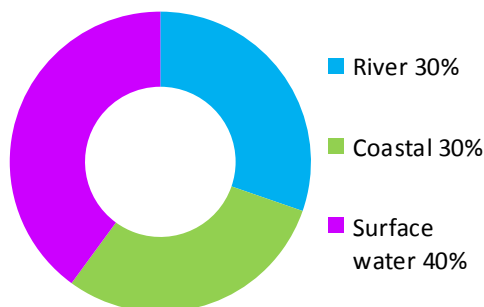


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There are no major rivers in this area. However, there are several small rivers such as the Abhainn Greadhain and Kentallen Burn.

There are approximately 20 residential and 40 non-residential properties are at risk of flooding.

The Annual Average Damages are approximately £130,000 with the majority caused by surface water flooding.



**Figure 1:** Annual Average Damages by flood source

### Summary of flooding impacts

Coastal flood risk is limited to the frontage along Lochs Leven and Linnhe, including South Ballachulish and West Laroch. There are several small watercourses, including the Abhainn Greadhain, which poses flood risk to South Ballachulish. Surface water flood risk is centred on South Ballachulish and Greenfield.

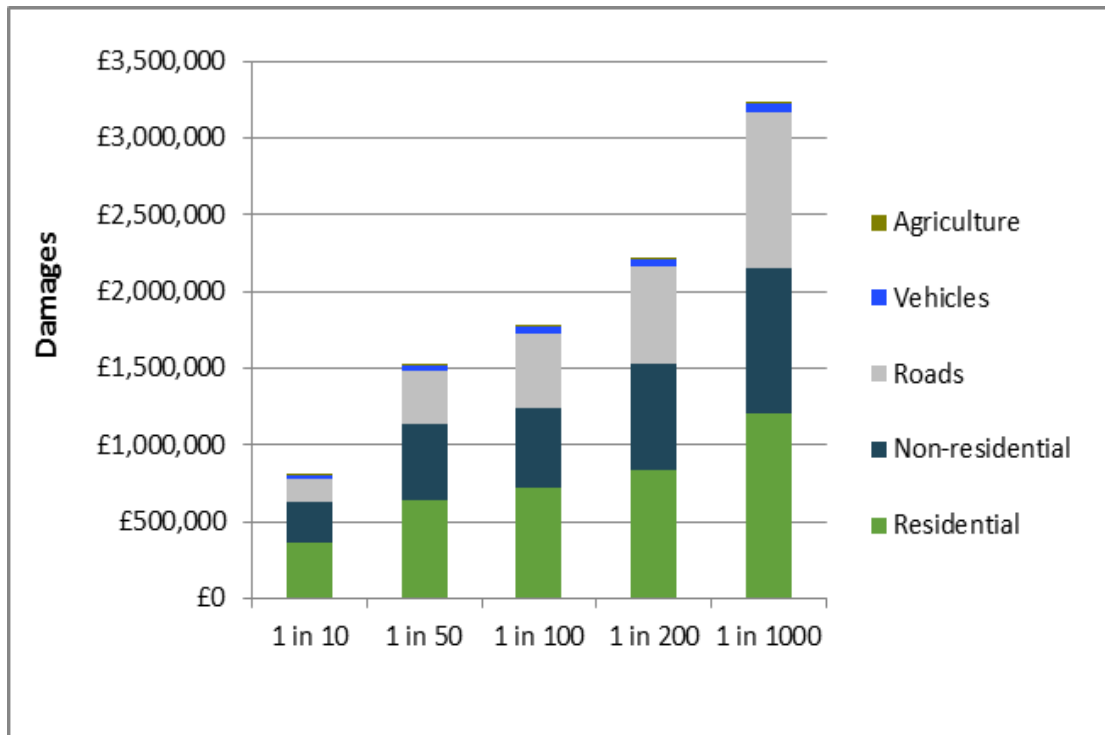
The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

Roads potentially affected by flooding include the A82 and A828. Small areas of environmental designated sites are shown to be at risk, including Special Areas of Conservation, Special Protection Areas, and Sites of Special Scientific Interest at Glen Etive and Glen Fyne, St John's Church, Kentallen, and Ardsheal Peninsula.

The damages associated with floods of different likelihood are shown in Figure 2. Residential and non-residential properties as well as roads experience the greatest economic impact. The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 240)	<10	20	30
Non-residential properties (total 90)	20	40	50
People	20	40	60
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 40 locations	Roads at 60 locations	Roads at 70 locations
Environmental designated areas (km <sup>2</sup> )	0.1	0.2	0.2
Designated cultural heritage sites	0	0	0
Agricultural land (km <sup>2</sup> )	0.1	0.3	0.3

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

## History of flooding

There is no record of large-scale flooding in this Potentially Vulnerable Area.

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

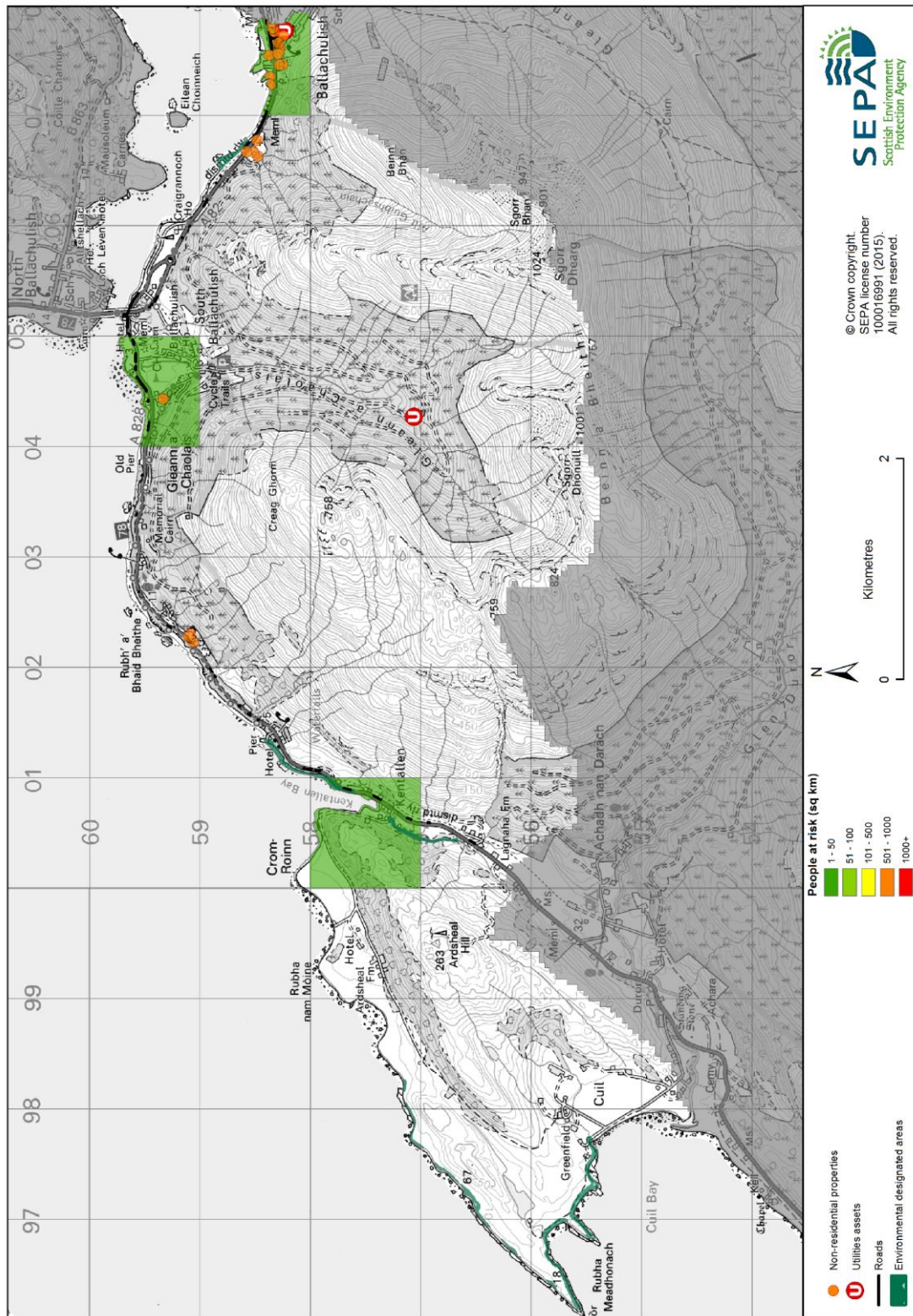


Figure 3: Impacts of flooding

## Objectives to manage flooding in Potentially Vulnerable Area 01/27

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 South Ballachulish Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 20 residential properties</li> <li>• £130,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 20 residential properties</li> <li>• £130,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/27

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 South Ballachulish Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Skye and Lochaber' flood alert area.</p>		



<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

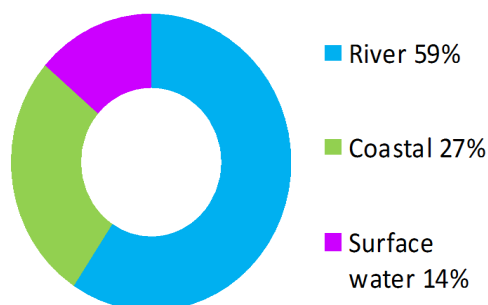
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Ballachulish and Glencoe (Potentially Vulnerable Area 01/28)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Appin coastal

### Summary of flooding impacts



#### At risk of flooding

- 50 residential properties
- 20 non-residential properties
- £180,000 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

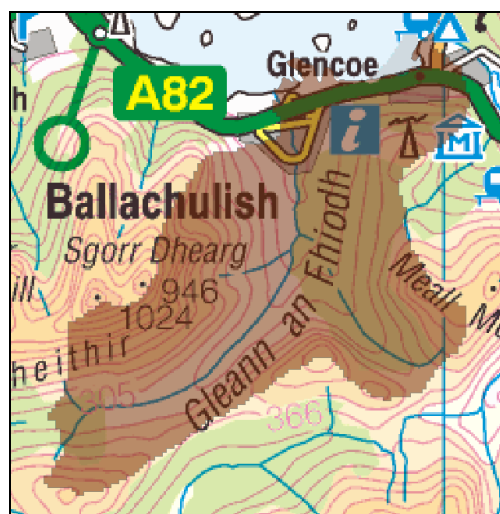
Actions

# Ballachulish and Glencoe (Potentially Vulnerable Area 01/28)

Local Plan District	Local authority	Main catchment
Highland and Argyll	The Highland Council	Appin coastal

## Background

This Potentially Vulnerable Area is located on the south of Loch Leven and covers Ballachulish and Glencoe (shown below). It is approximately 16km<sup>2</sup>. The A82 passes through the area.

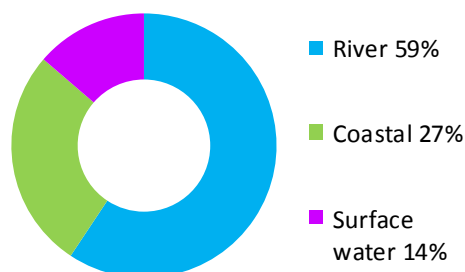


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The River Laroch which flows through Ballachulish into Loch Leven is the largest river in the area.

There are approximately 50 residential and 20 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £180,000 with the majority caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

## Summary flooding of impacts

Coastal flood risk affects the frontage in Glencoe from the camp site at Invercoe south towards the pier. River flood risk is predominantly from the River Laroch in Ballachulish.

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.

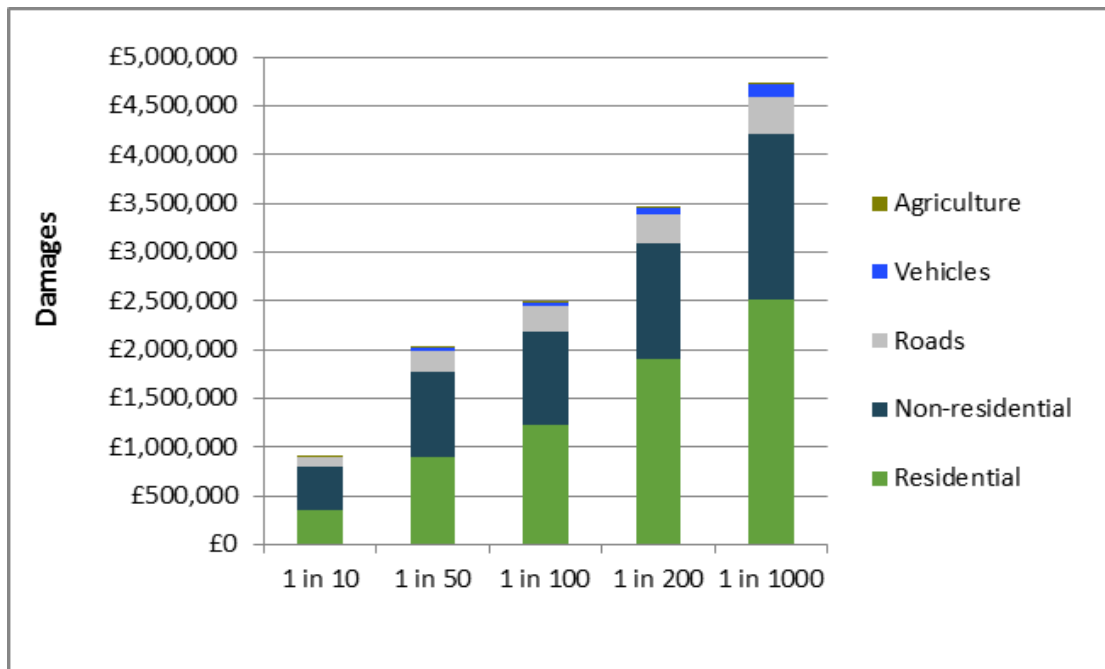
Roads affected by flooding include the A82 and B863. A school, the police station and small areas of the designated environmental site at Glen Etive and Glen Fyne, which is a Special Area of Conservation, are also at risk. One designated cultural heritage site is at risk of flooding.

The damages associated with floods of different likelihood are shown in Figure 2. Residential and non-residential properties experience the greatest economic impact.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 320)	10	50	60
Non-residential properties (total 70)	<10	20	20
People	20	110	130
Community facilities	0	<10 Includes: educational buildings and emergency services	<10 Includes: educational buildings and emergency services
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations	Roads at 30 locations	Roads at 30 locations
Environmental designated areas (km <sup>2</sup> )	0.1	0.1	0.1
Designated cultural heritage sites	1	1	2
Agricultural land (km <sup>2</sup> )	0.2	0.3	0.3

**Table 1:** Summary of flooding impacts<sup>1</sup>

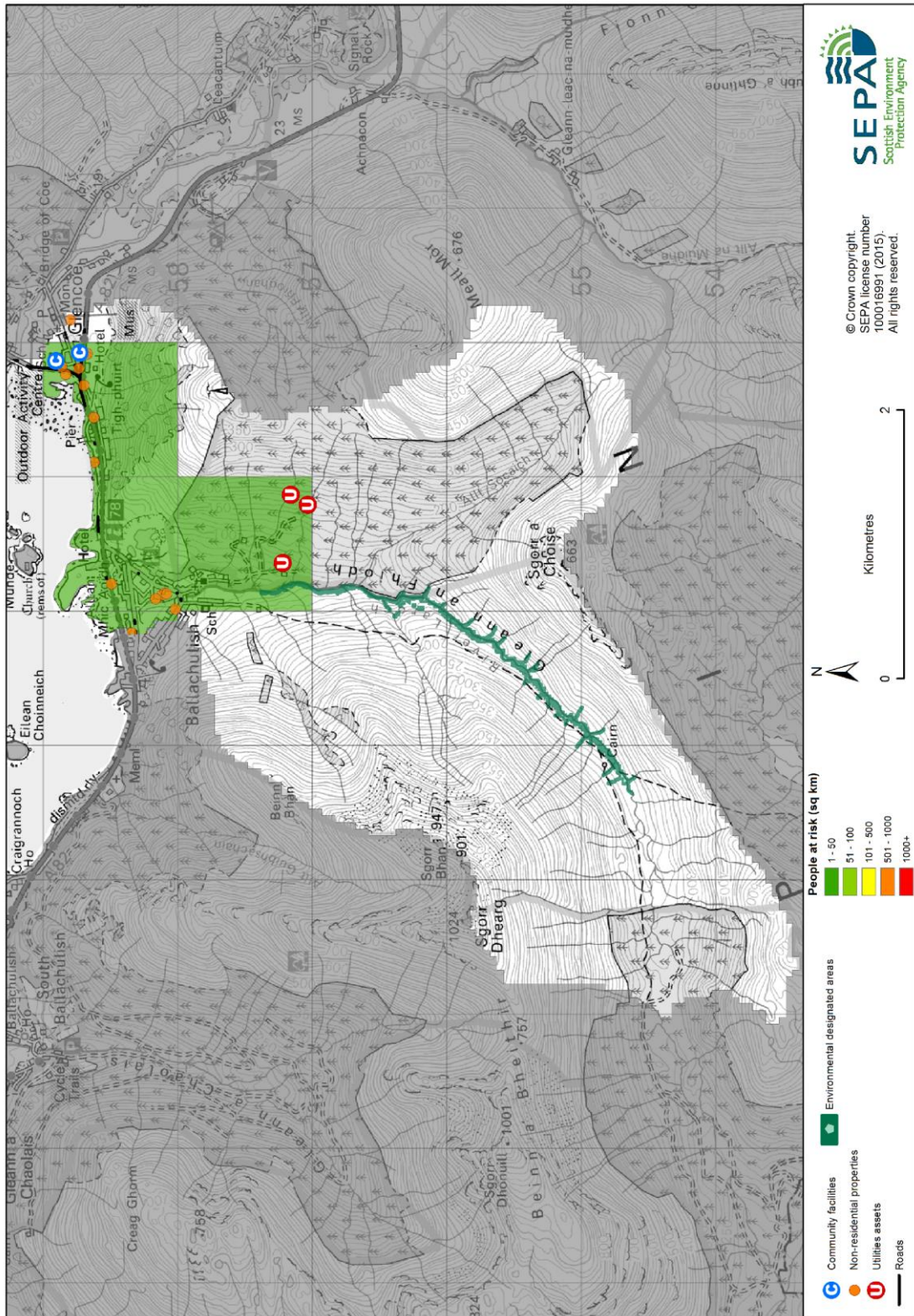


**Figure 2:** Damages by flood likelihood

## History of flooding

The earliest recorded flood was in 1869 and was caused by a particularly high tide in Loch Leven. Floods were reported in 2002, 2006 and in 2008 when the police station flooded.

<sup>1</sup> 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 01/28

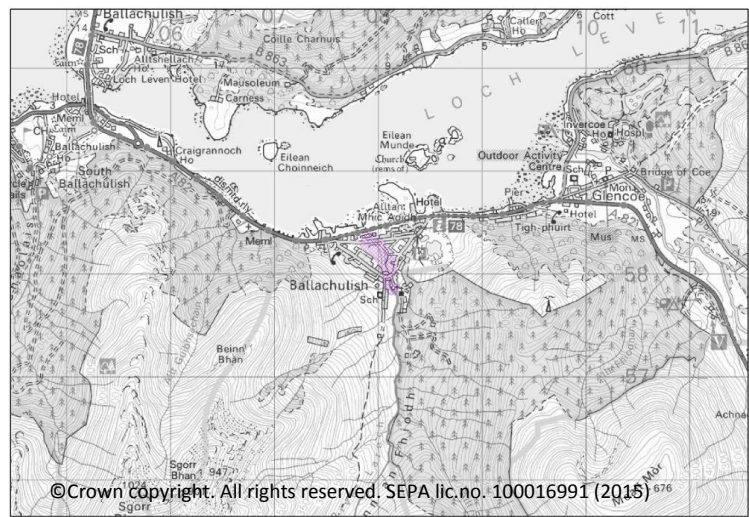
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

### Reduce flood risk in Ballachulish from the River Laroch

Indicators:

Target area:

- 40 people
- £31,000 Annual Average Damages from residential properties
- £58,000 Annual Average Damages from non-residential properties



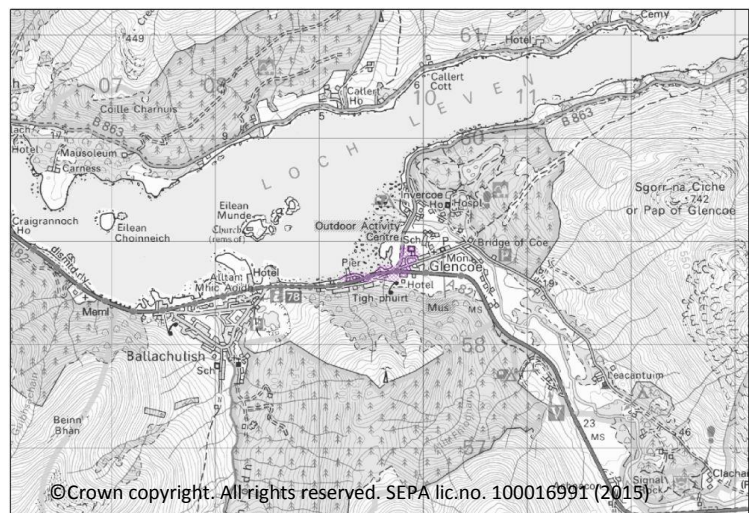
Objective ID: 102801

### Reduce flood risk in Glencoe from Loch Leven

Indicators:

Target area:

- 40 people
- 1 educational building



Objective ID: 102802

Target area	Objective	ID	Indicators within PVA
Ballachulish and Glencoe	Reduce the physical or disruption risk related to the transport network for roads	1309	<ul style="list-style-type: none"> <li>• 80m of the A82 in 1 location</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 50 residential properties</li> <li>• £180,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 50 residential properties</li> <li>• £180,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/28

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1309021)</b>		
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for roads (1309)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A82.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1028010005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Ballachulish from the River Laroch (102801)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>104 of 168</b>	<b>9 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A study is recommended to further investigate the feasibility of a flood protection scheme for Ballachulish, focusing on direct defences and channel modifications between Laroch Beag and Albert Road, and consideration of property level protection. Natural flood management, in particular sediment management, in the River Laroch to reduce bank erosion and any other actions may also be considered in order to develop the most sustainable range of options.		

	The study should look to confirm the length and size of works needed and the business case for flood protection works. The study will be carried out in cycle 2 as there is no known history of significant flooding in Ballachullish from the River Laroch.
Potential impacts	
<b>Economic:</b>	The business case for flood protection works will need to be developed further as part of the study to fully justify flood protection works. The study could benefit 17 residential and five non-residential properties at risk of flooding in this location, with potential damages avoided of up to £2.8 million.
<b>Social:</b>	Approximately 37 people may directly benefit from flood protection works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Roads, including the A82, may benefit from reduced flood risk, which could reduce disruption to the wider community. There are potential visual and access impacts for the community, reducing their connection to the watercourse. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	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. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on habitats and changes to channel morphology. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the Glen Etive and Glen Fyne Special Protection Area.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1028020005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Glencoe from Loch Leven (102802)		
<b>Delivery lead:</b>	The Highland Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>127 of 168</b>	<b>14 of 23</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A study is recommended to further investigate the feasibility of a flood protection scheme for Glencoe. The focus should be on direct defences, coastal revetments and consideration of property level protection for residual risk. Other actions may also be considered to develop the most sustainable range of options. The study should look to confirm the length and size of defences needed and the business case for flood protection works.		
Potential impacts			
<b>Economic:</b>	The business case for flood protection works will need to be developed further as part of the study to fully justify flood protection works. The study could benefit 20 residential and five non-residential		

<b>Economic:</b>	properties at risk of flooding in this location, with potential damages avoided of up to £1.2 million.
<b>Social:</b>	Approximately 44 people and the school in Glencoe may directly benefit from flood protection works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. There are potential visual and access impacts for the community, reducing their connection to the watercourse. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for negative impacts on coastal habitats through increased erosion and disruption of natural processes, and impacts on landscape through disruption of views of the loch and foreshore.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Skye and Lochaber' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	The Highland Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

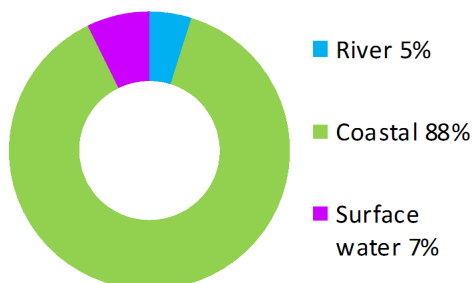
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Isle of Mull, Craignure (Potentially Vulnerable Area 01/29)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Island of Mull coastal

### Summary of flooding impacts



### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £69,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<i>Surface water plan/study</i>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

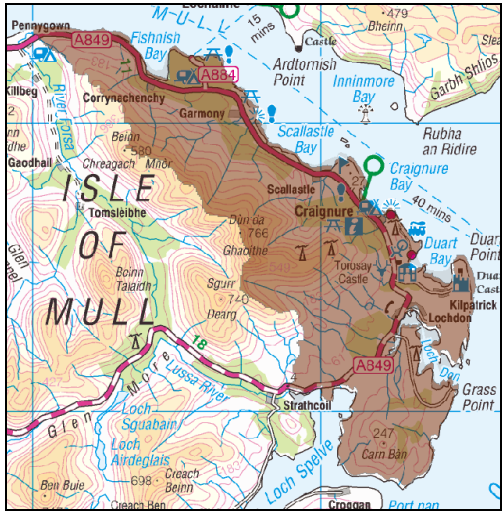
Actions

# Isle of Mull, Craignure (Potentially Vulnerable Area 01/29)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Island of Mull coastal

### Background

This Potentially Vulnerable Area is located on the north east coast of Mull and includes Craignure, Lochdon, Fishnish, Balmeanach and Scallastle (shown below). It is approximately 78km<sup>2</sup>.

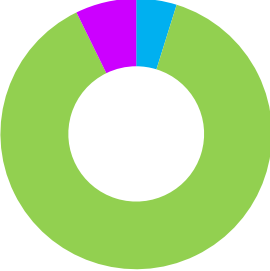


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The A849, an important transport link connecting coastal settlements to each other and to the Oban ferry, passes through the area.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are approximately £69,000 with the majority caused by coastal flooding.



Flood Source	Percentage
River	5%
Coastal	88%
Surface water	7%

**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

Coastal flood risk affects the frontage along the Sound of Mull and Firth of Lorn, most notably around Craignure.

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.

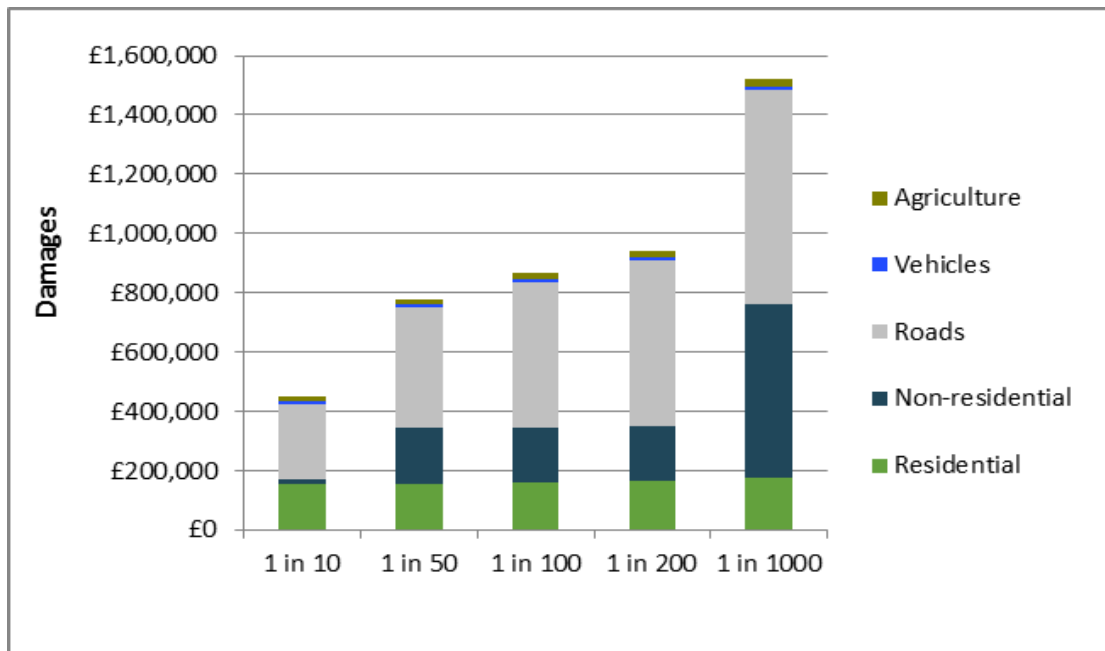
Roads with a risk of flooding include the A848 and A849, which connects communities across the Isle of Mull to each other and to the ferry terminal. Two designated cultural heritage sites and areas of environmental importance are at risk. These include Mull Oakwoods Special Areas of Conservation, Cnuic agus Cladach Mhuile Special Protection Areas, and Ardura-Auchnacraig Sites of Special Scientific Interest.

The damages associated with floods of different likelihood are shown in Figure 2. Roads experience the greatest economic impact followed by non-residential properties.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 170)	<10	<10	<10
Non-residential properties (total 100)	<10	<10	<10
People	10	10	10
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 40 locations	Roads at 50 locations	Roads at 50 locations
Environmental designated areas (km <sup>2</sup> )	1	1	1
Designated cultural heritage sites	2	2	2
Agricultural land (km <sup>2</sup> )	1	1	1

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

## History of flooding

There is no record of large-scale flooding in this Potentially Vulnerable Area.

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



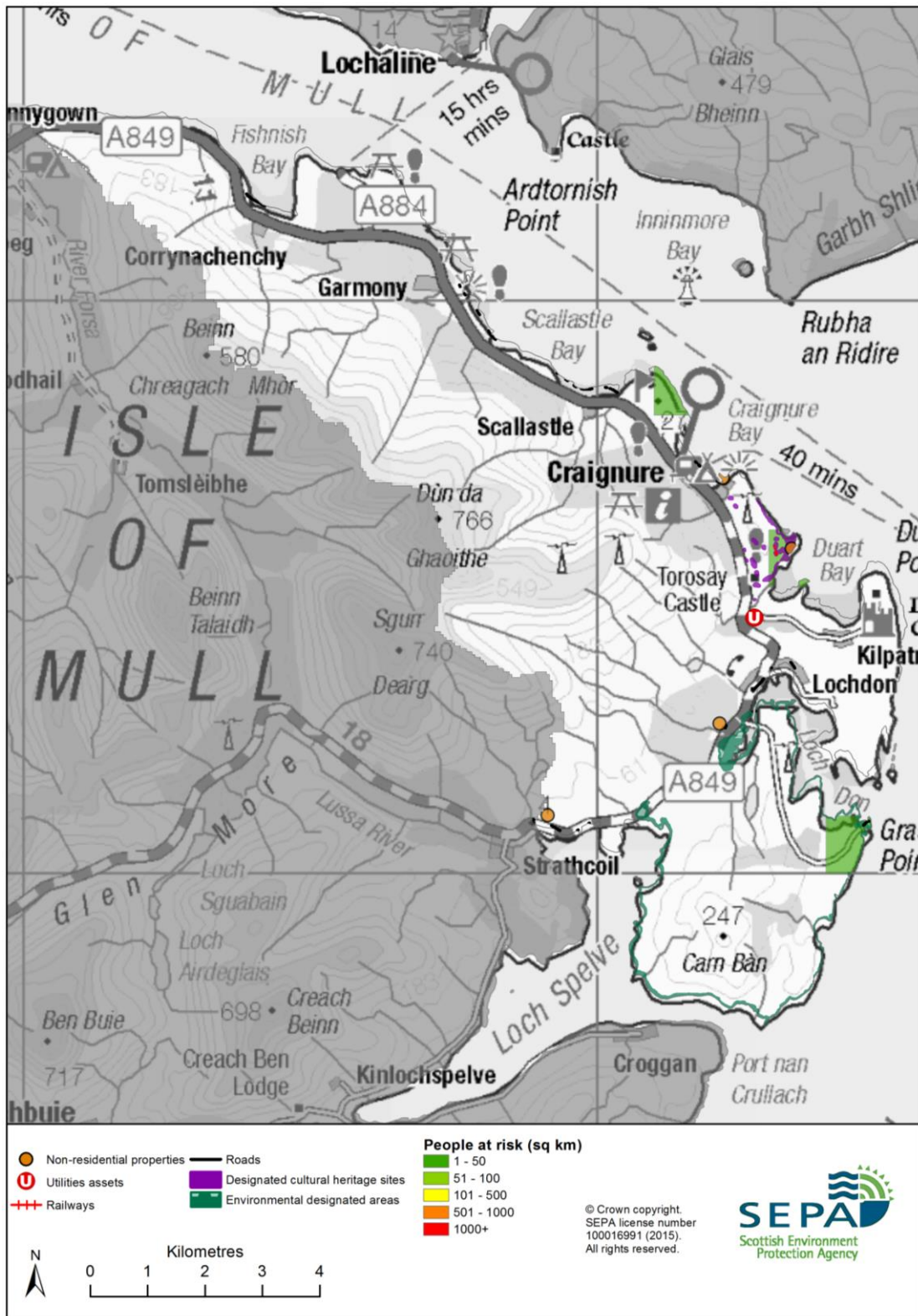


Figure 3: Impacts of flooding

## Objectives to manage flooding in Potentially Vulnerable Area 01/29

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 Isle of Mull, Craginure Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £69,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £69,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/29

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 Isle of Mull, Craignure Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

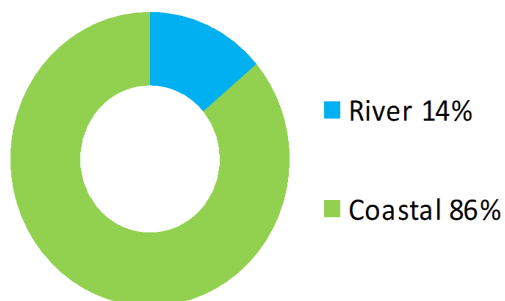
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Ross of Mull (Potentially Vulnerable Area 01/30)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Island of Mull coastal

### Summary of flooding impacts



#### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £110,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<i>Surface water plan/study</i>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

Actions

## Ross of Mull (Potentially Vulnerable Area 01/30)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Island of Mull coastal

### Background

This Potentially Vulnerable Area is approximately 194km<sup>2</sup> and is situated on the south of the Isle of Mull (shown below). It includes the village of Fionnphort and a number of smaller settlements.

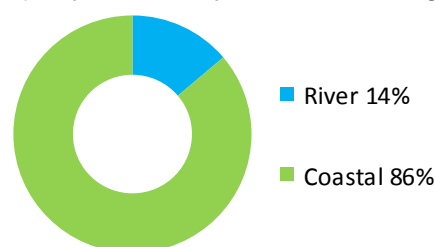


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The A849, an important transport link connecting settlements in Mull to each other and to neighbouring islands, passes through this area.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are approximately £110,000 with the majority caused by coastal flooding.



**Figure 1:** Annual Average Damages by flood source

### Summary of flooding impacts

This area has a long coastline with short sections subject to coastal flood risk.

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.

Roads with a risk of being flooding include the A849, which links communities across the Isle of Mull and to the neighbouring island of Iona, the island of Staffa and the fishing harbour at Bunesan.

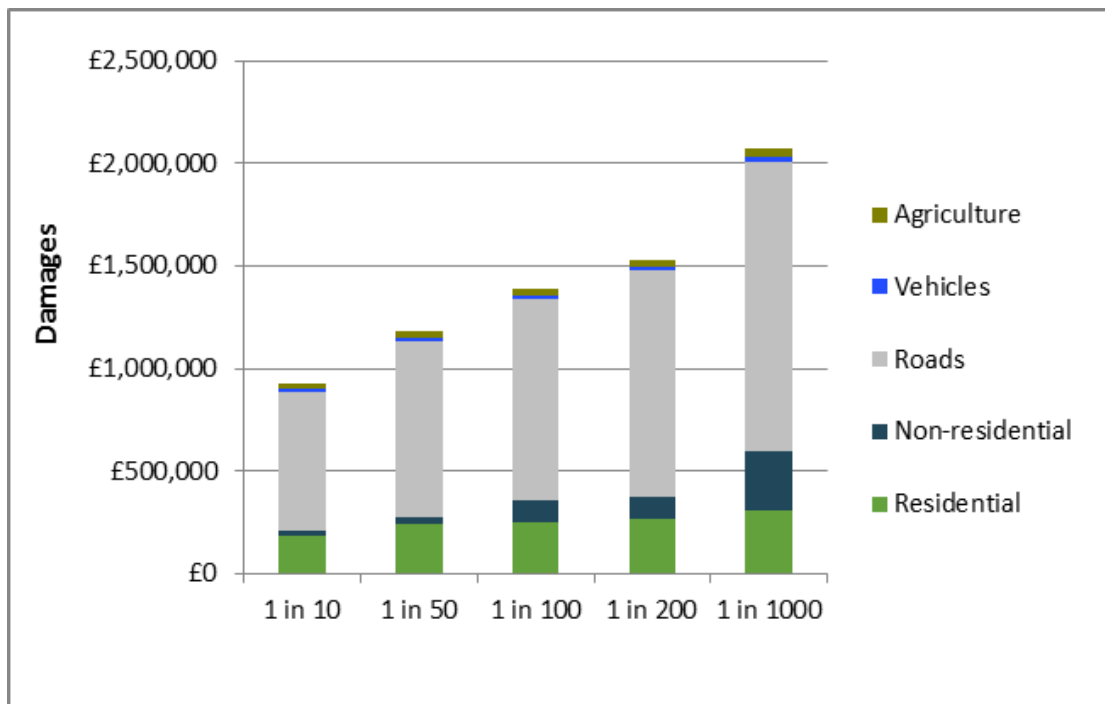
Four designated cultural heritage sites and an area of environmental importance are at risk within this area. These include Special Areas of Conservation, Special Protection Areas, and Sites of Special Scientific Interest at Coladoir Bog, South Mull Coast and Mull Oakwoods.

The damages associated with floods of different likelihood are shown in Figure 2. Roads experience the greatest economic impact.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 310)	<10	<10	<10
Non-residential properties (total 200)	<10	<10	<10
People	<10	<10	10
Community facilities	0	<10 Emergency services	<10 Emergency services
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at 40 locations	Roads at 40 locations	Roads at 50 locations
Environmental designated areas (km <sup>2</sup> )	2	2	2
Designated cultural heritage sites	4	4	4
Agricultural land (km <sup>2</sup> )	1	2	2

**Table 1:** Summary of flooding impacts<sup>1</sup>



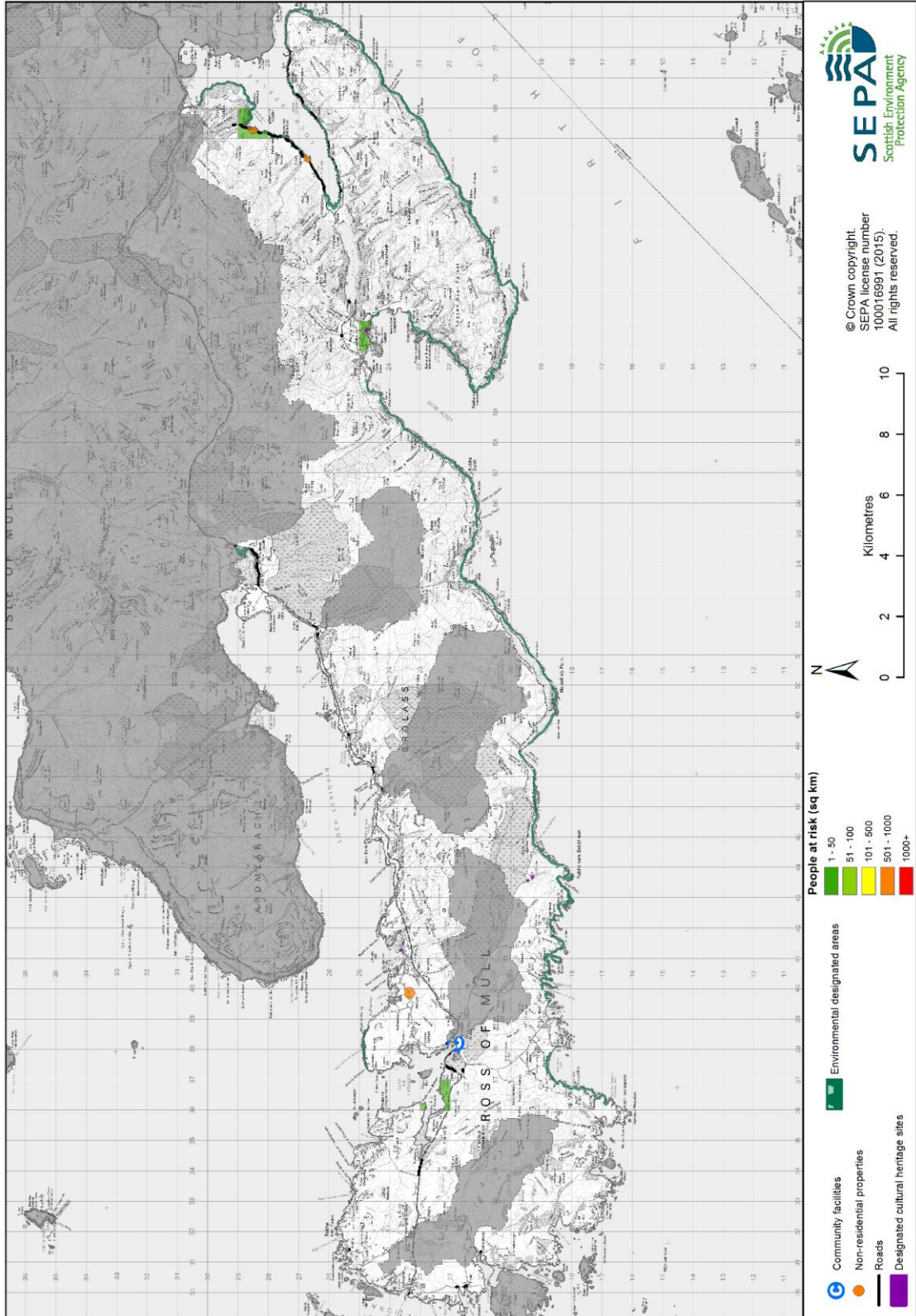
**Figure 2:** Damages by flood likelihood

## History of flooding

There is no record of large-scale flooding within this Potentially Vulnerable Area.

<sup>1</sup> 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 01/30

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 Ross of Mull Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £110,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £110,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/30

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 Ross of Mull Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

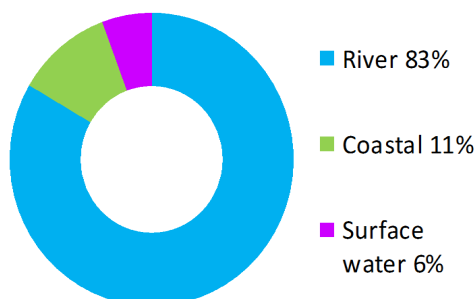
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

# Oban (Potentially Vulnerable Area 01/31)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Knapdale coastal

## Summary of flooding impacts



### At risk of flooding

- 320 residential properties
- 310 non-residential properties
- £1.8 million 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>	<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

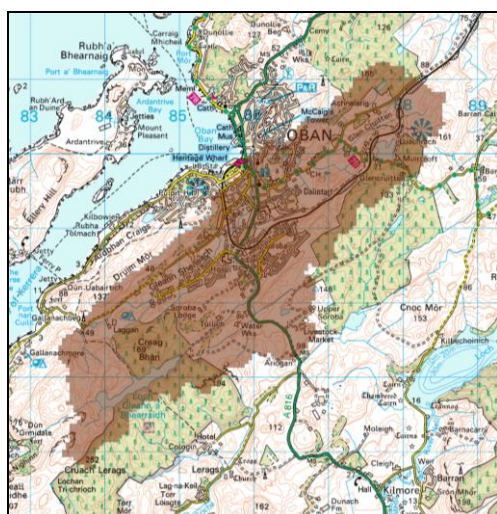
Actions

## Oban (Potentially Vulnerable Area 01/31)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Knapdale coastal

### Background

This Potentially Vulnerable Area includes Oban and the mainly rural area to the south (shown below). It is approximately 11km<sup>2</sup>. The A816 runs through the area.

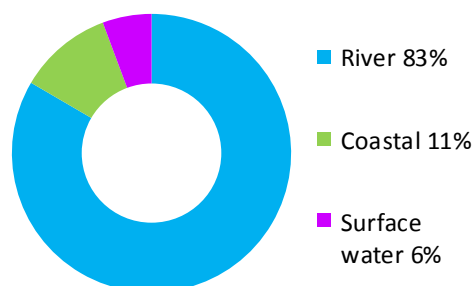


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The main river in Oban is the Black Lynn Burn.

There are approximately 320 residential and 310 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £1.8million with the majority due to river flooding.



**Figure 1:** Annual Average Damages by flood source

### Summary of flooding impacts

Flood risk in Oban is from the Black Lynn Burn, including its tidal section. There is also coastal flood risk along the sea front, which is exacerbated by wave overtopping.

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.

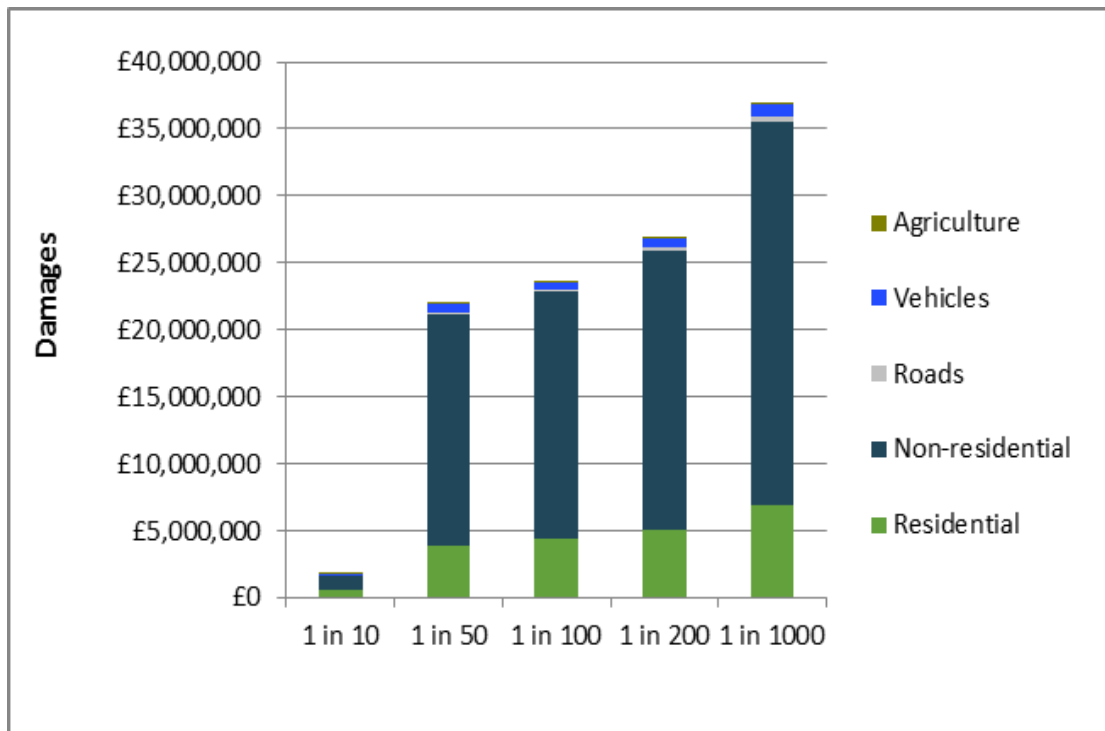
Roads potentially affected include the A816, which is the main route south linking Oban with the rest of southern Argyll. The Oban to Glasgow railway has a risk of being flooding in several locations.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential properties, followed by damages to residential properties.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 2,200)	40	320	400
Non-residential properties (total 820)	70	310	440
People	80	690	880
Community facilities	0	0	0
Utilities assets	<10	10	10
Transport links (excluding minor roads)	Roads at 40 locations Rail at <10 locations	Roads at 70 locations Rail at <10 locations	Roads at 80 locations Rail at <10 locations
Environmental designated areas (km <sup>2</sup> )	0	0	0
Designated cultural heritage sites	0	0	0
Agricultural land (km <sup>2</sup> )	<0.1	<0.1	<0.1

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



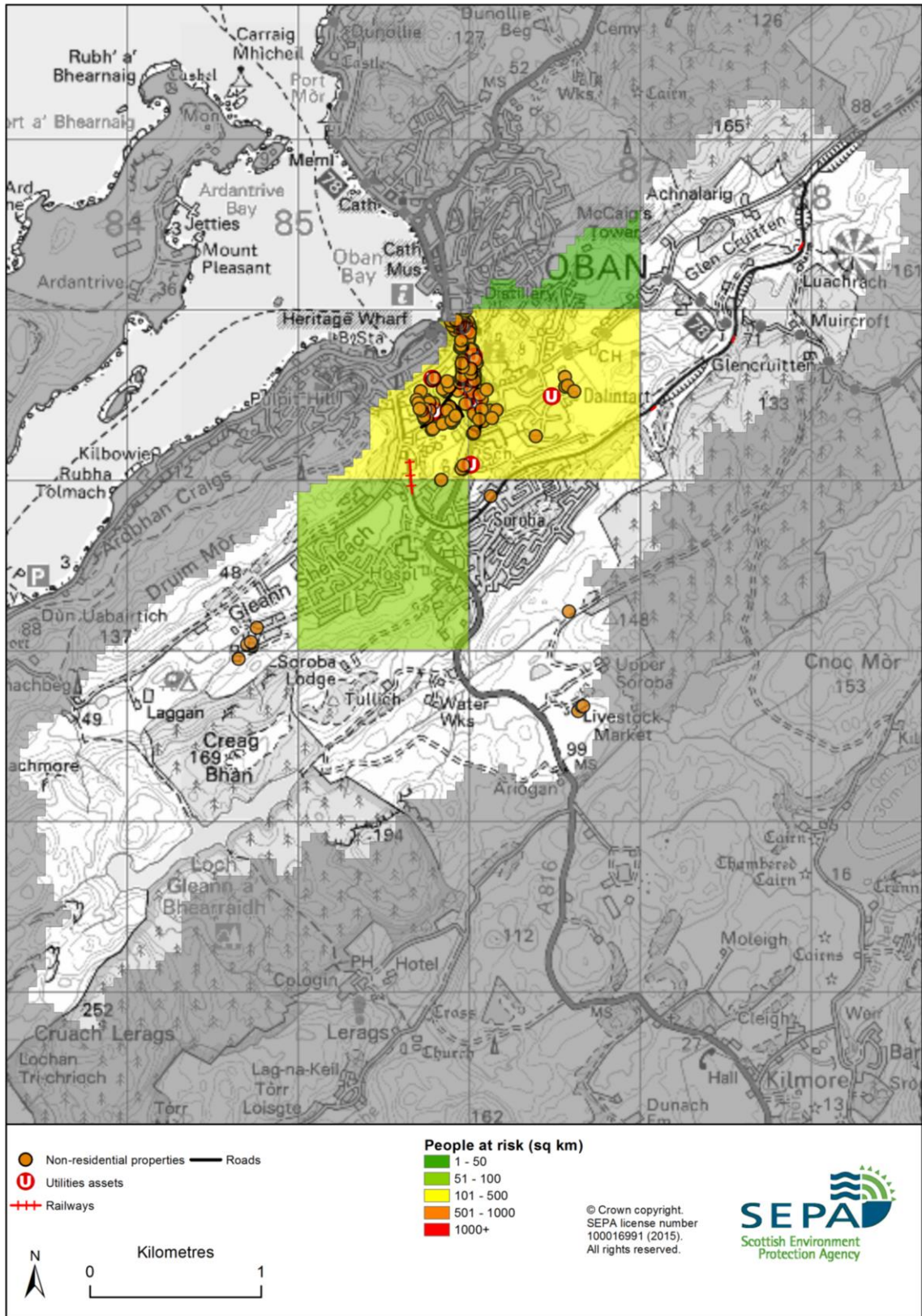


Figure 3: Impacts of flooding

## History of flooding

The earliest recorded flood was in 1869 when coastal flooding inundated properties to a depth of 2-3 feet and damaged roads, the sea wall and the pier.

Flooding was reported in 2006, and in 2005 the town was severely affected requiring the deployment of over 3,000 sandbags.

Floods at Dalintart and Lochavulin have been reported, affecting car parks, roads, and property. In 2013 there was a coastal flood that affected at least one non-residential property on the landward side of the A85.

## Objectives to manage flooding in Potentially Vulnerable Area 01/31

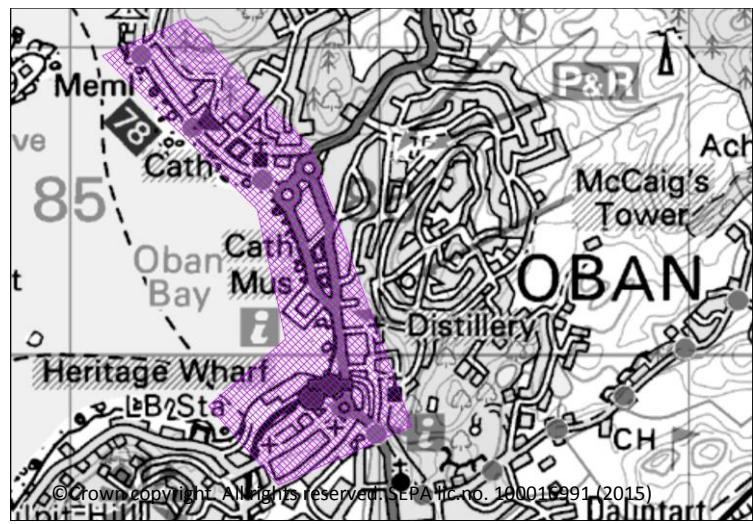
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

### Reduce risk along the Oban Bay frontage from coastal flooding

Indicators:

- £2,700 Annual Average Damages from residential properties
- £17,000 Annual Average Damages from non-residential properties

Target area:



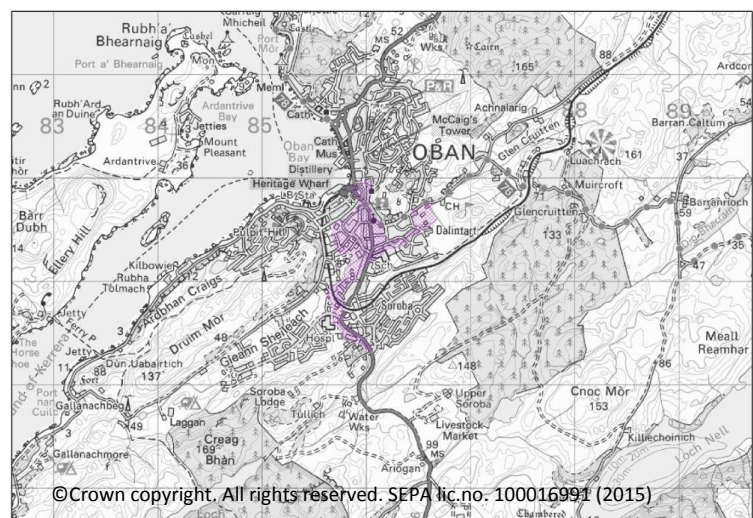
Objective ID: 103101

### Reduce river and coastal flooding in Oban from the Black Lynn Burn

Indicators:

- 650 people
- £280,000 Annual Average Damages from residential properties
- £1.2 million Annual Average Damages from non-residential properties

Target area:



Objective ID: 103102

Target area	Objective	ID	Indicators within PVA
Oban	Reduce risk from surface water flooding in Oban	103106	* See note below
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 320 residential properties</li> <li>• £1.8 million Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 320 residential properties</li> <li>• £1.8 million Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/31 there are 20 residential properties at risk and Annual Average Damages of £100,000.

## Actions to manage flooding in Potentially Vulnerable Area 01/31

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 Oban Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<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

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1031020005)</b>		
<b>Objective (ID):</b>	Reduce river and coastal flooding in Oban from the Black Lynn Burn (103102) Reduce risk along the Oban Bay frontage from coastal flooding (103101)		
<b>Delivery lead:</b>	Argyll and Bute Council		
<b>Priority:</b>	National: <b>5 of 168</b>	Within local authority: <b>1 of 9</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A study is recommended to assess flood risk from the Black Lynn Burn, including tidal effects in the Black Lynn Burn and coastal flooding in Oban Bay. The study should focus on direct defences, natural flood management (including flood storage, runoff control, sediment management), increasing storage on the existing lochs (Loch Gleann a Bhearraidh and Luachrach Loch), property level protection and individual property relocation for residual risk. Other actions may also be considered to develop the most sustainable flood risk management options.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 297 residential and 260 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £46 million.		
<b>Social:</b>	Approximately 653 people may directly benefit from flood protection works. Oban has a higher than average proportion of vulnerable residents. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Reduced flood risk to major transport links including the		

<b>Social:</b>	A816, Oban to Glasgow railway line, eight energy production/electricity utility sites and a telecommunications site would benefit the wider community. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	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. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on habitats and channel morphology, however the Black Lynn Burn is already heavily modified and channelized, and therefore impacts are likely to be limited. There is potential for creating new habitats through new flood storage areas. There are no nearby environmentally designated sites which could be impacted by flood protection works.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (1031060018)</b>		
<b>Objective (ID):</b>	Reduce risk from surface water flooding in Oban (103106)		
<b>Delivery lead:</b>	Argyll and Bute Council		
<b>Status:</b>	<b>Ongoing</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Oban' coastal flood warning area which is part of the Firth of Lorn and Loch Linnhe coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>From 2016 SEPA will engage with communities and promote Floodline using most the appropriate mix of methods for the area. These could include direct mailings, education activities, participation in local events and relevant flooding messages in the media. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

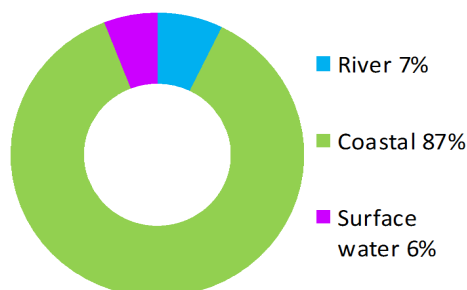


<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Scottish 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.		

## Loch Feochan (Potentially Vulnerable Area 01/32)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Knapdale coastal

### Summary of flooding impacts



### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £19,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<i>Surface water plan/study</i>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

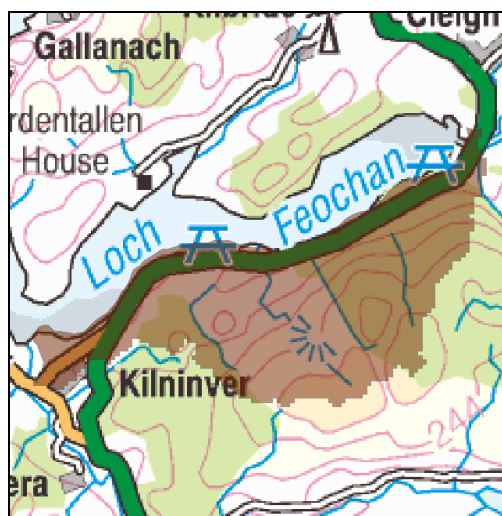
Actions

# Loch Feochan (Potentially Vulnerable Area 01/32)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Knapdale coastal

## Background

This Potentially Vulnerable Area is approximately 7km<sup>2</sup>. It is located on the southern shore of Loch Feochan approximately 8km south of Oban (shown below).

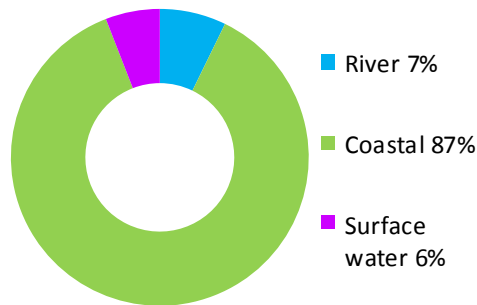


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The A816 and B844 pass through the Potentially Vulnerable Area.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are approximately £19,000 with the majority caused by coastal flooding.



**Figure 1: Annual Average Damages by flood source**

## Summary of flooding impacts

The coastal flood risk in this area is from Loch Feochan and is to the A816 road.

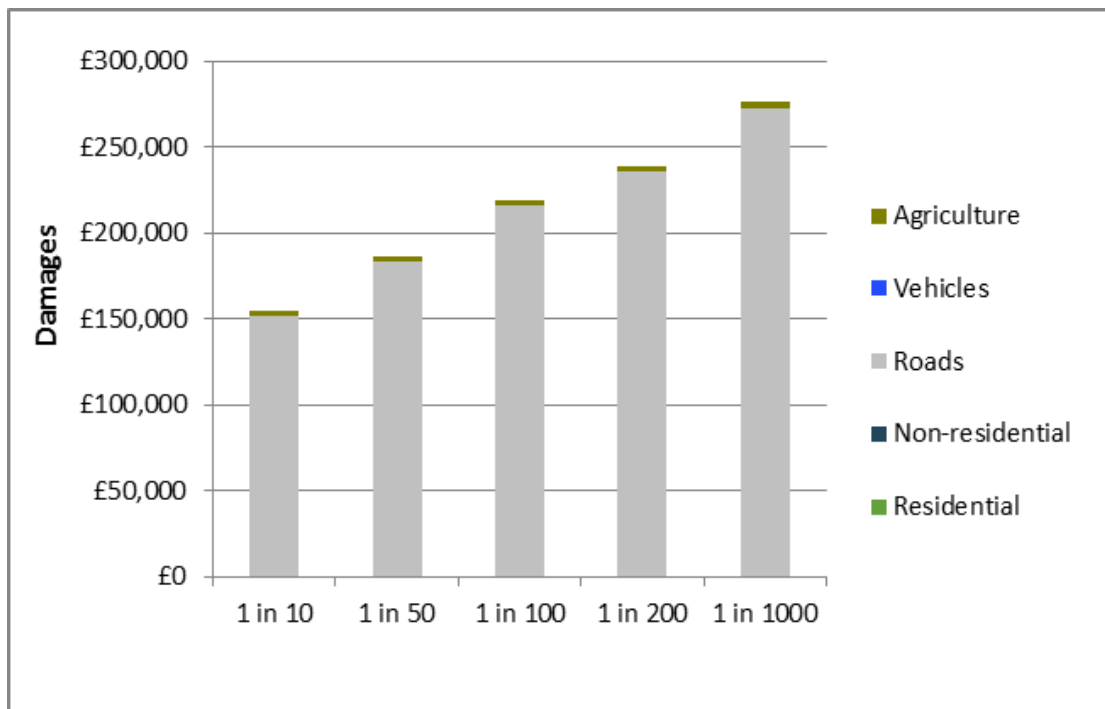
The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to roads.

The location of the impacts is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 20)	<10	<10	<10
Non-residential properties (total <10)	<10	<10	<10
People	<10	<10	<10
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at <10 locations	Roads at 10 locations	Roads at 10 locations
Environmental designated areas (km <sup>2</sup> )	0	0	0
Designated cultural heritage sites	0	0	0
Agricultural land (km <sup>2</sup> )	<0.1	0.1	0.2

**Table 1:** Summary of flooding impacts<sup>1</sup>

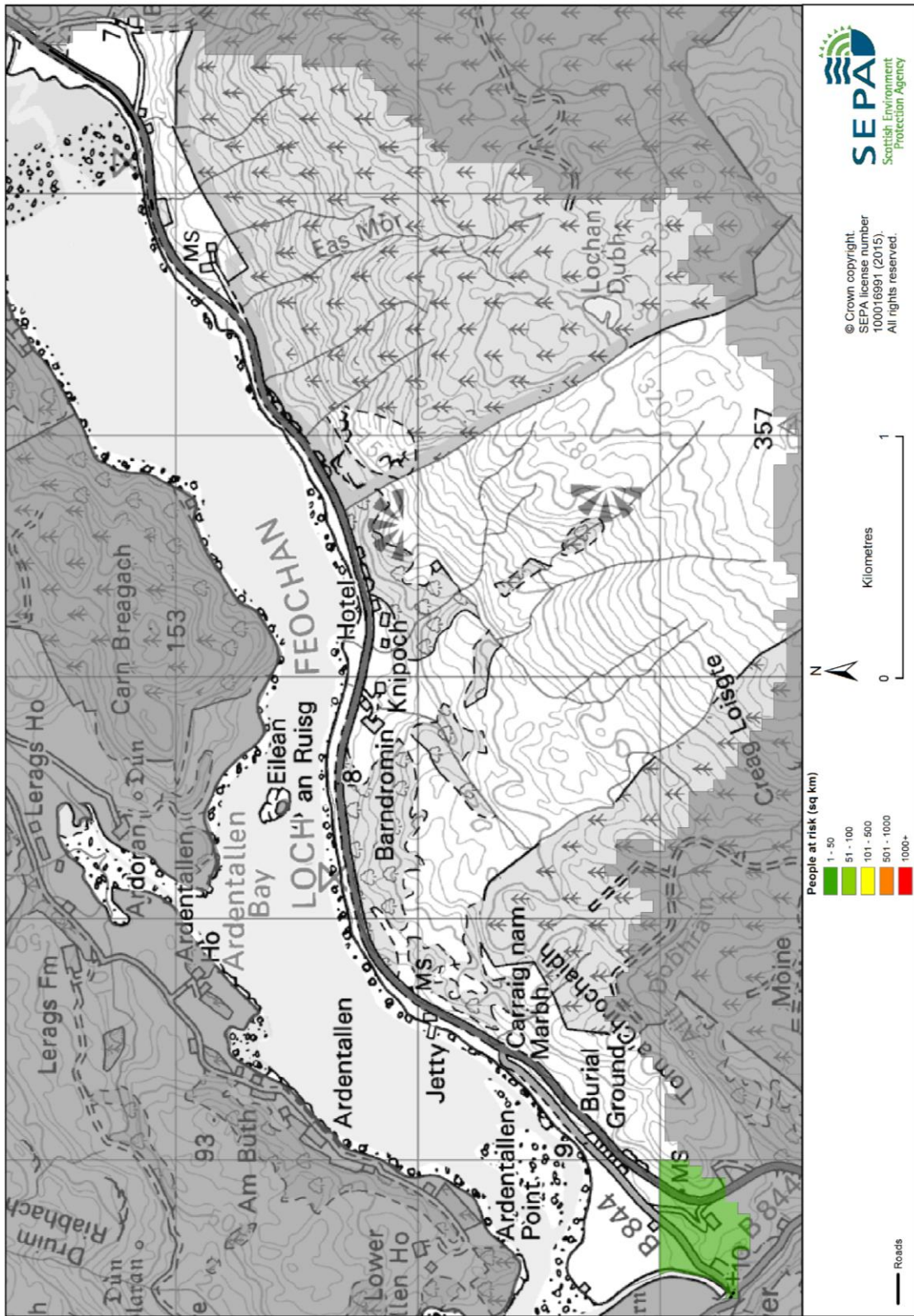


**Figure 2:** Damages by flood likelihood

## History of flooding

The A816 suffered from coastal flooding in 2009.

<sup>1</sup> 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 01/32

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 Loch Feochan Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £19,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £19,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/32

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 Loch Feochan Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		



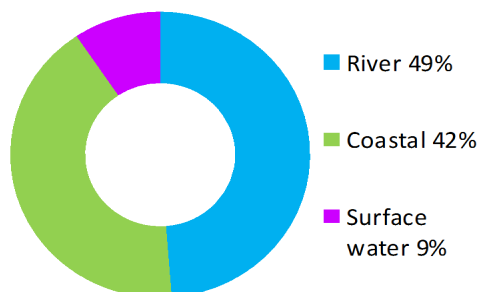
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Taynuilt (Potentially Vulnerable Area 01/33)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Etive coastal

### Summary of flooding impacts



#### At risk of flooding

- 40 residential properties
- <10 non-residential properties
- £130,000 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

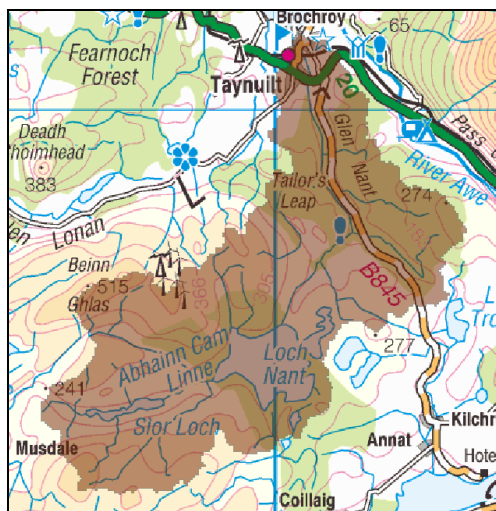
# Taynuilt (Potentially Vulnerable Area 01/33)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Etive coastal

## Background

This Potentially Vulnerable Area is located to the south of Loch Etive and includes the village of Taynuilt (shown below). It is approximately 45km<sup>2</sup>.

The A85 road runs through the area.

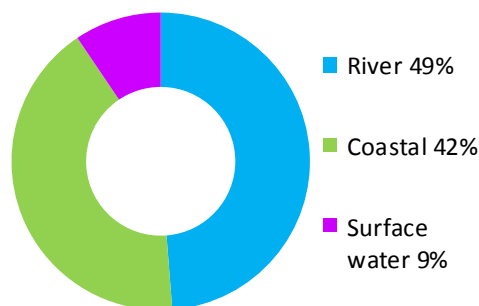


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The River Nant is the largest river in this Potentially Vulnerable Area.

There are approximately 40 residential and fewer than 10 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £130,000 with the majority caused by river and coastal flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

Coastal and river flood risk are both focused on Taynuilt, with coastal flood risk associated with Loch Etive and river flood risk from the River Nant.

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.

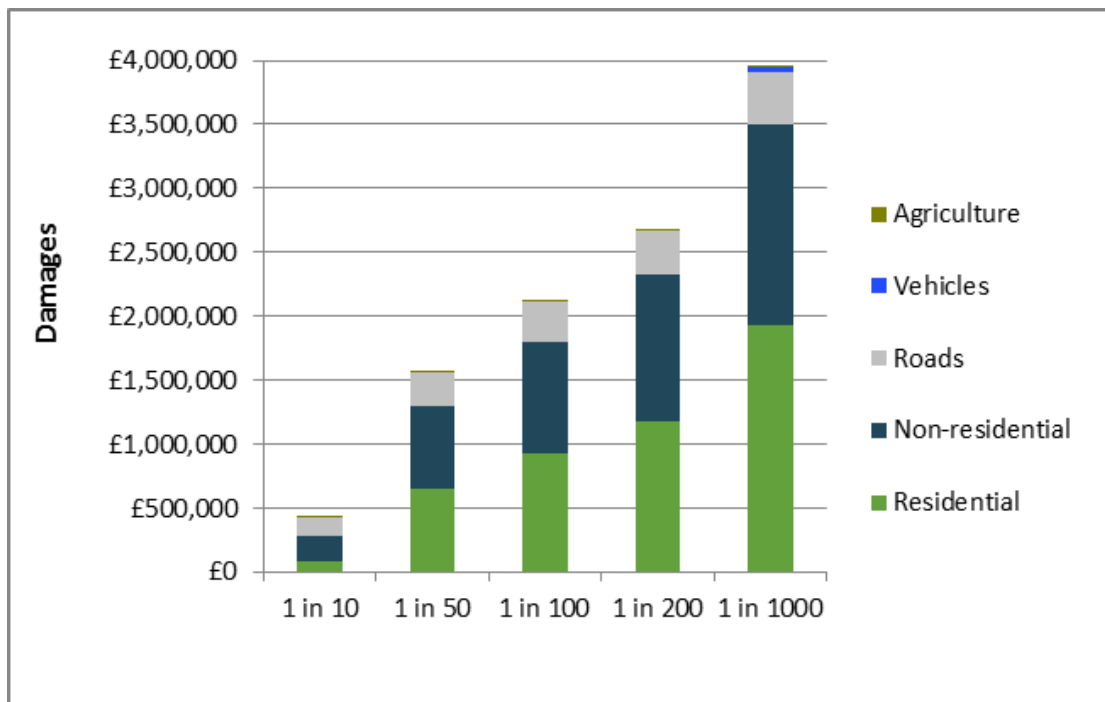
The A85 is at risk, as are small areas of designated environment sites including Loch Etive Woods Special Area of Conservation and Glen Nant National Nature Reserve and Site of Special Scientific Interest.

The damages associated with floods of different likelihood are shown in Figure 2. Residential and non-residential properties experience the greatest economic impact.

The location of the impacts is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 280)	<10	40	60
Non-residential properties (total 70)	<10	<10	<10
People	<10	90	130
Community facilities	0	0	0
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations Rail at <10 locations	Roads at 20 locations Rail at <10 locations	Roads at 30 locations Rail at <10 locations
Environmental designated areas (km <sup>2</sup> )	0.5	0.5	0.5
Designated cultural heritage sites	0	0	0
Agricultural land (km <sup>2</sup> )	0.6	0.6	0.6

**Table 1:** Summary of flooding impacts<sup>1</sup>

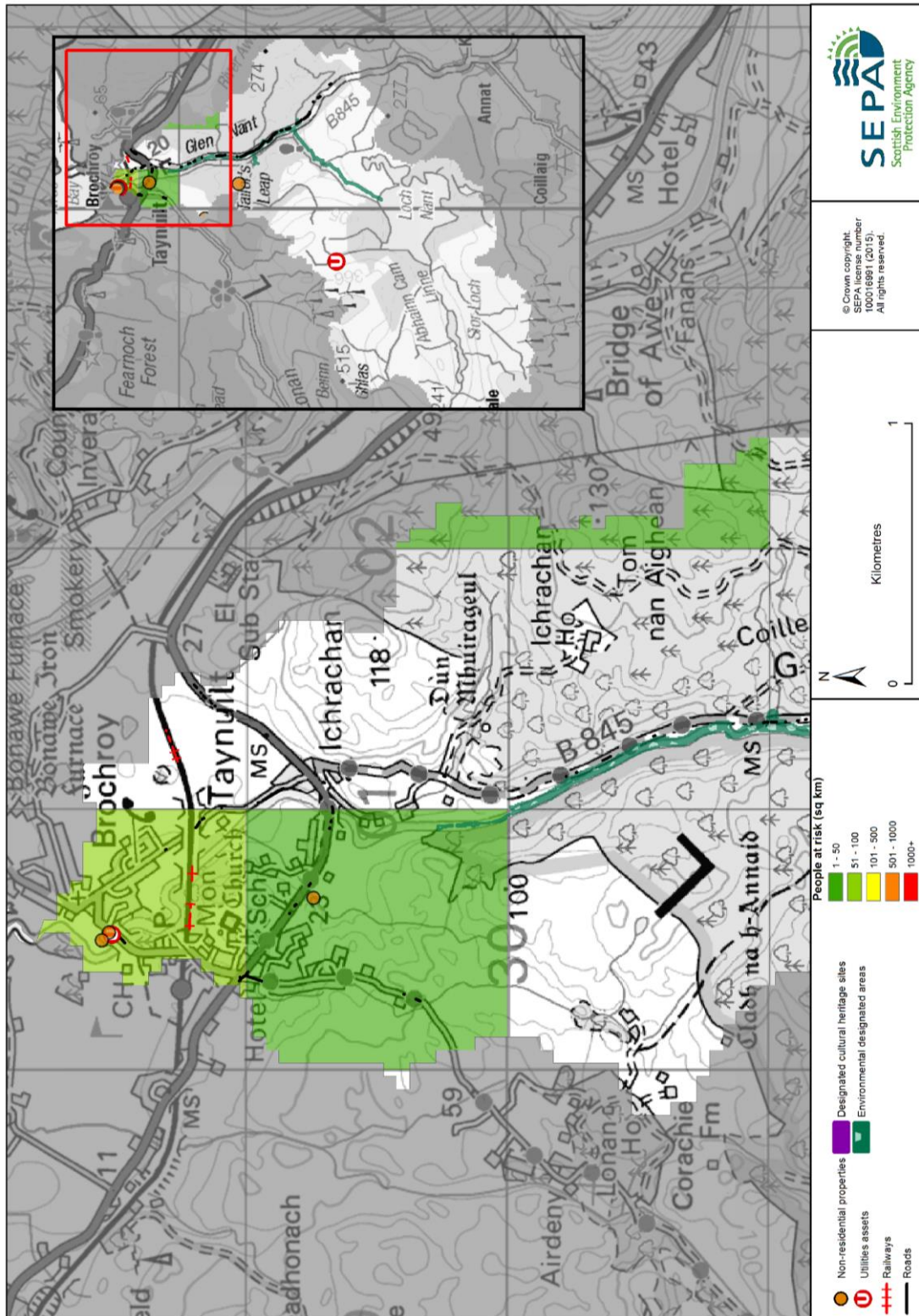


**Figure 2:** Damages by flood likelihood

## History of flooding

There are records of flooding in Taynuilt from Loch Etive. This affects the lower stretches of the road at the mouth of the River Awe.

<sup>1</sup> 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 01/33

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 Taynuilt Potentially Vulnerable Area.

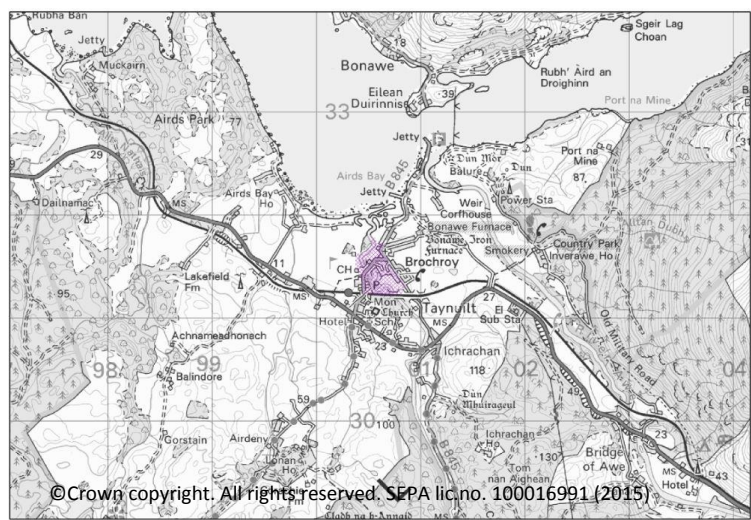
### Reduce flood risk in Taynuilt from the River Nant

Indicators:

- 90 people
- £42,000 Annual Average Damages from residential properties

Objective ID: 103301

Target area:



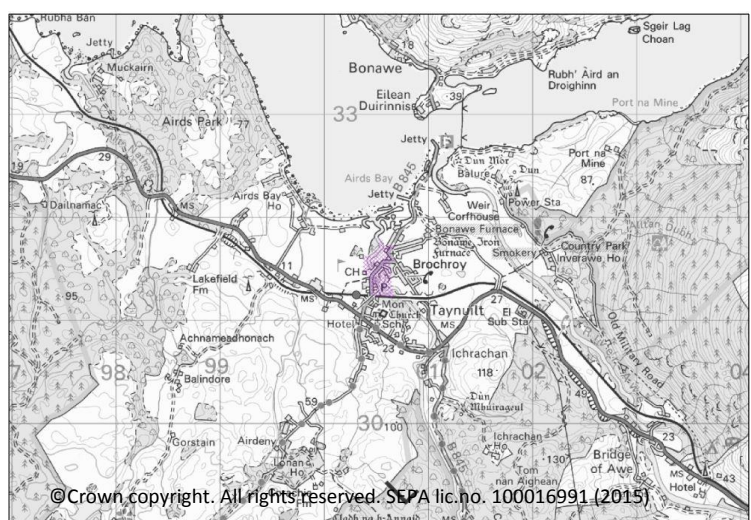
### Reduce flood risk in Taynuilt from Loch Etive

Indicators:

- £49,000 Annual Average Damages from non-residential properties

Objective ID: 103302

Target area:



Target area	Objective	ID	Indicators within PVA
Taynuilt	Reduce the physical or disruption risk related to the transport network for roads	1310	<ul style="list-style-type: none"> <li>• 5 locations on the A85 with a total length of 120m</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £130,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £130,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/33

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 Taynuilt 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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1310021)</b>		
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for roads (1310)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A85.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1033020016)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Taynuilt from the River Nant (103301) Reduce flood risk in Taynuilt from Loch Etive (103302)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will review existing coastal and river modelling and data in this area, to determine if any improvements can be made to the flood maps. SEPA will support the local authority if further work beyond a strategic scale required.		



<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

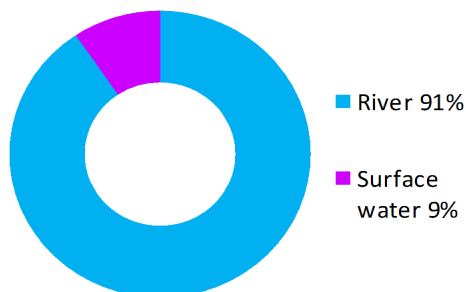
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Loch Awe (Potentially Vulnerable Area 01/34)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Etive coastal

### Summary of flooding impacts



#### At risk of flooding

- 20 residential properties
- 30 non-residential properties
- £100,000 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

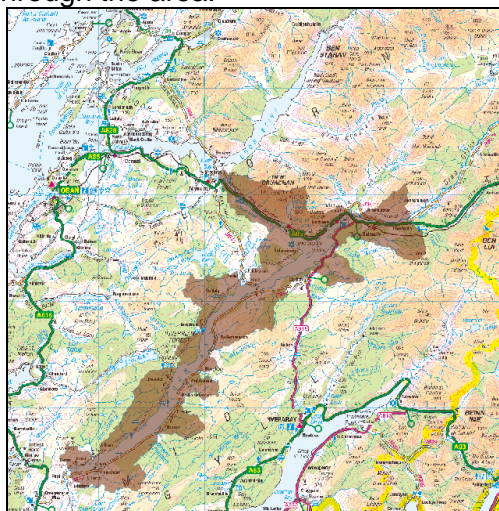
## Loch Awe (Potentially Vulnerable Area 01/34)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	River Awe

### Background

This Potentially Vulnerable Area is located around Loch Awe and includes Dalmally (shown below). It is approximately 230km<sup>2</sup>.

The A85 and A819 roads and the Glasgow to Oban railway line pass through the area.

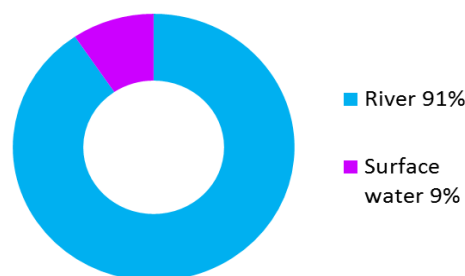


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The main rivers are the Awe and the Orchy.

There are approximately 20 residential and 30 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £100,000 with the majority caused by river flooding.



**Figure 1:** Annual Average Damages by flood source

### Summary of flooding impacts

River flood risk is associated with the southern end of the River Orchy where it enters Loch Awe adjacent to the A85, and in Dalmally Bridge. Other areas of river flood risk are Bridge of Awe, Lochawe and Dalavich.

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.

Roads potentially affected include the A85, the B8077 and the B840, which links local communities on the south side of Loch Awe. Several locations along the Glasgow to Oban railway line are also at risk of flooding.

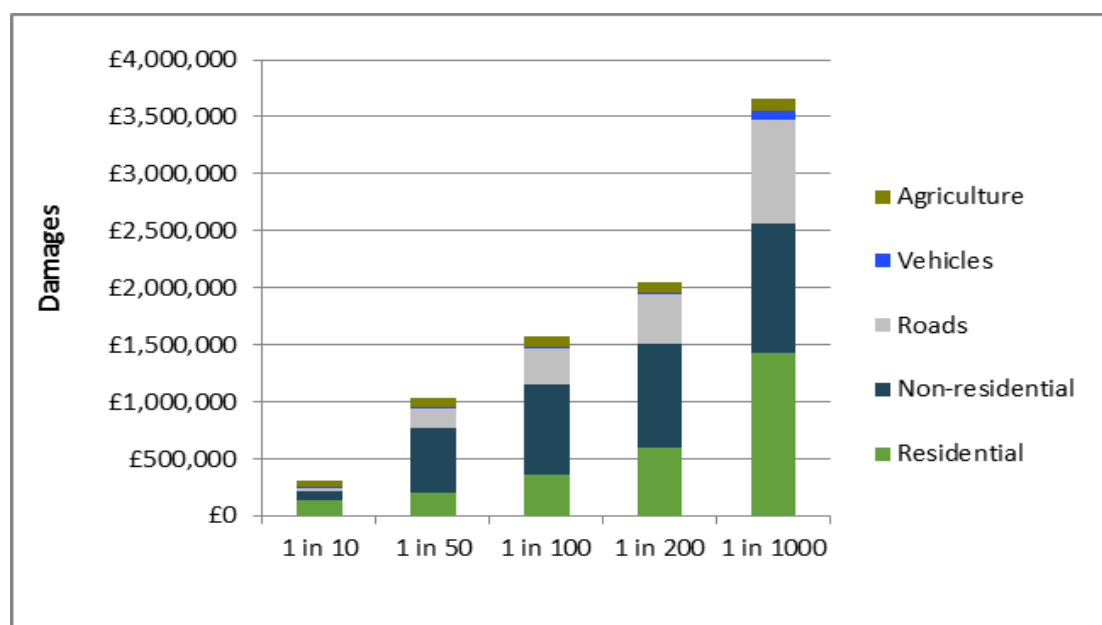
Dalmally Primary School and large areas of agricultural land are at risk of flooding. There are 27 designated cultural heritage sites and small areas of designated environmental sites at risk. These include Special Areas of Conservation, Special Protection Areas, and Sites of Special Scientific Interest at Loch Etive Woods, Glen Etive and Glen Fyne and Coille Leitire.

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 non-residential properties and roads.

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 560)	<10	20	30
Non-residential properties (total 230)	<10	30	40
People	10	30	60
Community facilities	0	<10 Educational buildings	<10 Educational buildings
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 70 locations Rail at 20 locations	Roads at 90 locations Rail at 20 locations	Roads at 110 locations Rail at 30 locations
Environmental designated areas (km <sup>2</sup> )	<0.1	<0.1	<0.1
Designated cultural heritage sites	25	27	29
Agricultural land (km <sup>2</sup> )	3	5	5

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

## History of flooding

In 1884 heavy rain flooded low lying land and the railway line between Falls of Cruachan and the Pass of Brander. Roads along Loch Awe up to Dalmally were also damaged.

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

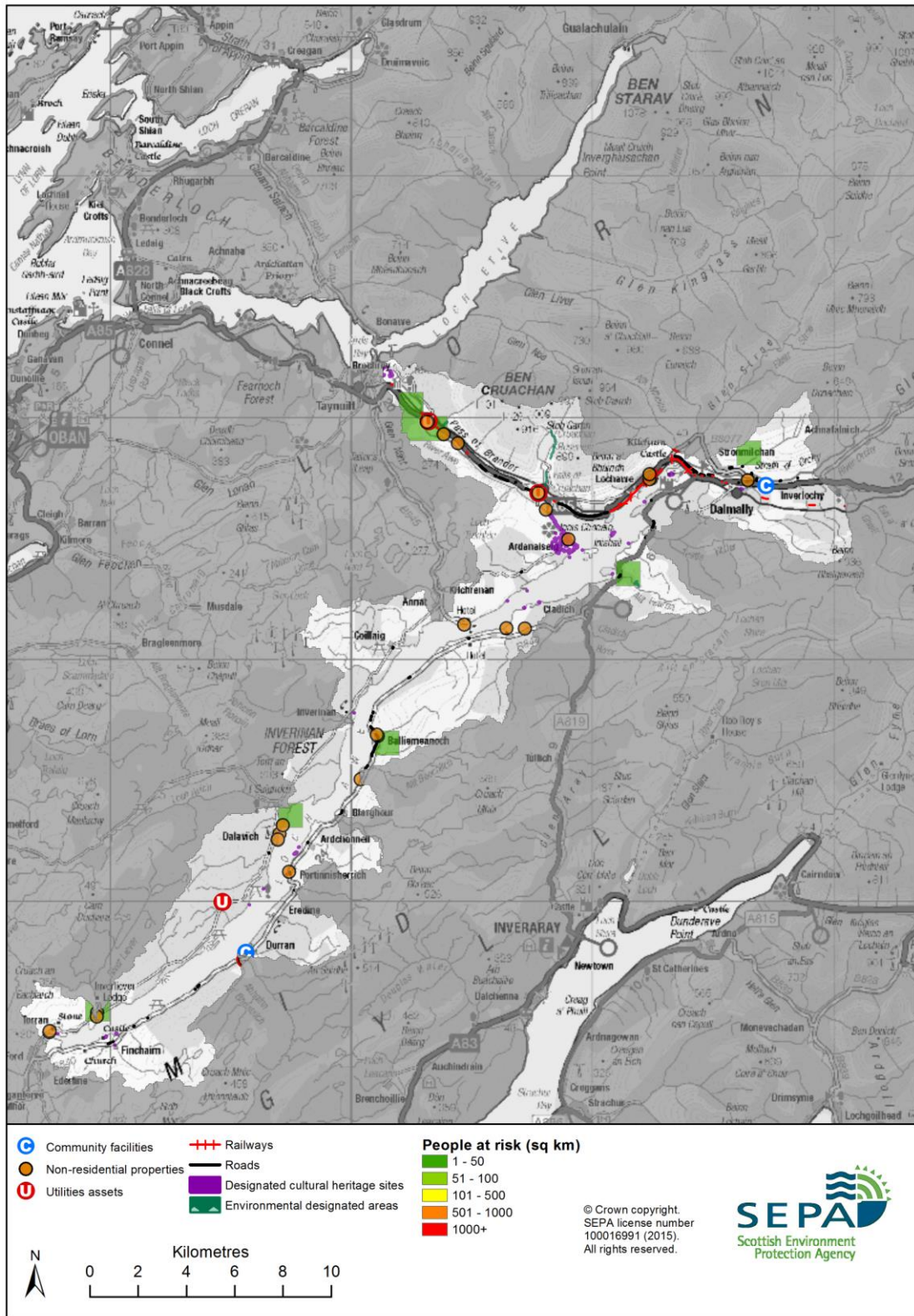


Figure 3: Impacts of flooding

## Objectives to manage flooding in Potentially Vulnerable Area 01/34

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 Loch Awe Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Loch Awe	Reduce the physical or disruption risk related to the transport network for roads	1311	<ul style="list-style-type: none"> <li>• 19 locations on the A85 with a total length of 720m</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 20 residential properties</li> <li>• £100,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 20 residential properties</li> <li>• £100,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/34

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 Loch Awe Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1311021)</b>		
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for roads (1311)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A85.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020016)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will be seeking to incorporate additional surface water hazard mapping information into the flood maps to improve understanding of flood risk. Approximately 2,100km <sup>2</sup> of improved data is currently available within this Local Plan District.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

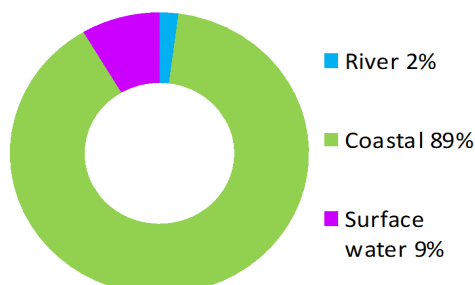
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Providing an emergency response to 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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Craignish (Potentially Vulnerable Area 01/35)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Knapdale coastal

### Summary of flooding impacts



### At risk of flooding

- <10 residential properties
- 10 non-residential properties
- £93,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<i>Surface water plan/study</i>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

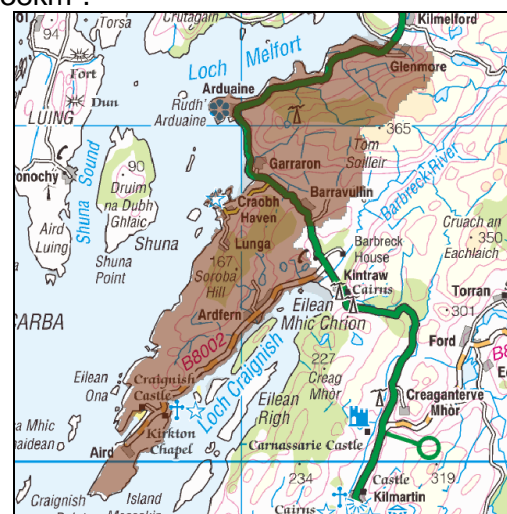
Actions

## Craignish (Potentially Vulnerable Area 01/35)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Knapdale coastal

### Background

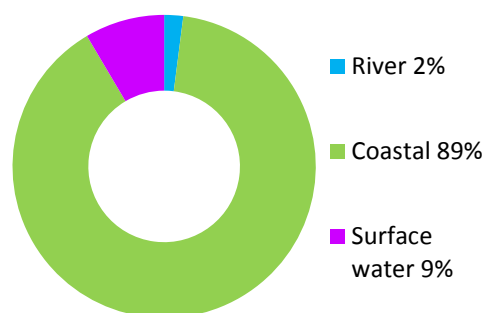
This Potentially Vulnerable Area is located between Loch Craignish and Loch Melfort and includes Glenmore, Arduaine and Aird (shown below). It is largely rural and is approximately 38km<sup>2</sup>.



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There are fewer than 10 residential and approximately 10 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £93,000 with the majority caused by coastal flooding.



**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

Coastal flood risk affects the estuary of Staing Mhor and short stretches of coastline, for example the A816 road near Tullich and Kames Farm.

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.

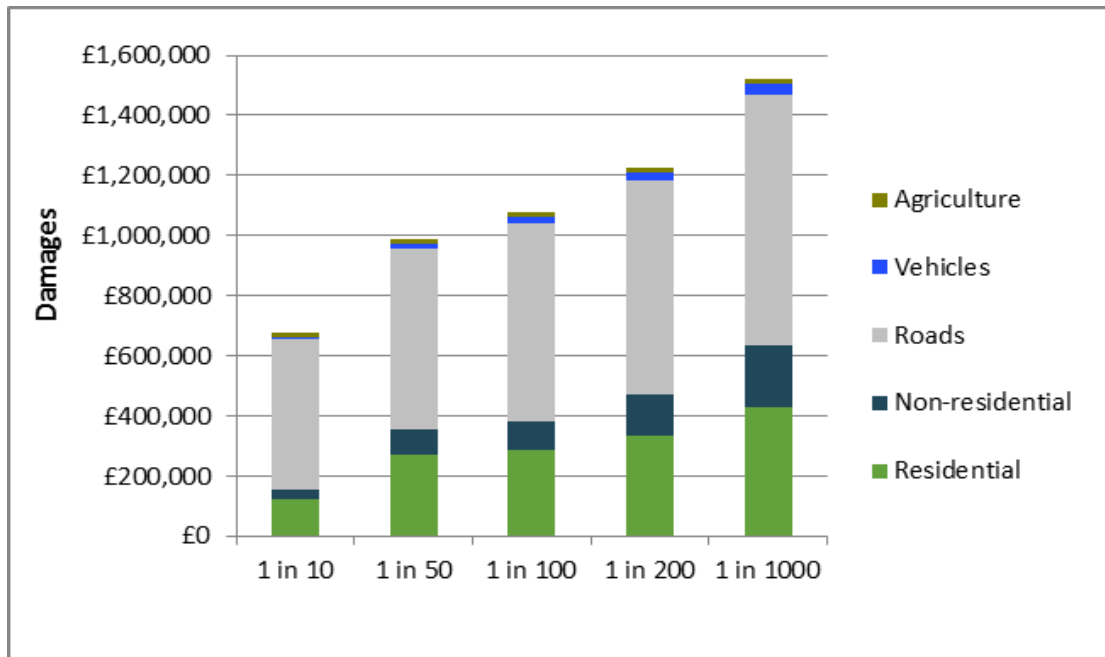
Roads at risk of flooding include the A816, which links communities between north and south Argyll, and the B8002 which links communities west of Loch Craignish to mainland Scotland. Craignish Primary School, two designated cultural heritage sites and a small area of the Firth of Lorn Special Area of Conservation are also at risk of flooding.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to roads followed by damages to residential properties.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 270)	<10	<10	<10
Non-residential properties (total 160)	<10	10	20
People	<10	20	20
Community facilities	<10 Educational buildings	<10 Educational buildings	<10 Educational buildings
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations	Roads at 30 locations	Roads at 30 locations
Environmental designated areas (km <sup>2</sup> )	<0.1	<0.1	<0.1
Designated cultural heritage sites	1	2	3
Agricultural land (km <sup>2</sup> )	0.5	0.7	0.8

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

## History of flooding

There is no record of large-scale flooding within this Potentially Vulnerable Area.

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

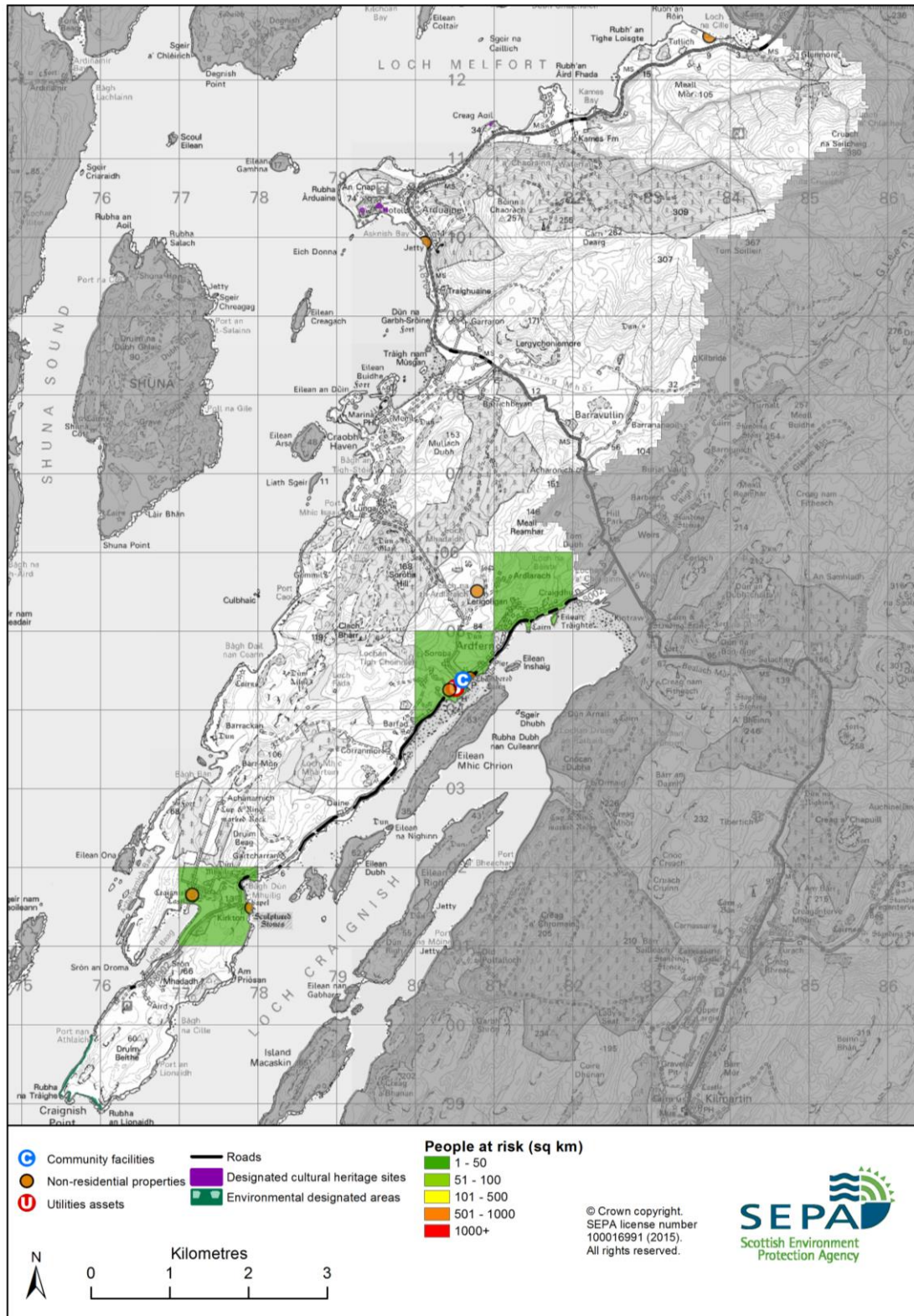


Figure 3: Impacts of flooding

## Objectives to manage flooding in Potentially Vulnerable Area 01/35

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 Craignish Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £93,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £93,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/35

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 Craignish Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

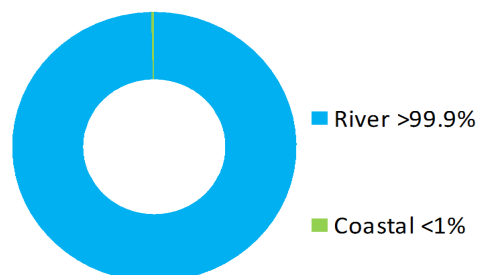
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Kilmartin (Potentially Vulnerable Area 01/36)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	River Add

### Summary of flooding impacts



#### At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £49,000 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>	<i>New flood warning</i>	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<i>Surface water plan/study</i>	<b>Emergency plans/response</b>
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	<b>Flood forecasting</b>	<b>Self help</b>	<b>Maintenance</b>	<b>Planning policies</b>

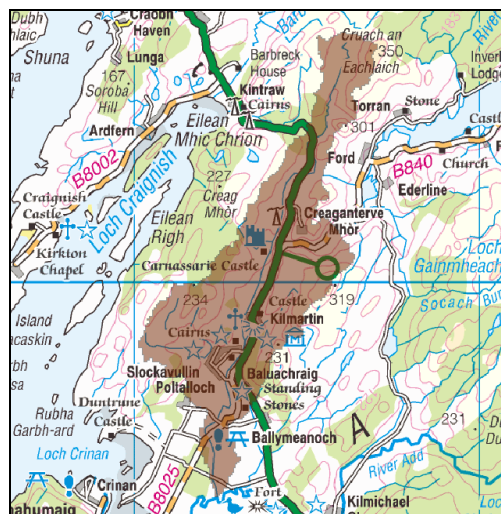
Actions

# Kilmartin (Potentially Vulnerable Area 01/36)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	River Add

## Background

This Potentially Vulnerable Area covers Poltalloch, Kilmartin and surrounding rural areas (shown below). It is approximately 29km<sup>2</sup>. The A816 passes through the area.

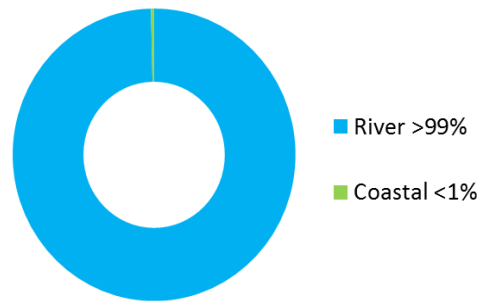


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The Kilmartin Burn is the main watercourse in this area.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are approximately £49,000 with the majority are caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

## Summary of flooding impacts

There is flood risk in the south of this area from the Kilmartin Burn. This affects mainly agricultural land south of Slockavullin as well as some isolated properties and the A816 road. The area at risk of flooding around Slockavullin contains a number of important historical sites.

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.

Roads with a risk of flooding include the A816 which links communities between Lochgilphead and Oban, the B840 and the B8025.

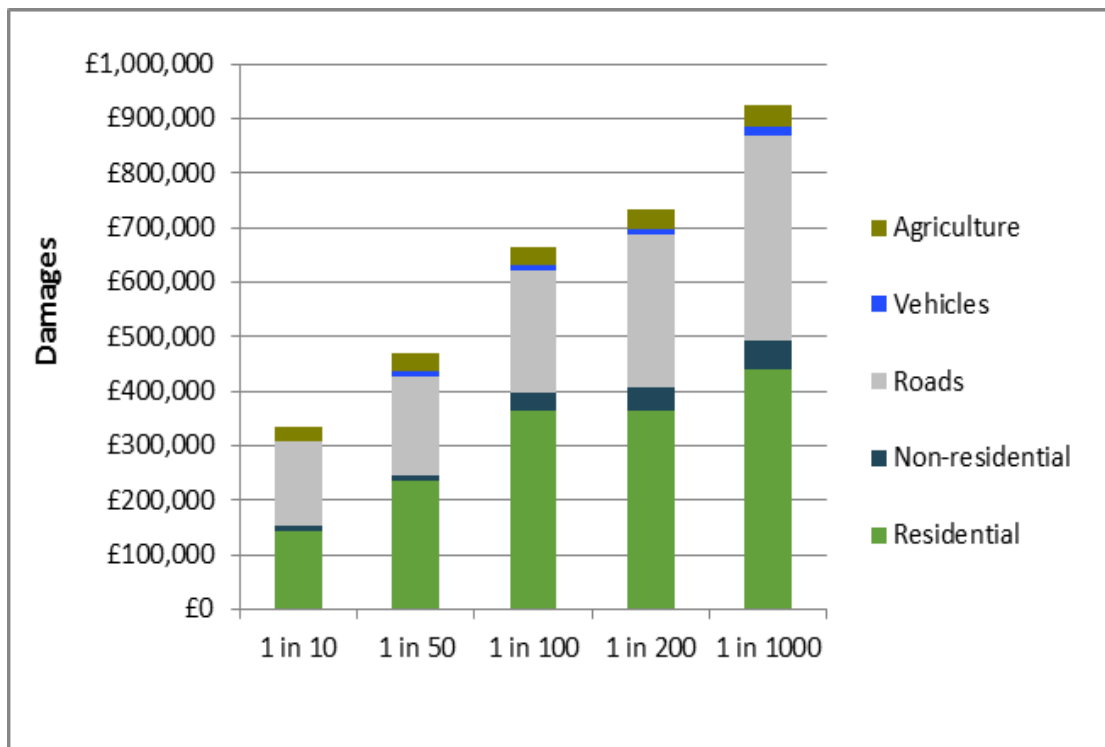
Three designated cultural heritage sites and small areas of designated environmental sites are at risk. These include the Moine Mhor Special Area of Conservation and Site of Special Scientific Interest.

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 roads.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 140)	<10	<10	<10
Non-residential properties (total 60)	<10	<10	<10
People	<10	20	20
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at 30 locations	Roads at 30 locations	Roads at 30 locations
Environmental designated areas (km <sup>2</sup> )	0.1	0.2	0.2
Designated cultural heritage sites	2	3	4
Agricultural land (km <sup>2</sup> )	1	2	2

**Table 1:** Summary of flooding impacts<sup>1</sup>

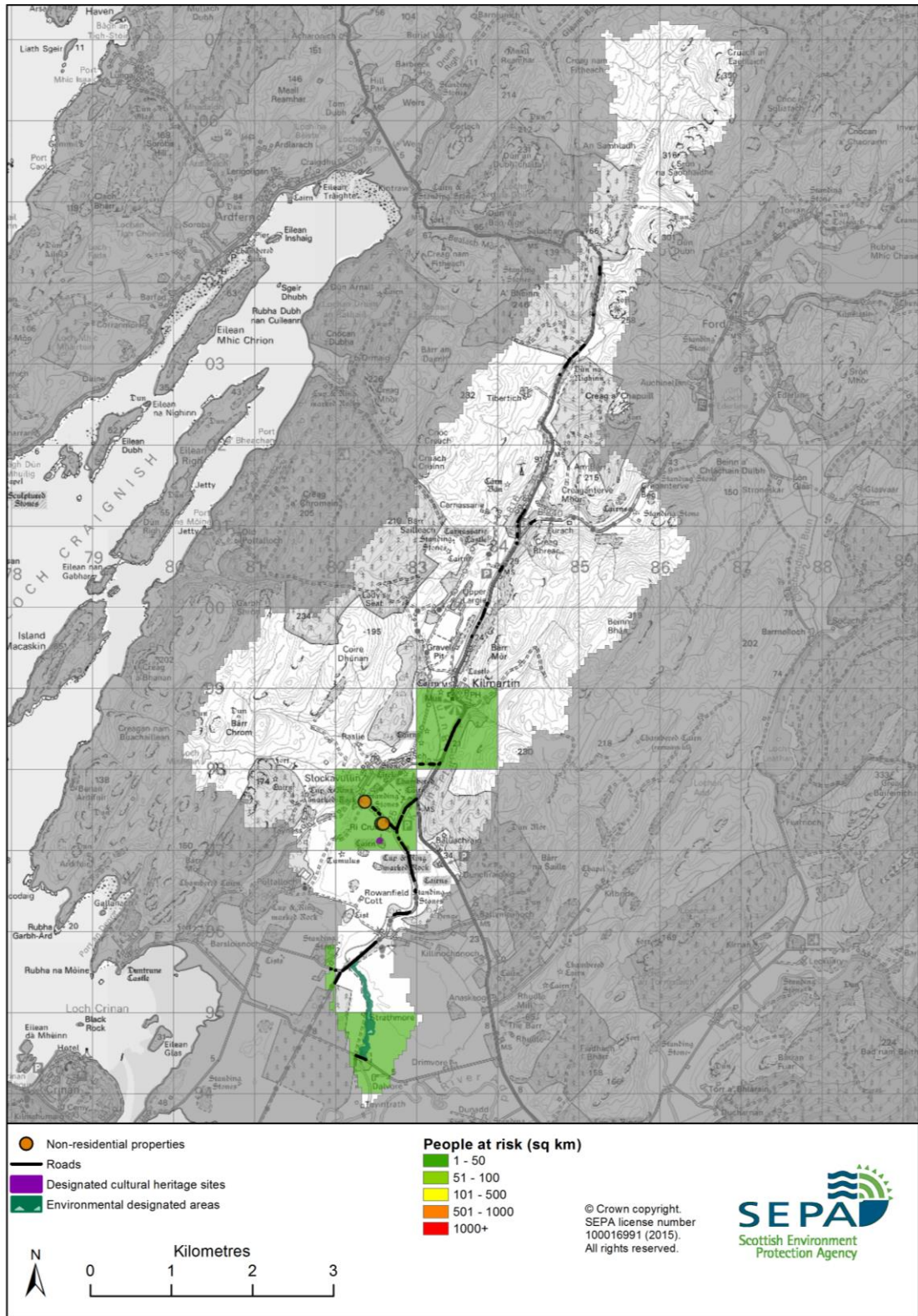


**Figure 2:** Damages by flood likelihood

## History of flooding

Flooding between Kilmartin and Ford Road End on the A816 has occurred on a number of occasions, including in November 2007.

<sup>1</sup> 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 01/36

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 Kilmartin Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £49,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• &lt;10 residential properties</li> <li>• £49,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/36

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 Kilmartin Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

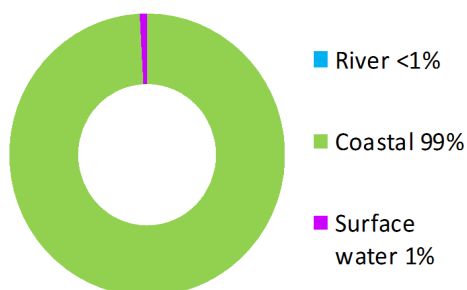
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

## Inveraray (Potentially Vulnerable Area 01/37)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Loch Fyne coastal

### Summary of flooding impacts



### At risk of flooding

- 40 residential properties
- 50 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	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

## Inveraray (Potentially Vulnerable Area 01/37)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Loch Fyne coastal

### Background

This Potentially Vulnerable Area is approximately 6km<sup>2</sup> and is centred on the town of Inveraray, close to the head of Loch Fyne. It also includes the community of Dalchenna (shown below). The A83 and A819 pass through the area.

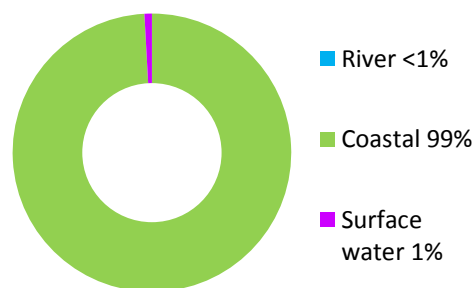


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The River Aray passes to the north; otherwise there are no significant watercourses in the area.

There are approximately 40 residential and 50 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £390,000 with the majority caused by coastal flooding.



**Figure 1:** Annual Average Damages by flood source

### Summary of flooding impacts

Coastal flood risk is identified along the seafront in Inveraray, extending south towards Main Street East and further to the south at Newtown.

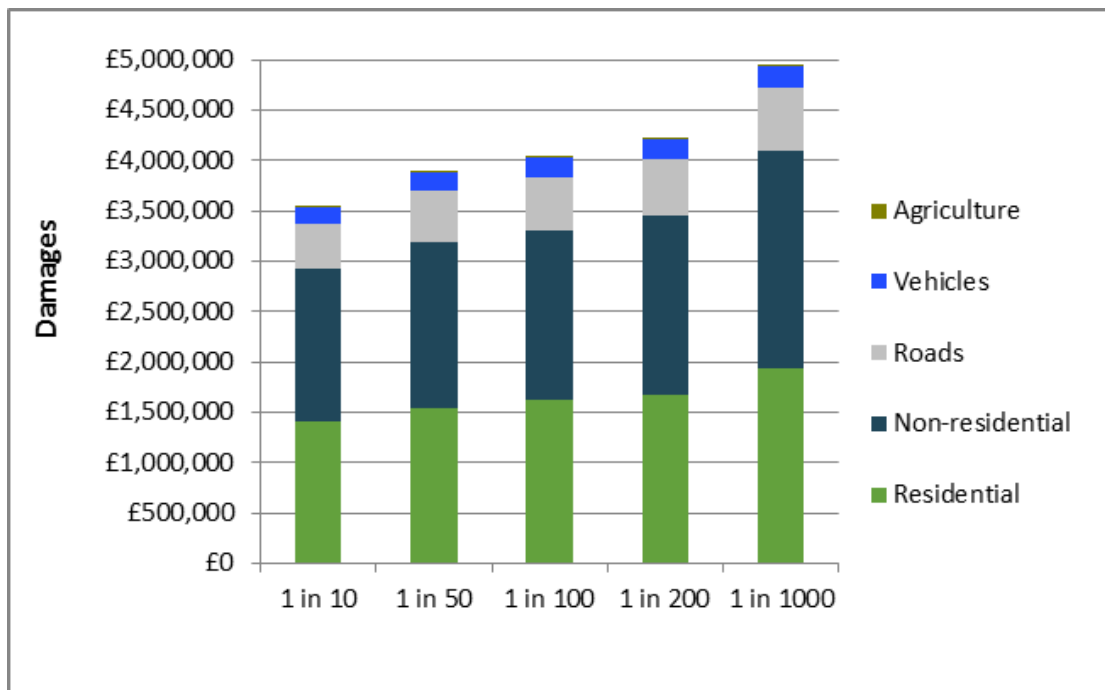
The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. Roads potentially affected by flooding include the A83 and A819. There are 17 designated cultural heritage sites at risk of flooding.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential and non-residential properties.

The location of the impacts from flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 280)	40	40	50
Non-residential properties (total 130)	40	50	50
People	80	100	100
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at <10 locations	Roads at 10 locations	Roads at 10 locations
Environmental designated areas (km <sup>2</sup> )	0	0	0
Designated cultural heritage sites	16	17	17
Agricultural land (km <sup>2</sup> )	<0.1	1	1

**Table 1:** Summary of flooding impacts<sup>1</sup>

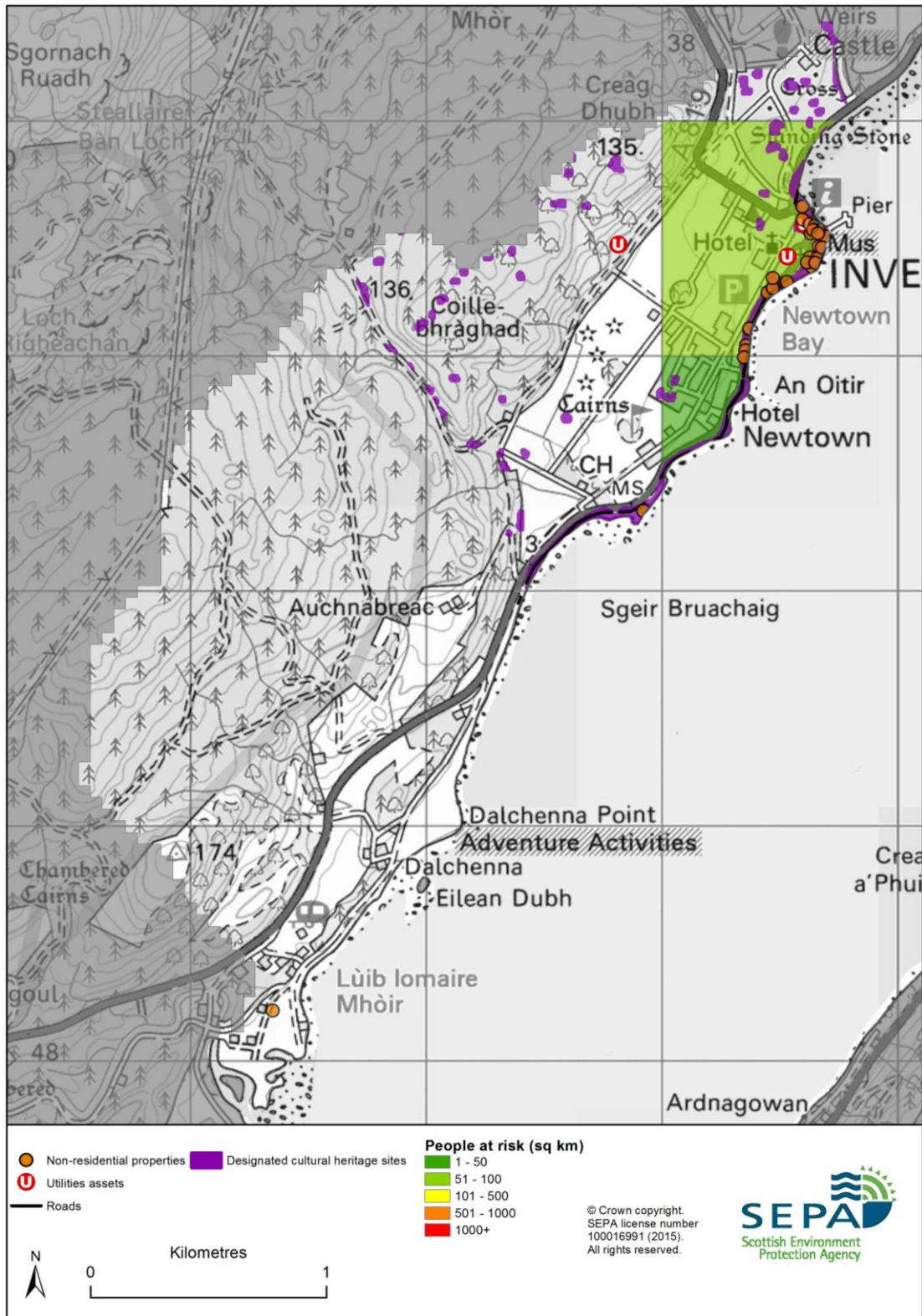


**Figure 2:** Damages by flood likelihood

## History of flooding

The earliest recorded flood was in 1772, when roads were affected and the river destroyed several bridges. In 1893, surface water flooded several properties due to blocked drains. In 1909, heavy rainfall caused surface water flooding.

<sup>1</sup> 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 01/37

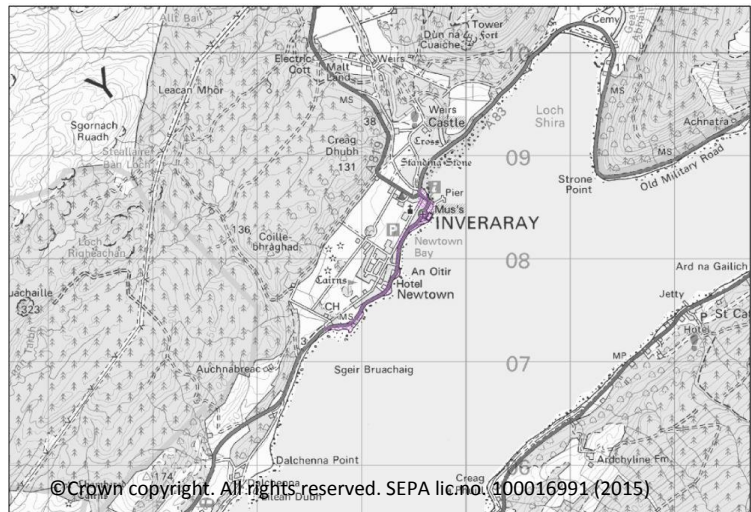
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

### Reduce risk in Inveraray from coastal flooding

Indicators:

Target area:

- 100 people
- £150,000 Annual Average Damages from residential properties
- £160,000 Annual Average Damages from non-residential properties



Objective ID: 103701

Target area	Objective	ID	Indicators within PVA
Inveraray	Reduce the physical or disruption risk related to the transport network for roads	1312	<ul style="list-style-type: none"> <li>• 8 locations on the A83 with a total length of 1.3km</li> </ul>
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £390,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 40 residential properties</li> <li>• £390,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/37

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 Inveraray Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1312021)</b>		
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for roads (1312)		
<b>Delivery lead:</b>	Transport Scotland		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce flood risk to identified sections of the A83.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1037020016)</b>		
<b>Objective (ID):</b>	Reduce risk in Inveraray from coastal flooding (103701)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	SEPA will review existing modelling for this area in partnership with Argyll and Bute Council to determine if any improvements can be made to the flood maps. SEPA will support the local authority if further work beyond a strategic scale is required.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

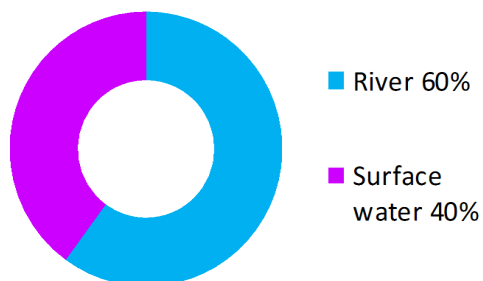
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Providing an emergency response to 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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Lochgilphead (Potentially Vulnerable Area 01/38)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Loch Fyne coastal

### Summary of flooding impacts



#### At risk of flooding

- 20 residential properties
- 10 non-residential properties
- £69,000 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>	<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	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

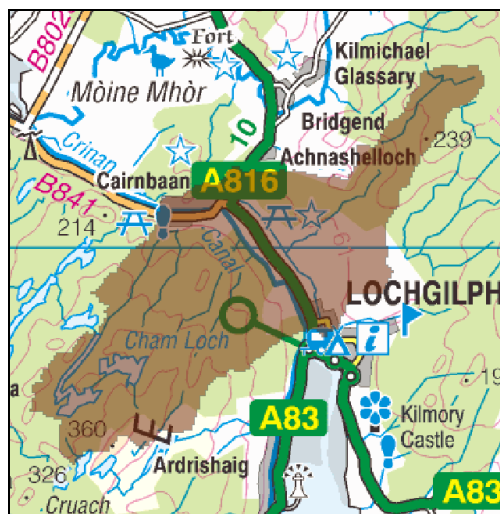
Actions

## Lochgilhead (Potentially Vulnerable Area 01/38)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Loch Fyne coastal

### Background

This Potentially Vulnerable Area covers the northern part of Lochgilhead, Cairnbaan and surrounding rural areas (shown below). It is approximately 23km<sup>2</sup> and the A816 passes through the area.

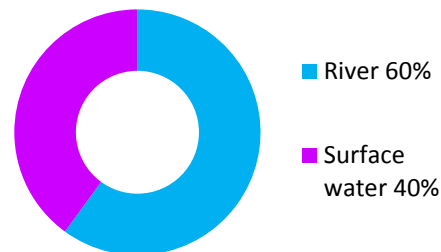


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The Crinan Canal and the Badden Burn are the main watercourses in the area.

There are approximately 20 residential and 10 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £69,000 with the majority caused by river flooding.



**Figure 1: Annual Average Damages by flood source**

### Summary of flooding impacts

The Badden Burn and Crinan Canal are the primary sources of river flood risk in the area affecting properties and roads in Lochgilhead.

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.

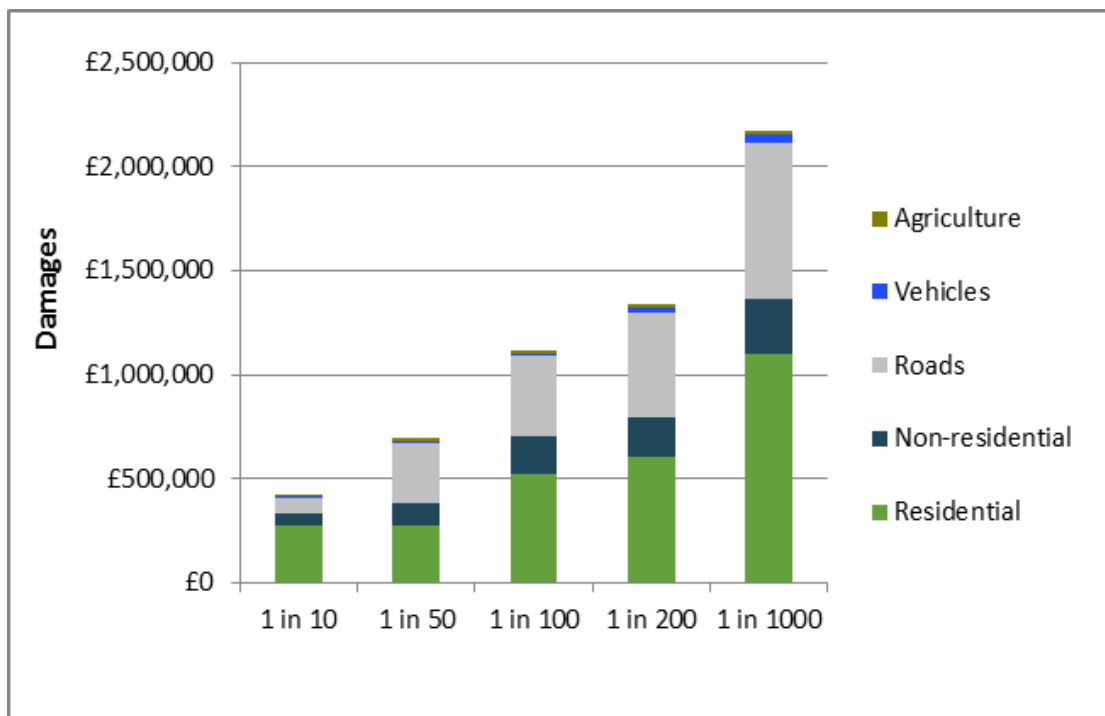
There are significant lengths of road at risk of flooding, including the A816 between Lochgilhead and Cairnbaan and the B841. Five designated cultural heritage sites and small areas of environmental importance are at risk. These include Knapdale Lochs Special Protection Area and Site of Special Scientific Interest.

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 roads.

The location of the impacts of flooding is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 360)	<10	20	30
Non-residential properties (total 60)	<10	10	20
People	20	40	70
Community facilities	0	0	<10 Educational buildings
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations	Roads at 30 locations	Roads at 30 locations
Environmental designated areas (km <sup>2</sup> )	0.3	0.3	0.3
Designated cultural heritage sites	4	5	5
Agricultural land (km <sup>2</sup> )	0.6	0.7	0.7

**Table 1:** Summary of flooding impacts<sup>1</sup>

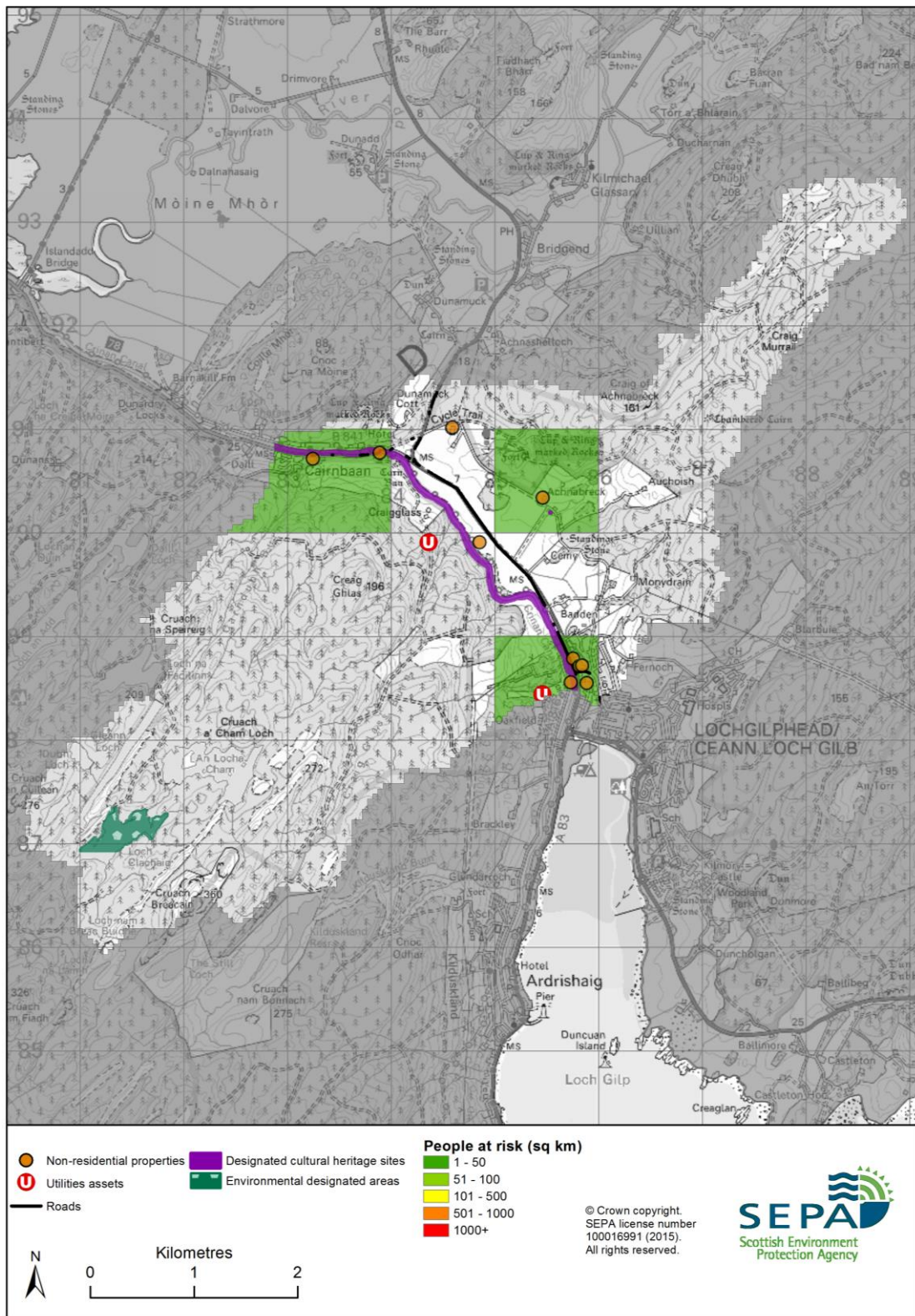


**Figure 2:** Damages by flood likelihood

## History of flooding

The Badden Burn is known to flood regularly on the Moss and the Crinan Canal floods the A816.

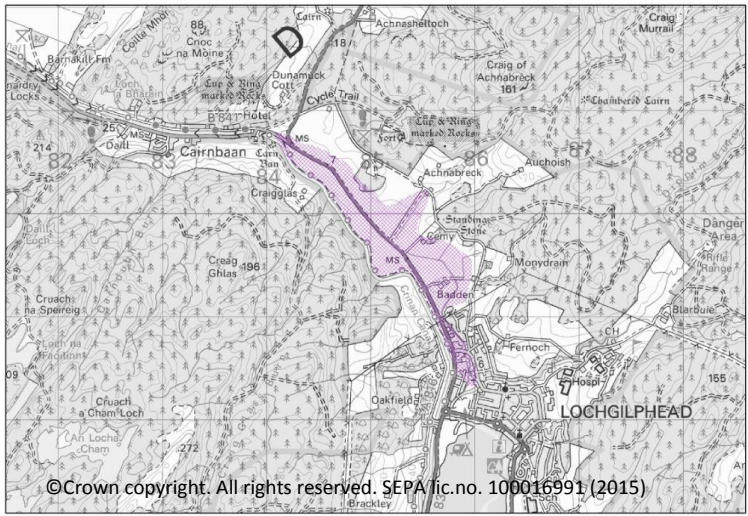
<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



**Figure 3: Impacts of flooding**

## Objectives to manage flooding in Potentially Vulnerable Area 01/38

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 Lochgilphead Potentially Vulnerable Area.

Reduce flood risk in Lochgilphead from the Badden Burn	
Indicators:	Target area:
<ul style="list-style-type: none"> <li>20 people</li> <li>A816</li> </ul>	
Objective ID: 103801	

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>20 residential properties</li> <li>£69,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>20 residential properties</li> <li>£69,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/38

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 Lochgilphead Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1038010005)</b>		
<b>Objective (ID):</b>	Reduce flood risk in Lochgilphead from the Badden Burn (103801)		
<b>Delivery lead:</b>	Argyll and Bute Council		
<b>Priority:</b>	National:		Within local authority:
	<b>154 of 168</b>		<b>8 of 9</b>
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A hydraulic study is required to investigate river and coastal flooding in Lochgilphead. The flood risk in the Lochgilphead area is complex due to the interaction of different sources, which are not thought to be currently represented accurately in the baseline flood modelling. A better understanding of the interaction of the Badden Burn with the Crinan Canal and the tide is needed before the feasibility of actions can be appraised in greater detail. Due to the frequency history of flooding that results in annual road closures and significant disruption to travel, this study will to be progressed in cycle 1.		
<b>Potential impacts</b>			
<b>Economic:</b>	Based on the current data, potential damages avoided of up to £180,000 can be achieved. However, this is likely to be underestimated due to the complex interactions between flood sources and a better estimate should be developed as part of the study.		
<b>Social:</b>	Improved understanding of the flood extents will confirm the number of properties and other receptors (such as the A816 road and the school) at risk of flooding from the Badden Burn. A reduction in flood risk would have a positive benefit to the health and wellbeing of the		

<b>Social:</b>	community and socially vulnerable people. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for environmental impacts if any actions are progressed following the outcome of the improvements to the modelling of the flood risk. There are two scheduled monument cultural heritage sites which may benefit from any future works. There are no environmentally designated sites nearby which could be impacted by future flood protection works.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020017)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Lochgilphead A83' flood warning area which is part of the Firth of Clyde coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>Scottish Canals manage levels on the Crinan Canal which is crucial to avoiding flooding on the A816.</p>		

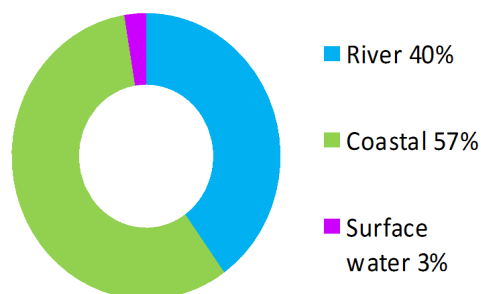
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>Providing an emergency response 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>A flood monitoring station has been set up on the Badden Burn close to the main flood area. This is linked to a text flood warning system for the Argyll and Bute Council area team.</p>		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Tarbert (Potentially Vulnerable Area 01/39)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Loch Fyne coastal

### Summary of flooding impacts



### At risk of flooding

- 10 residential properties
- 20 non-residential properties
- £110,000 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>	<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	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

# Tarbert (Potentially Vulnerable Area 01/39)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Loch Fyne coastal

## Background

This Potentially Vulnerable Area is centred around Tarbert on the west shore of Loch Fyne (shown below). It is approximately 61km<sup>2</sup>.

The A83 is an important transport link and passes through the area.

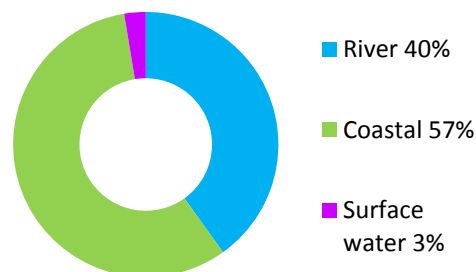


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The Inverneil, Stronchullin, Artilligan and Abhainn Strathainn burns are the main watercourses in the area.

There are approximately 10 residential and 20 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £110,000 with the majority caused by coastal and river flooding.



**Figure 1: Annual Average Damages by flood source**

## Summary of flooding impacts

Coastal flood risk is mainly focused around the seafront at Tarbert with river flood risk mainly centred on Inverneil.

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.

Roads at risk of flooding include the A8015 and A83 between Tarbert and Inverneil. The A83 links the Kintyre peninsula to the mainland and when this road is closed there is no access to ferries to or from the Cowal peninsula, the Kintyre peninsula and Islay.

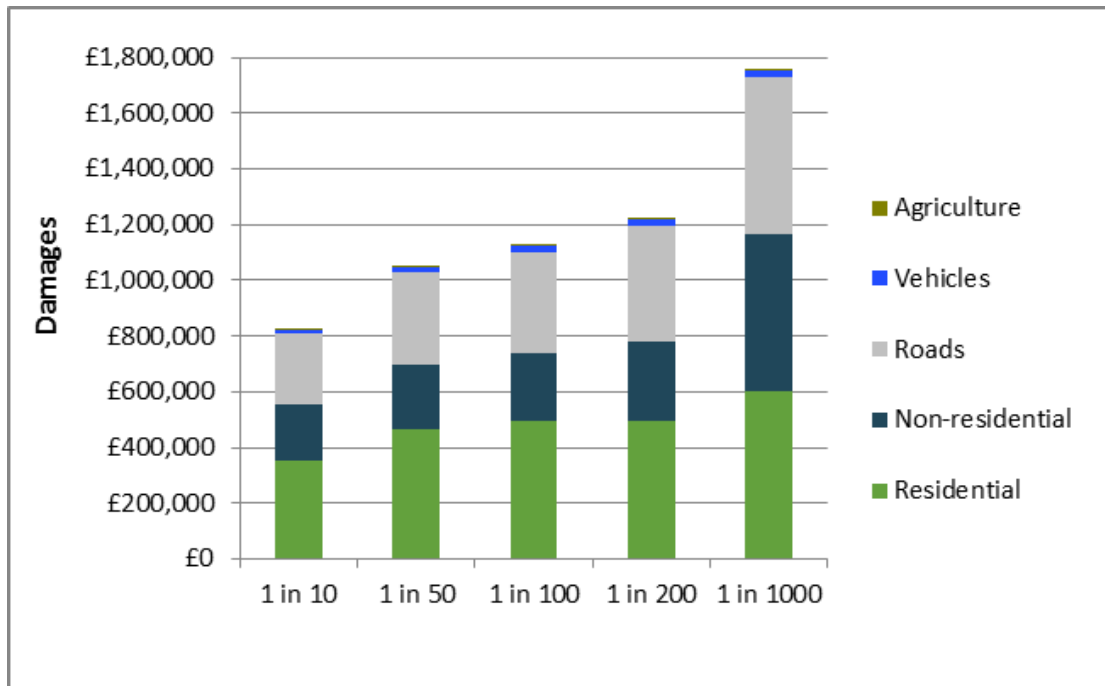
Three designated cultural heritage sites and small areas of environmental importance are also at risk. These include the Tarbert Woods Special Area of Conservation and Artilligan and Abhainn Srathain Burns Sites of Special Scientific Interest.

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 and roads.

The location of the impacts is shown in Figure 3.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 670)	10	10	20
Non-residential properties (total 300)	20	20	30
People	30	30	30
Community facilities	0	0	0
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations	Roads at 30 locations	Roads at 40 locations
Environmental designated areas (km <sup>2</sup> )	0.3	0.3	0.4
Designated cultural heritage sites	3	3	3
Agricultural land (km <sup>2</sup> )	0.2	0.3	0.3

**Table 1:** Summary of flooding impacts<sup>1</sup>



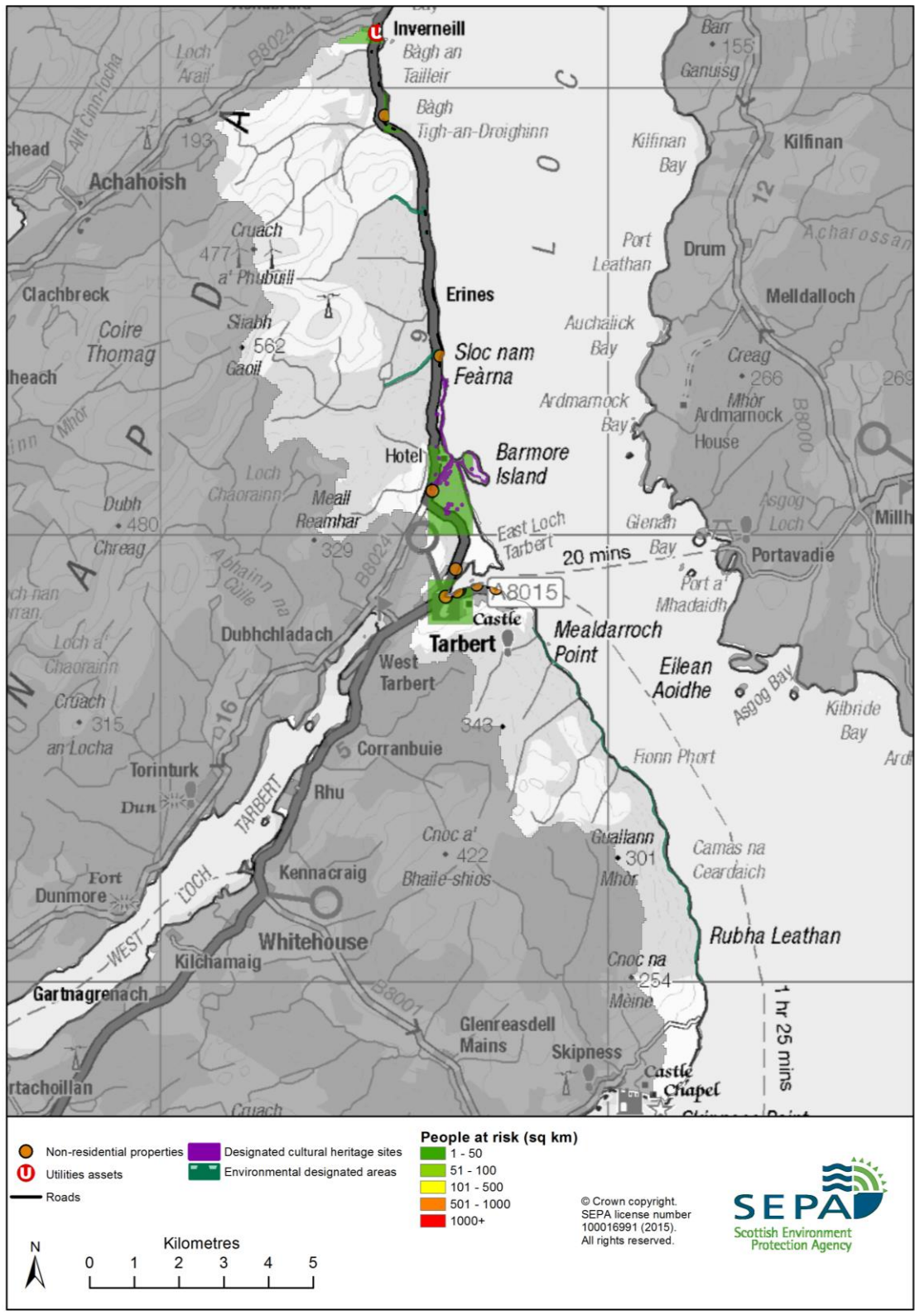
**Figure 2:** Damages by flood likelihood

## History of flooding

In 2013, overtopping of the seawall (coupled with drainage systems which were unable to discharge due to high sea levels) caused flooding in Tarbert. No major damage was reported. Significant flooding of Harbour Street in Tarbert was reported in January 2014.

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources

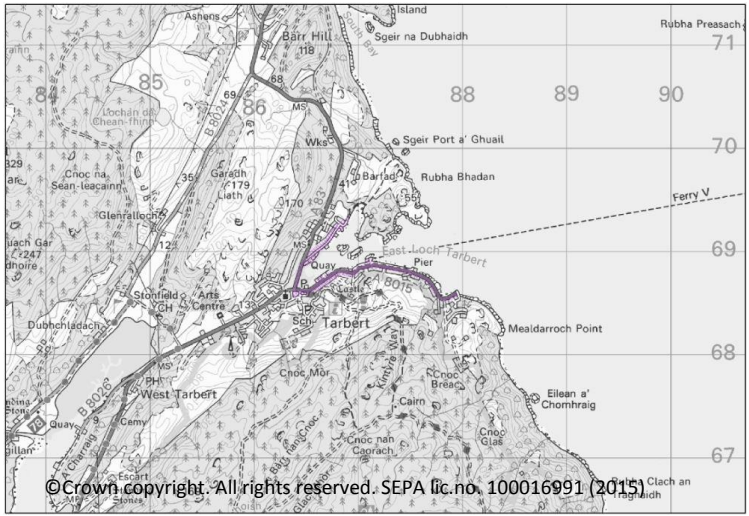




**Figure 3: Impacts of flooding**

## Objectives to manage flooding in Potentially Vulnerable Area 01/39

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 Tarbert Potentially Vulnerable Area.

Reduce risk in Tarbert from coastal flooding	
Indicators:	Target area:
<ul style="list-style-type: none"> <li>£6,000 Annual Average Damages from residential properties</li> <li>£19,000 Annual Average Damages from non-residential properties</li> </ul>	 <p style="font-size: small; text-align: center;">© Crown copyright. All rights reserved. SEPA lic.no. 100016991 (2015)</p>
Objective ID: 103901	

Target area	Objective	ID	Indicators within PVA
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>10 residential properties</li> <li>£110,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>10 residential properties</li> <li>£110,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/39

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 Tarbert Potentially Vulnerable Area.

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

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1039010005)</b>		
<b>Objective (ID):</b>	Reduce risk in Tarbert from coastal flooding (103901)		
<b>Delivery lead:</b>	Argyll and Bute Council		
<b>Priority:</b>	National:		Within local authority:
	<b>75 of 168</b>		<b>2 of 9</b>
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	A study is recommended to further investigate the feasibility of a flood protection scheme for coastal flooding in Tarbert, focusing on direct defences, coastal revetments and consideration of property level protection for residual risk. Other actions may also be considered to develop the most sustainable range of options. The study should look to confirm the length and size of defences needed, and the business case for flood protection works. The flood mapping for Tarbert should be refined as part of the study as it is currently thought to underestimate the flood risk.		
<b>Potential impacts</b>			
<b>Economic:</b>	The flood protection study should confirm the economic impacts and number of properties at risk. Currently it is estimated that 12 residential and 23 non-residential properties could benefit, with potential damages avoided of up to £4.7 million. However, the history of flooding suggests that the potential benefits are likely to be higher.		
<b>Social:</b>	Approximately 26 people may directly benefit from flood protection works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Reduced flooding of major transport links, including the A83		

<b>Social:</b>	and A8015, would benefit the wider community. Negative impacts through disturbance to the local community during the construction phase should be considered.
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on coastal habitats through increased erosion and disruption of natural processes, and impacts on landscape and the conservation area through disruption of views of the loch and foreshore. Due to the presence of existing structures these impacts could be limited. There are no environmentally designated sites nearby which could be impacted by future flood protection works.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2016-2021</b>
<b>Description:</b>	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Tarbert Harbour' flood warning area which is part of the Firth of Clyde coastal flood warning scheme.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

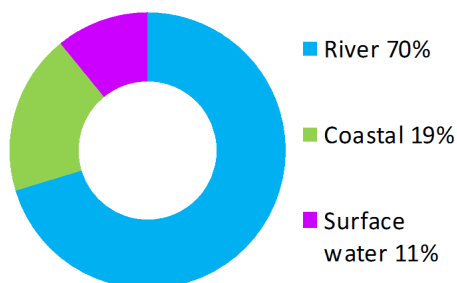
<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	Providing an emergency response to 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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001) Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

## Campbeltown (Potentially Vulnerable Area 01/40)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Kintyre coastal

### Summary of flooding impacts



### At risk of flooding

- 360 residential properties
- 350 non-residential properties
- £550,000 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

# Campbeltown (Potentially Vulnerable Area 01/40)

Local Plan District	Local authority	Main catchment
Highland and Argyll	Argyll and Bute Council	Kintyre coastal

## Background

This Potentially Vulnerable Area is centred around Campbeltown which is located on the west shore of Campbeltown Loch (shown below). It has an area of approximately 51km<sup>2</sup>.

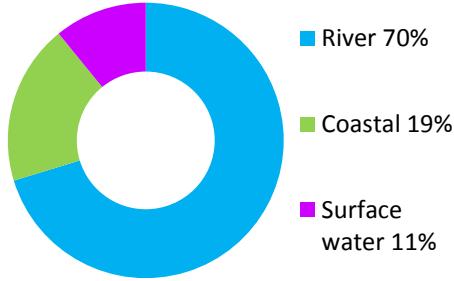


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A number of small rivers drain into Campbeltown Loch and the Firth of Clyde.

There are approximately 360 residential and 350 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £550,000 with the majority caused by river flooding.



**Figure 1:** Annual Average Damages by flood source

## Summary of flooding impacts

The majority of properties at risk of flooding are in Campbeltown. River flood risk is associated with a number of small burns which flow through the town and coastal flood risk mainly affects properties along the main seafront.

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.

Roads at risk of flooding include the A83, which links the Kintyre peninsula to mainland Scotland, and the B842, which links communities along the eastern coast of Kintyre. The police station and the fire station are both at risk of flooding.

Eight designated cultural heritage sites and small areas of environmental importance are also at risk. This includes a small area of Balnabraid Glen Site of Special Scientific Interest.

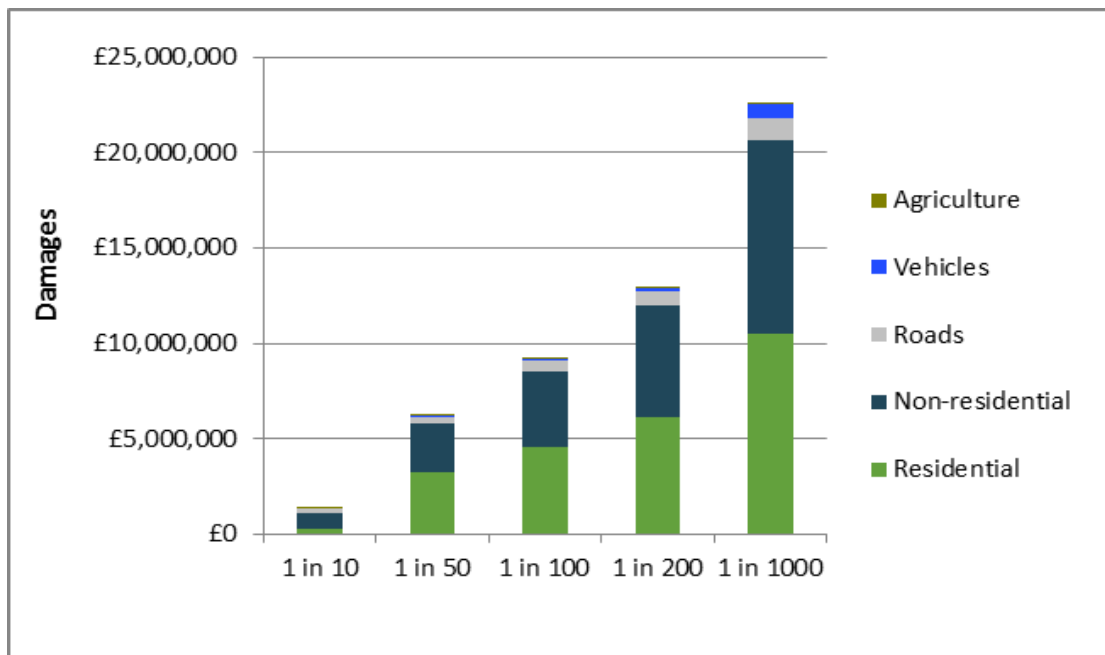
The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to non-residential properties.

The location of the impacts of flooding is shown in Figure 3.



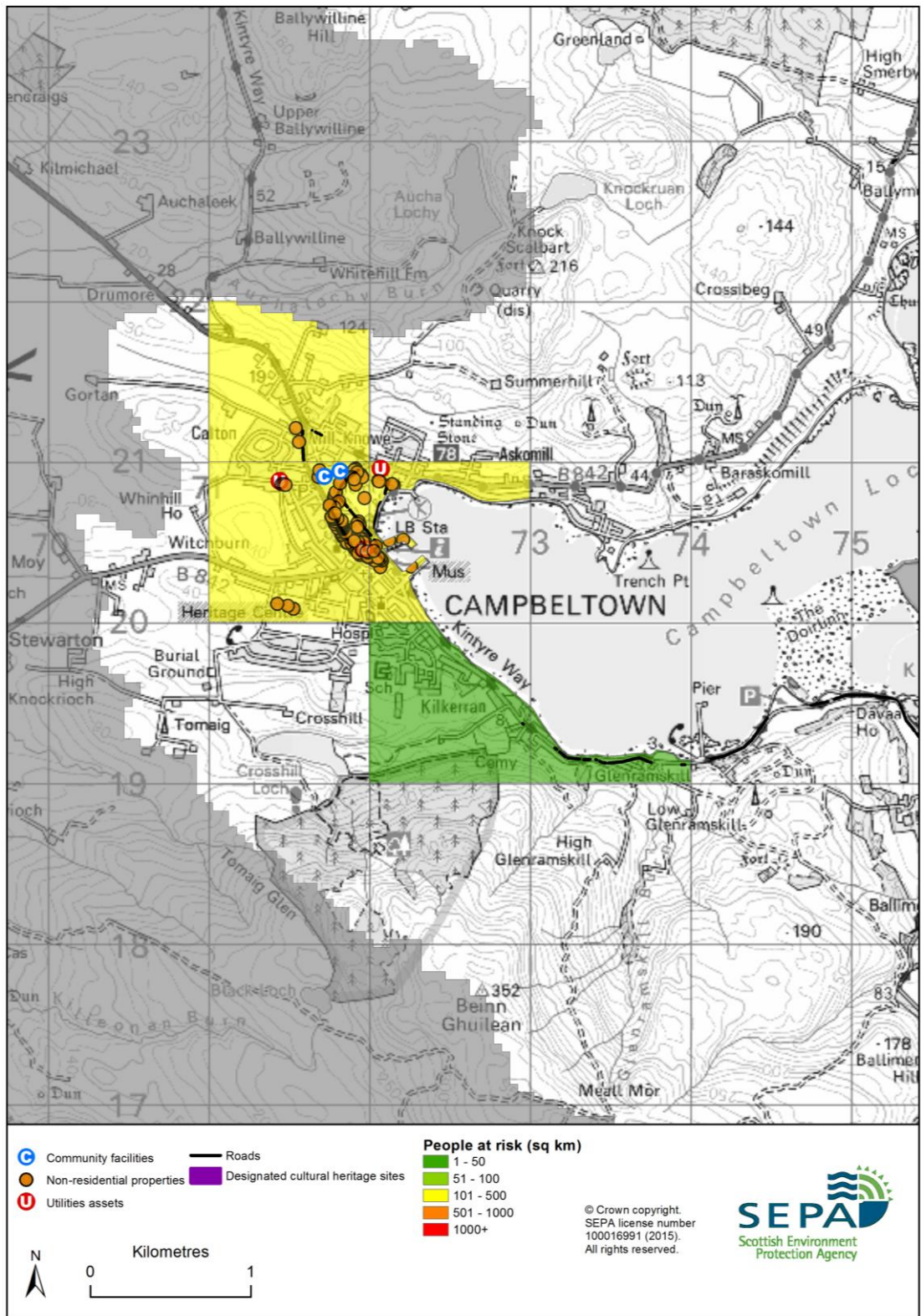
	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 2,500)	30	360	550
Non-residential properties (total 800)	40	350	550
People	60	800	1,200
Community facilities	<10 Emergency services	<10 Emergency services	<10 Emergency services
Utilities assets	<10	<10	10
Transport links (excluding minor roads)	Roads at 30 locations	Roads at 70 locations	Roads at 100 locations
Environmental designated areas (km <sup>2</sup> )	<0.1	<0.1	<0.1
Designated cultural heritage sites	4	8	8
Agricultural land (km <sup>2</sup> )	0.2	0.3	0.3

**Table 1:** Summary of flooding impacts<sup>1</sup>



**Figure 2:** Damages by flood likelihood

<sup>1</sup> Some receptors are counted more than once if flooded from multiple sources



**Figure 3: Impacts of flooding**

## History of flooding

The earliest recorded flood was in 1874, when agricultural land was affected. The area between Campbeltown and Machariorch Bay was largely submerged in 1875. There were floods in 1881, 1901, 1902, and 1903 which affected low lying land, properties, roads and a distillery.

In 2008, surface water flooding in Campbeltown resulted in properties in High Street, Saddle Street, Bolgam Street, Longrow, Lochend Street, and McCallum Street being flooded externally.

Between 2011 and 2013, overtopping at Millknowe affected several roads in Campbeltown, including the A83.

## Objectives to manage flooding in Potentially Vulnerable Area 01/40

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 Campbeltown Potentially Vulnerable Area.

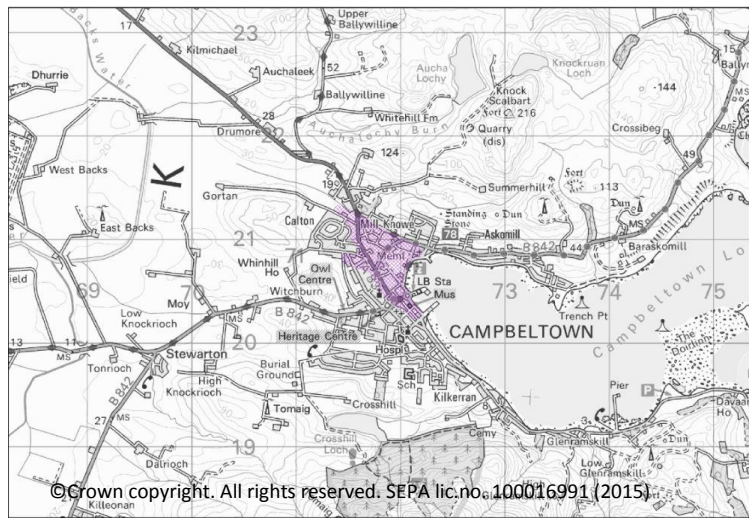
### Reduce flood risk in Campbeltown from river flooding

Indicators:

- 560 people
- £91,000 Annual Average Damages from residential properties
- £160,000 Annual Average Damages from non-residential properties
- 2 emergency services

Objective ID: 104001

Target area:



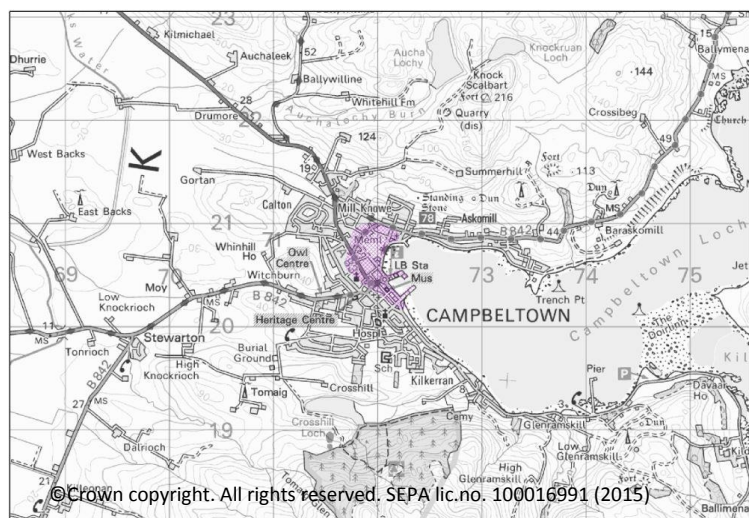
### Reduce risk in Campbeltown from coastal flooding

Indicators:

- 210 people
- £25,000 Annual Average Damages from residential properties
- £39,000 Annual Average Damages from non-residential properties

Objective ID: 104002

Target area:



Target area	Objective	ID	Indicators within PVA
Campbeltown	Reduce risk from surface water flooding in Campbeltown	104005	* See note below
Applies across Highland and Argyll Local Plan District	Avoid an overall increase in flood risk	100001	<ul style="list-style-type: none"> <li>• 360 residential properties</li> <li>• £550,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll Local Plan District	Reduce overall flood risk	100002	<ul style="list-style-type: none"> <li>• 360 residential properties</li> <li>• £550,000 Annual Average Damages</li> </ul>
Applies across Highland and Argyll 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 01/40 there are <10 residential properties at risk and Annual Average Damages of £60,000.

## Actions to manage flooding in Potentially Vulnerable Area 01/40

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 Campbeltown 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

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (1040010006)</b>				
<b>Objective (ID):</b>	Reduce flood risk in Campbeltown from river flooding (104001)				
<b>Delivery lead:</b>	Argyll and Bute Council				
<b>Priority:</b>	National:		Within local authority:		
	<b>15 of 42</b>		<b>1 of 1</b>		
<b>Status:</b>	<b>Under development</b>	Indicative delivery:	<b>2016-2021</b>		
<b>Description:</b>	A flood protection scheme is to be developed for Campbeltown to reduce flood risk from small watercourses. Feasibility studies indicate that the scheme should include temporary storage of flood water on two burns plus a relief culvert in the town to a standard of 1 in 200 years. There have been a number of floods in Campbeltown in recent years including incidence of sewer flooding which the scheme should contribute to reducing. The detailed design should also include consideration of runoff reduction (woodland planting, land management techniques) and the creation of wetlands and ponds. Other natural flood management actions may also be considered in order to develop the most sustainable solution.				
<b>Potential impacts</b>					
<b>Economic:</b>	The proposed flood protection works could achieve damages avoided of £18 million. The benefit-cost ratio of the proposed works is estimated to be 3.49				
<b>Social:</b>	Campbeltown has a higher than average proportion of vulnerable residents. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and				

<b>Social:</b>	tourism. A scheme could also benefit major transport links including the A83 and B842, two emergency services facilities and two energy production/electricity utility sites reducing disruption to the wider community.
<b>Environmental:</b>	Flood protection works can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. Natural flood management actions can have a positive impact by restoring and enhancing natural habitats. There is potential for impacts on habitats and channel morphology, however the lower sections of the burns are already culverted, and therefore impacts are likely to be limited. Opportunities to mitigate any environmental impacts should be identified as part of the study through the design and timing of works. There is a scheduled monument which may benefit from any future works. There are no environmentally designated sites nearby which could be impacted by future flood protection works.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (1040020005)</b>		
<b>Objective (ID):</b>	Reduce risk in Campbeltown from coastal flooding (104002)		
<b>Delivery lead:</b>	Argyll and Bute Council		
<b>Priority:</b>	National:	Within local authority:	
	<b>142 of 168</b>	<b>6 of 9</b>	
<b>Status:</b>	<b>Not started</b>	Indicative delivery:	<b>2022-2027</b>
<b>Description:</b>	A study is recommended to further investigate the feasibility of a flood protection scheme for the coastal frontage of Campbeltown, focusing on direct defences. The study should look to confirm the existing defence levels of structures and the promenade to identify where structures need to be raised and where gaps in the defences need to be filled (i.e. at the piers). Other actions may also be considered to develop the most sustainable range of options.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 96 residential and 178 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £1.1 million. There is potential for disruption to the operational areas of the harbour which would need to be considered and mitigated during the design of the works.		
<b>Social:</b>	Approximately 211 people may directly benefit from flood protection works. Campbeltown has a higher than average proportion of vulnerable residents. Local roads around the seafront would benefit from flood protection works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts		

<b>Environmental:</b>	may include design and timing of works. There is potential for impacts on coastal habitats through increased erosion and disruption of natural processes, and impacts on landscape and the conservation area through disruption of views of the loch and foreshore. Due to the presence of existing structures these impacts could be limited. There is a scheduled monument cultural heritage site which may benefit from any future works. There are no environmentally designated sites nearby which could be impacted by future flood protection works.
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<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (1040050018)</b>		
<b>Objective (ID):</b>	Reduce risk from surface water flooding in Campbeltown (104005)		
<b>Delivery lead:</b>	Argyll and Bute Council		
<b>Status:</b>	<b>Ongoing</b>	<b>Indicative delivery:</b>	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (1000020019)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Scottish Water		
<b>Status:</b>	<b>Not started</b>	<b>Indicative delivery:</b>	<b>2016-2021</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (1000020030)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	<b>Indicative delivery:</b>	<b>Ongoing</b>
<b>Description:</b>	Continue to maintain the 'Campbeltown Hall Street and Esplanade' flood warning area which is part of the Firth of Clyde coastal flood warning scheme.		



<b>Action (ID):</b>	<b>FLOOD FORECASTING (1000020009)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	SEPA		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Argyll and Bute' flood alert area.</p>		

<b>Action (ID):</b>	<b>SELF HELP (1000020011)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	—		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>		

<b>Action (ID):</b>	<b>AWARENESS RAISING (1000020013)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Responsible authorities		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	<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>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.</p>		

<b>Action (ID):</b>	<b>MAINTENANCE (1000020007)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Argyll and Bute Council, asset / land managers		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (1000020014)</b>		
<b>Objective (ID):</b>	Reduce overall flood risk (100002)		
<b>Delivery lead:</b>	Category 1 and 2 Responders		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

<b>Action (ID):</b>	<b>PLANNING POLICIES (1000010001)</b>		
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (100001)		
<b>Delivery lead:</b>	Planning authority		
<b>Status:</b>	<b>Existing</b>	Indicative delivery:	<b>Ongoing</b>
<b>Description:</b>	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.		

# Flood Risk Management Strategy

## Highland and Argyll Local Plan District

This section provides supplementary information on the characteristics and impacts of river, coastal and surface water flooding. Future impacts due to climate change, the potential for natural flood management and links to river basin management are also described within these chapters.

Detailed information about the objectives and actions to manage flooding are provided in Section 2.

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## 3.1 Introduction

In the Highland and Argyll Local Plan District, river flooding is reported across seven distinct river catchments. Coastal flooding is reported over six distinct coastal areas and surface water flooding is reported across the whole Local Plan District.

A summary of the number of properties and Annual Average Damages from river, coastal and surface water flooding is outlined in Table 1.

	Total number of properties at risk <sup>1</sup>	Annual Average Damages	Local authority
<b>River catchments</b>			
Wick, Thurso and Naver catchment group	160	£1.0 million	The Highland Council
Helmsdale, Shin and Conon catchment group	440	£1.5 million	The Highland Council
Ness and Beaulay catchment group	1,100	£2.9 million	The Highland Council
Fyne, Firth of Clyde, Awe and Etive, and Kintyre catchment group	1,300	£3.8 million	Argyll and Bute Council The Highland Council
Loch Linnhe, Lochy (Invernessshire), and Loch Sheil catchment group	270	£920,000	Argyll and Bute Council The Highland Council
Loch Alsh, Loch Maree and Laxford catchment group	240	£1.0 million	The Highland Council
Inner Hebrides catchment group	190	£630,000	Argyll and Bute Council The Highland Council
<b>Coastal flooding</b>			
Nairn to Tarbat Ness coastal area	890	£3.6 million	The Highland Council
Tarbat Ness to Duncansby Head coastal area	40	£230,000	The Highland Council
Duncansby Head to Cape Wrath coastal area	10	£62,000	The Highland Council
Cape Wrath to Ardnamurchan Point coastal area	320	£2.3 million	The Highland Council
Ardnamurchan Point to Mull of Kintyre coastal area	780	£4.4 million	Argyll and Bute Council The Highland Council
Mull of Kintyre to Kilbride Bay coastal area	510	£900,000	Argyll and Bute Council
<b>Surface water flooding</b>			
Highland and Argyll Local Plan District	2,100	£2.9 million	Argyll and Bute Council The Highland Council

**Table 1:** Summary of flood risk from various sources within the Highland and Argyll Local Plan District

<sup>1</sup> Total number of residential and non-residential properties at risk of flooding.

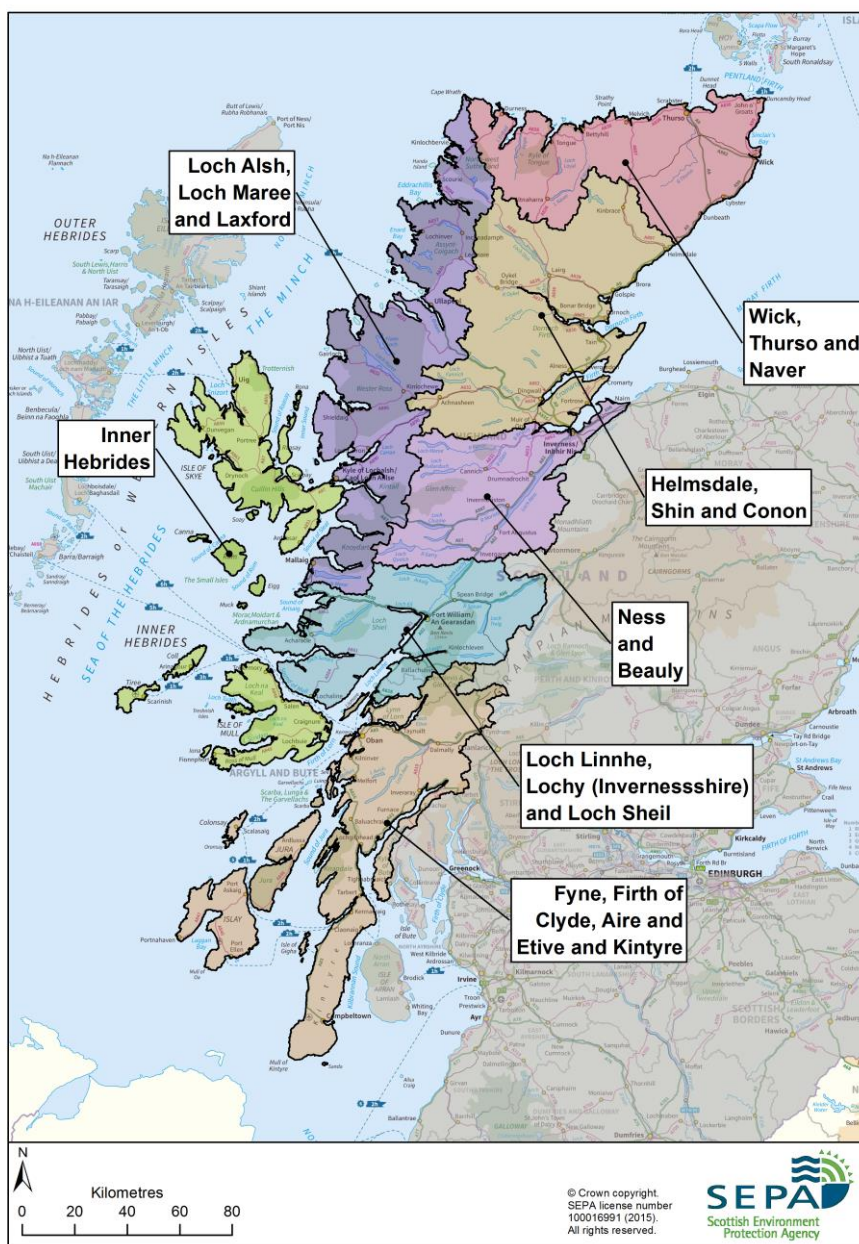
## 3.2 River flooding

### Highland and Argyll Local Plan District

This chapter provides supplementary information on river flooding at the catchment level. It provides an overview of the catchment's natural characteristics, flood risk and the existing actions to manage flooding. It outlines the likely impact of climate change and the potential for natural flood management.

Detailed information about the objectives and actions to manage flooding are provided in Section 2.

In the Highland and Argyll Local Plan District, river flooding is reported across seven river catchment groups (Figure 1).



**Figure 1:** River catchments within the Highland and Argyll Local Plan District

## River flooding Wick, Thurso and Naver catchment group

### Catchment overview

The Wick, Thurso and Naver catchment group covers the north of the Highland and Argyll Local Plan District (Figure 1) and has an area of approximately 3,800km<sup>2</sup>. There are three main rivers; the River Wick is located in the east of the catchment group, the River Thurso in the north-east, whilst the River Naver drains the highland areas in the north. There are a number of smaller rivers and burns which drain the highland areas into lochs or to the coast. Their catchments are generally small and flashy in nature.

The predominant land cover in the catchment is bog, covering around 36% of the area. Rough grassland (16%) and heather grassland (13%) also provide significant land cover. The east of the catchment group has an annual rainfall of between 800mm and 1700mm with higher rainfall (1700mm to 2800mm per annum) in the west.

There are four Potentially Vulnerable Areas, which are located in the north-east of the catchment group around Thurso and Wick:

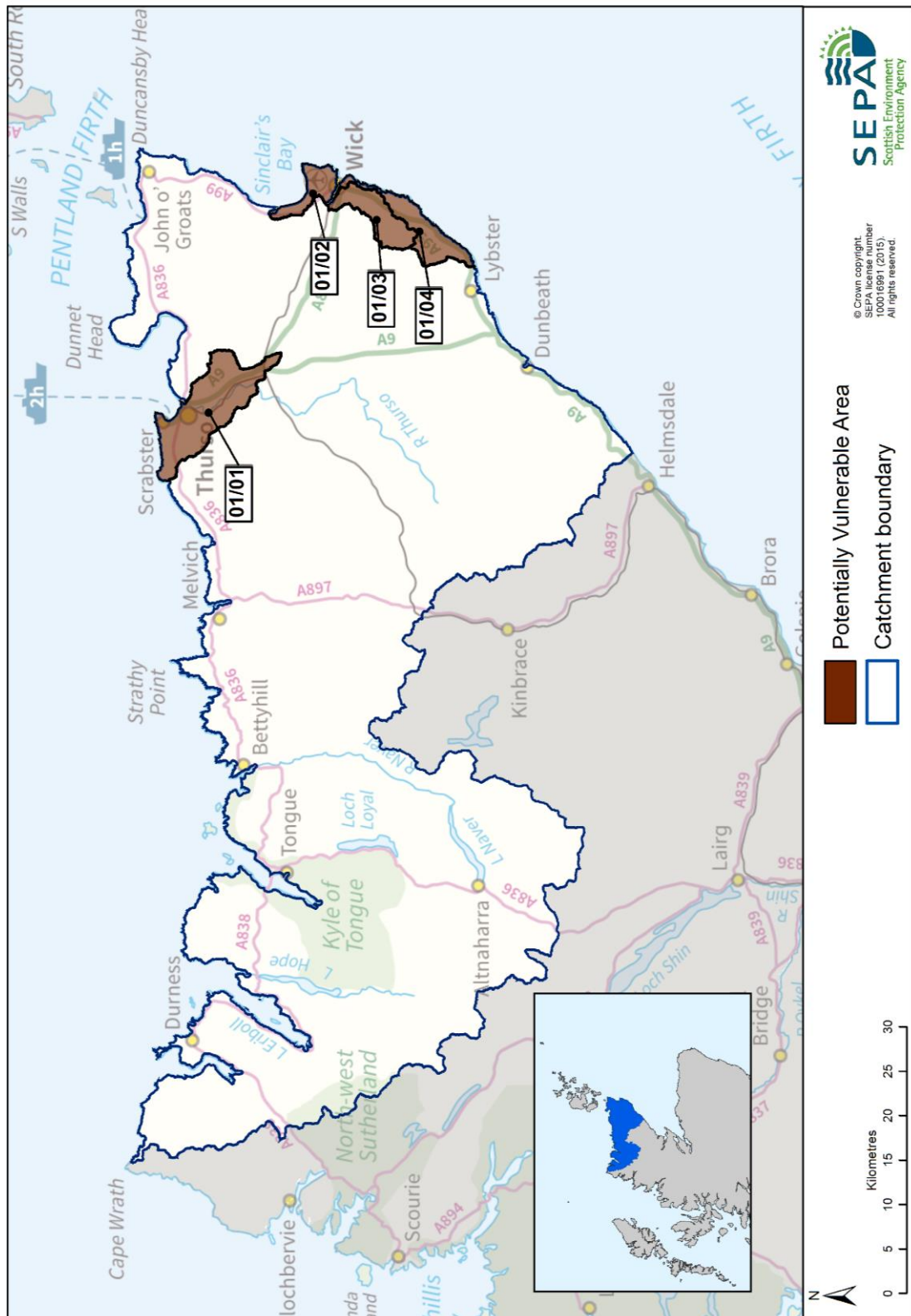
- Thurso (01/01)
- Wick Airport (01/02)
- Wick – Burn of Newton (01/03)
- Wick Coastal (01/04).

### Flood risk in the catchment

There are approximately 130 residential properties and approximately 30 non-residential properties at risk of river flooding. 55% of residential properties and 16% of non-residential properties at risk are located within Potentially Vulnerable Areas.

#### Main areas at risk

Almost half of the residential properties at risk of river flooding are located in Wick. There are no other notable concentrations of properties at flood risk, although historical records suggest the risk in Thurso from the River Thurso is likely to be underestimated.



**Figure 1:** Wick, Thurso and Naver river catchment group and Potentially Vulnerable Areas

## Economic activity and infrastructure at risk

The Annual Average Damages from river flooding in this catchment group area are estimated to be £1.0 million. This accounts for around 4% of the Annual Average Damages for the Highland and Argyll Local Plan District. The damages are distributed as follows:

- 52% residential properties (£560,000)
- 21% non-residential properties (£230,000)
- 14% agriculture (£150,000)
- 9% roads (£96,000)
- 2% emergency services (£26,000)
- 1% vehicles (£10,000).

Figure 2 shows the location of Annual Average Damages from river flooding across the area.

Table 1 shows the approximate numbers of further infrastructure assets which are at risk of flooding within this catchment.

	Number at risk	Further detail
<b>Community facilities</b>	0	n/a
<b>Utility assets</b>	<10	Includes; electricity substations, fuel extraction sites and telephone exchanges
<b>Roads (excluding minor roads)</b>	250 locations	Notably the A99 and A83
<b>Railway routes</b>	30 locations	Inverness to Wick, Inverness to Thurso
<b>Agricultural land (km<sup>2</sup>)</b>	21	n/a

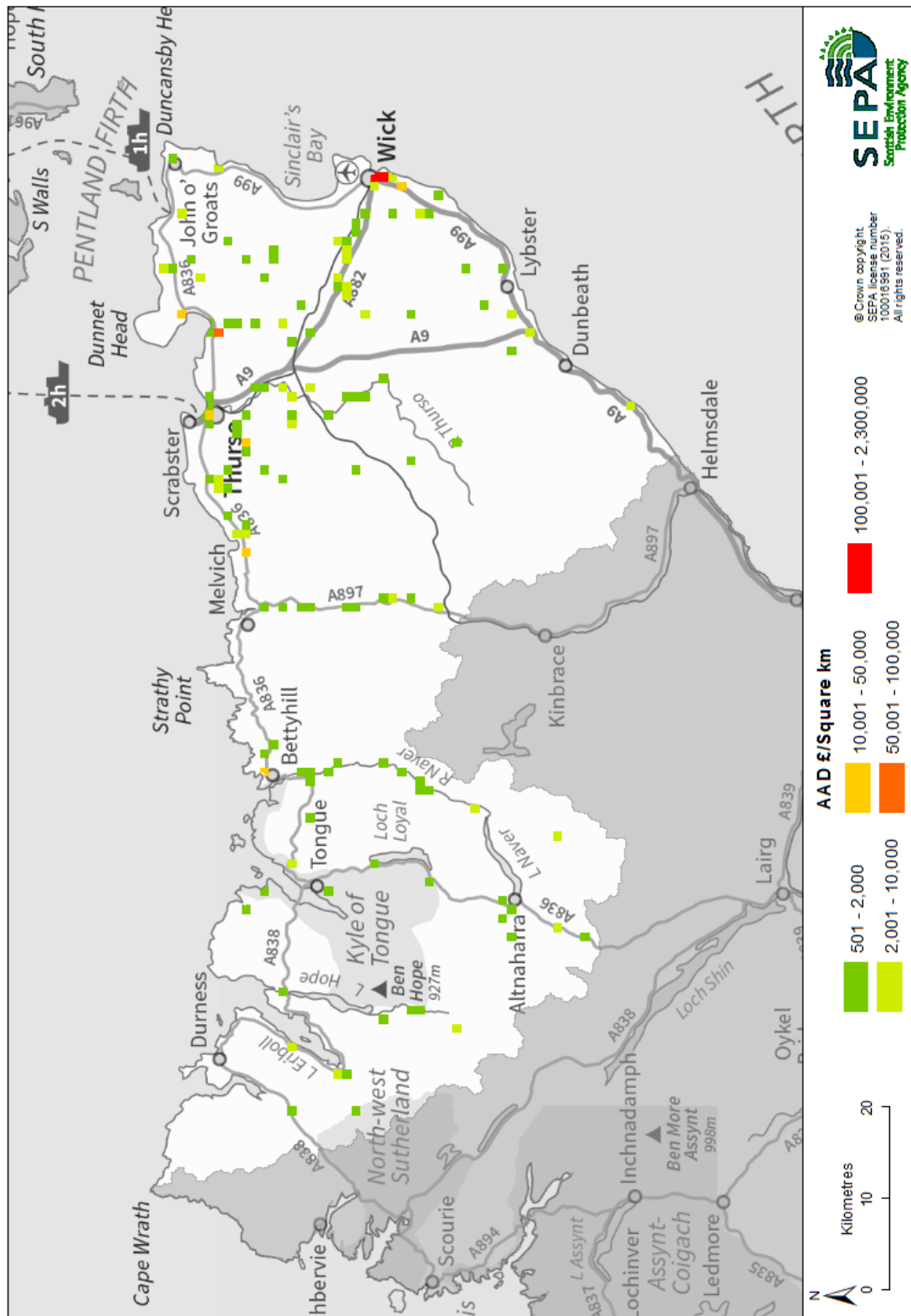
**Table 1:** Infrastructure and agricultural land at risk of river flooding

## Designated environmental and cultural heritage sites at risk

There are approximately 70 designated cultural heritage sites at risk of river flooding. These sites include scheduled monuments, gardens and designed landscapes and listed buildings.

Approximately 176km<sup>2</sup> of environmental designated area is at risk of river flooding, including Special Areas of Conservation, Special Protection Areas and Sites of Special Scientific Interest. The sites include lochs, peatlands, marshes, and rivers. The designated sites which have the largest areas flooded include Caithness Lochs, Caithness and Sutherland Peatlands, Foinaven, Loch Watten, River Naver, and Loch Calder.





**Figure 2:** Annual Average Damages from river flooding

## History of river flooding

There was a flood in 1903, when several houses flooded in Wick and a railway line was washed away. In 2006, there was flooding of a power station, properties, and roads in Thurso.

## Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk in this area are described in Section 2.

## Climate change and future flood risk

The UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall. The predicted increase in rainfall and river flows may increase the potential for river flooding.

Under the UKCP09 high emissions scenario for 2080, average peak river flows for the Wick, Thurso and Naver catchment group may increase by 37%<sup>1</sup>. This would potentially increase in the number of residential properties at risk of river flooding from approximately 130 to 140 and the number of non-residential properties from 30 to 40.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for runoff reduction, floodplain storage and sediment management. They show areas where natural flood management could be effective and where further detailed assessment should take place. This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Runoff reduction

There are widespread areas of potential for runoff reduction within the Wick, Thurso and Naver catchment group. However, the areas of potential for runoff reduction are

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<sup>1</sup> From the study 'An assessment of the vulnerability of Scotland's river catchments and coasts to the impacts of climate change' (CEH, 2011)

concentrated in the west and south of the catchment and there is limited potential for runoff reduction either within Potentially Vulnerable Areas or in the areas immediately adjacent to Potentially Vulnerable Areas. It is therefore unlikely that runoff reduction measures would have any significant impact on flood risk within the Potentially Vulnerable Areas.

### **Floodplain storage**

There are scattered areas of potential for flood storage throughout the Wick, Thurso, and Naver catchment group, including within all four Potentially Vulnerable Areas. Due to the proximity of some of these areas it is possible that floodplain storage adjacent to or within Potentially Vulnerable Areas may have a beneficial impact on flood risk within the Potentially Vulnerable Areas.

### **Sediment management**

The majority of the system upstream of, and through Thurso is either in balance or moderately eroding, suggesting there is limited potential for improving flood risk through sediment management. The watercourse system which flows through the Loch of Yarrows and Loch Hempriggs in the Wick area is generally in balance or moderately eroding, with areas of deposition in the lochs and short sections of high erosion immediately downstream of the lochs. It is unlikely that there will be significant flood risk improvements through sediment management measures in this catchment.

## River flooding Helmsdale, Shin and Conon catchment group

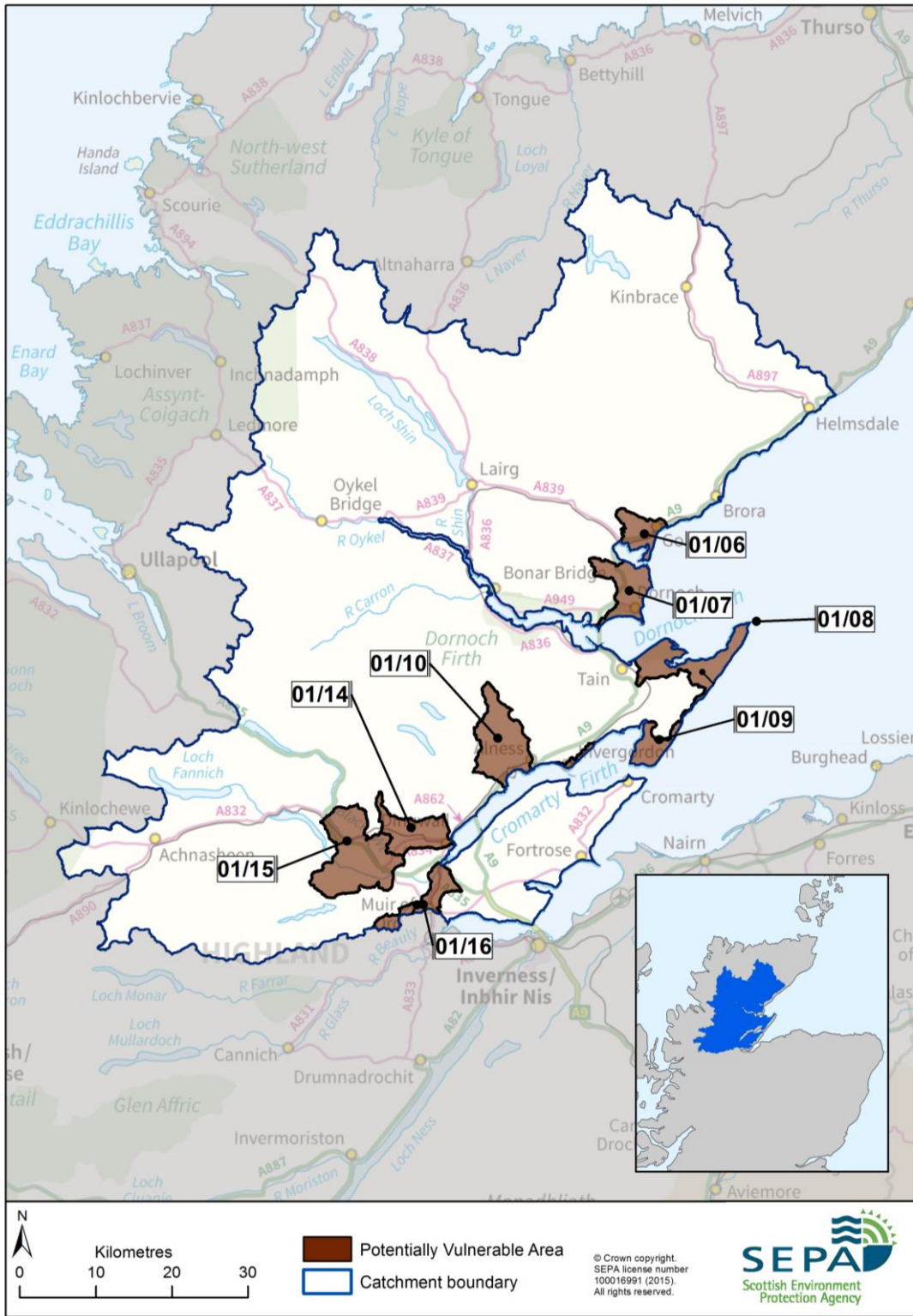
### Catchment overview

The Helmsdale, Shin and Conon catchment group covers an area of approximately 5,500km<sup>2</sup> in the central eastern part of the Highland and Argyll Local Plan District (Figure 1). The largest rivers are the River Shin, River Carron and River Oykel, which discharge into the Dornoch Firth, and the River Conon which discharges into the Cromarty Firth. These rivers drain the highland areas in the west of the catchment group. In addition, there are several smaller rivers which drain the highland areas to the coast include the River Helmsdale, River Brora and River Fleet. The majority of watercourses are relatively small with small catchments that are flashy in nature.

The predominant land covers are acid grassland, bog, coniferous woodland, heather grassland and heather, which each share between 11-18% coverage of the catchment. Rainfall on the higher ground in the west of the catchment group area is typically over 1700mm per annum, whilst the coastal areas and peninsulas receive less rainfall at between 600mm and 1200mm per annum.

There are eight Potentially Vulnerable Areas which are located at the downstream end of the rivers, close to the coast:

- 01/06: Golspie
- 01/07: Dornoch
- 01/08: Tarbat Ness
- 01/09: Invergordon
- 01/10: Alness
- 01/14: Dingwall and Strathpeffer
- 01/15: Contin and Garve
- 01/16: Conon Bridge and Muir of Ord.



**Figure 1:** Helmsdale, Shin and Conon river catchment group and Potentially Vulnerable Areas

## Flood risk in the catchment

There are approximately 290 residential properties and approximately 150 non-residential properties at risk of river flooding. 43% of residential properties and 45% of non-residential properties at risk are located within Potentially Vulnerable Areas.

### Main areas at risk

The main areas which have greater than 20 residential properties at risk of river flooding are shown in Table 1.

	Residential and non-residential properties at risk of river flooding	Annual Average Damages
Dingwall and Strathpeffer	40	£65,000
Alness	70	£65,000
Muir of Ord	20	£180,000

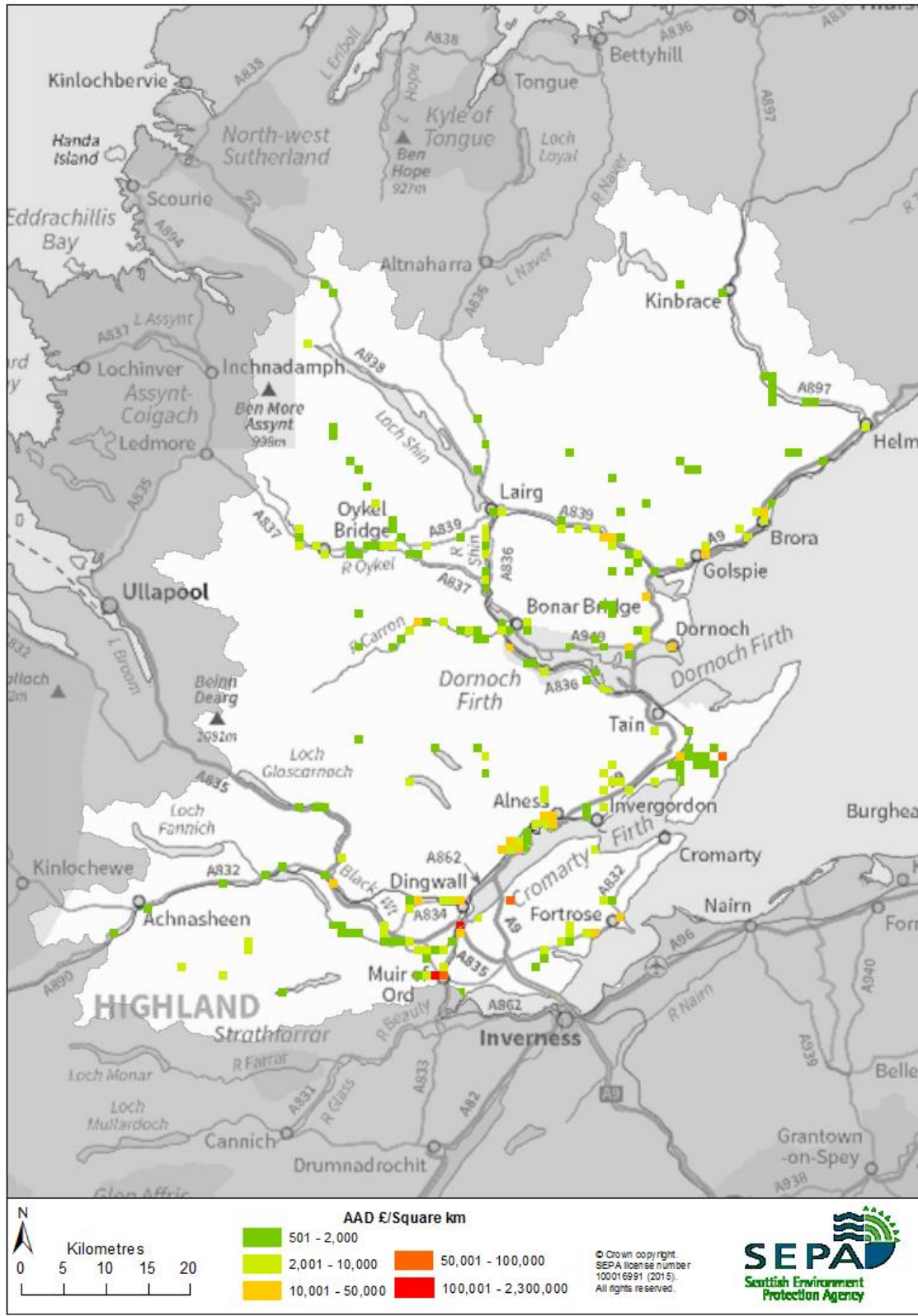
**Table 1:** Main areas at risk of river flooding

### Economic activity and infrastructure at risk

The Annual Average Damages from river flooding are estimated to be approximately £1.5 million. This accounts for around 6% of the Annual Average Damages for the Highland and Argyll Local Plan District. The damages are distributed as follows:

- 40% residential properties (£740,000)
- 20% non-residential properties (£300,000)
- 14% roads (£210,000)
- 11% agriculture (£160,000)
- 6% emergency services (£97,000)
- 1% vehicles (£21,000).

Figure 2 shows the location of Annual Average Damages from river flooding across the area. The area shown to have the highest damage is Muir of Ord. However, the outfall of Loch Ord is via a culvert, which is not well represented in the modelling or assessment of flood risk at present. As a result, flooding in Muir of Ord is potentially overestimated.



**Figure 2:** Annual Average Damages from river flooding

Table 2 shows the approximate numbers of further infrastructure assets which are at risk of flooding within this catchment.

	Number at risk	Further detail
<b>Community facilities</b>	<10	Healthcare facilities
<b>Utility assets</b>	10	Includes; electricity substations and mineral/fuel extraction sites
<b>Roads (excluding minor roads)</b>	500 locations	Notably the A825 and A834
<b>Railway routes</b>	120 locations	Inverness to Wick
<b>Agricultural land (km<sup>2</sup>)</b>	128	n/a

**Table 2:** Infrastructure and agricultural land at risk of river flooding

### Designated environmental and cultural heritage sites at risk

There are 66 cultural heritage sites at risk of river flooding. The sites include scheduled monuments (which include prehistoric domestic/defensive and ritual/funerary sites, chapels, bridges, and settlements) and listed buildings.

Approximately 56km<sup>2</sup> of environmental designated area is at risk of river flooding, including Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Sites of Special Scientific Interest (SSSI). Sites include Caithness and Sutherland Peatlands, Achanalt Marshes, Loch Eye, Glen Affric to Strathconon, Strath Carnaig and Strath Fleet Moors, and Mound Alderwood.

### History of river flooding

Dingwall has been flooded from the River Peffery, though smaller water courses have also caused significant problems, such as in 2006.

Garve flooded from the Blackwater in 1960 and 1990.

Serious floods on the Conon in 1960/1970 instigated the construction of a flood embankment in Conon Bridge, which breached in a severe flood in 1989 and was then raised and strengthened in 1991.

The largest flood for 25 years occurred in March 2015 although the impacts were limited due to the effectiveness of flood warning and the existing flood defences. Livestock was lost in the upper Conon where agricultural embankments breached and widespread areas of low lying land, including farmland were flooded. This resulted in loss of livestock by three landowners at Scatwell. Moy Bridge was closed. There were reports of water entering the gardens of properties in Maryburgh, but no reports of property flooding internally.

### Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.



This section describes the existing actions that are in place to manage flood risk and are in addition to the information presented in the relevant Potentially Vulnerable Area chapter of this document.

Existing actions that are in place to manage flood risk and that are in addition to the information presented in Section 2 are described below.

### River flood warning schemes

There are 11 flood warning areas (Table 3, Figure 3) in this catchment group. These are areas where SEPA has forecast models to predict flooding on specific rivers. Note that in Table 3, this is not the number of properties at risk of flooding.

Flood warning area (FWA)	Number of properties within flood warning area	% of properties registered January 2014
Conon Bridge	89	74%
Contin	27	22%
Garve	56	61%
Lairg	18	72%
Moy Bridge	19	32%
Orrin	6	50%
Scatwell	7	71%
Strath Bran	1	0%
Strath Carron	110	26%
Strath Oykel	27	37%
Strathconon	33	30%

**Table 3:** Flood warning areas

The Highland Council has a flood monitor on the River Oykel by Oykel Bridge to give early warning of potential flooding.

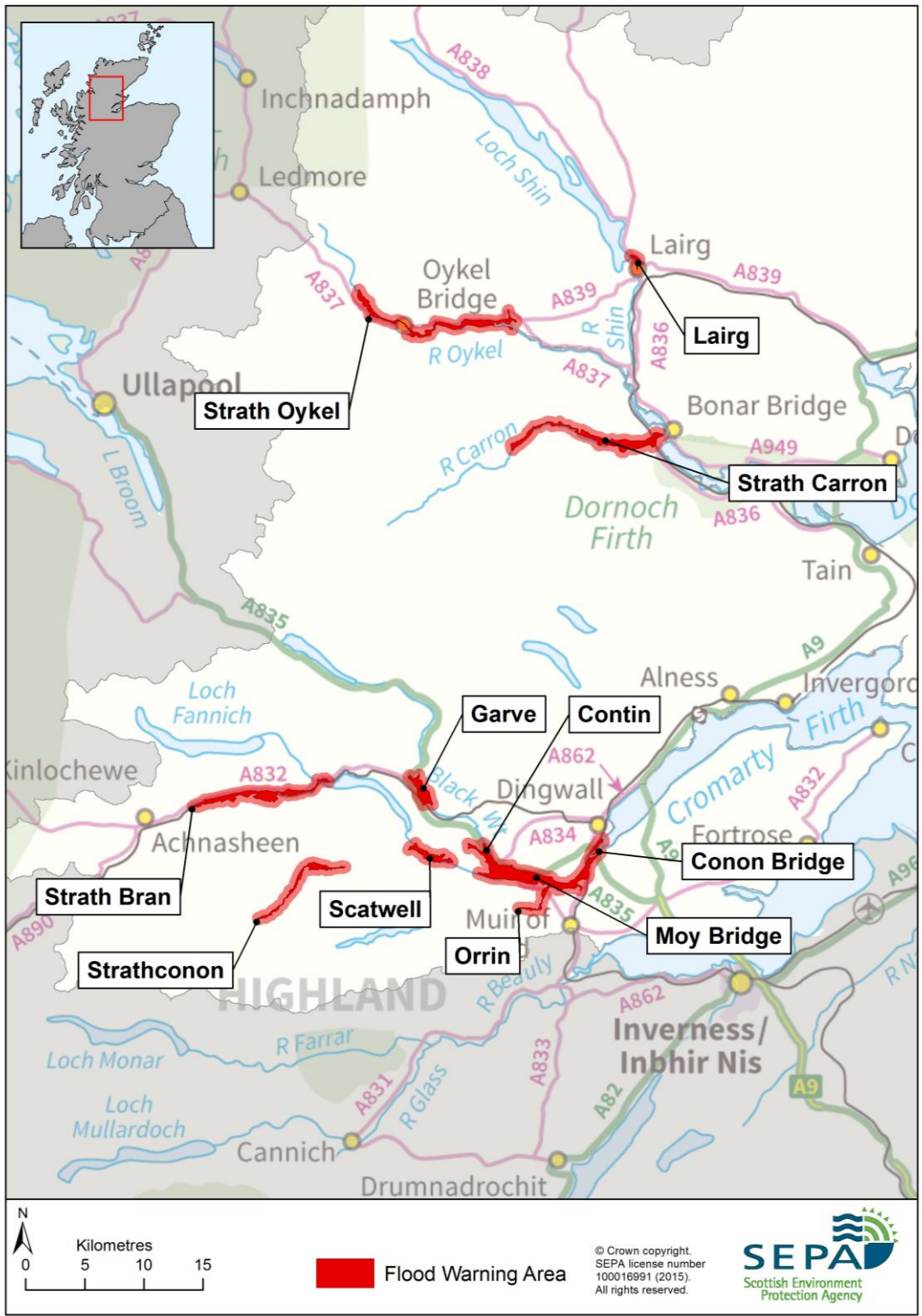
### Climate change and future flood risk

The UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall. The predicted increase in rainfall and river flows may increase the potential for river flooding.

Under the UKCP09 high emissions scenario for 2080, average peak river flows for the Helmsdale, Shin and Conon catchment group may increase by 37%<sup>1</sup>. This would potentially increase in the number of residential properties at risk of river flooding from approximately 290 to 430 and the number of non-residential properties from 150 to 190.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

<sup>1</sup> From the study 'An assessment of the vulnerability of Scotland's river catchments and coasts to the impacts of climate change' (CEH, 2011)



**Figure 3: Flood warning areas**

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for runoff reduction, floodplain storage and sediment management. They show areas where natural flood management could be effective and where further detailed assessment should take place. This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Runoff reduction

There are widespread areas of potential for runoff reduction within the Helmsdale, Shin, and Conon catchment group. The areas of potential for runoff reduction are concentrated in the highland areas in the west of the catchment group. There is limited potential for runoff reduction either within the Potentially Vulnerable Areas closest to the coast (Golspie (01/06), Dornoch (01/07), Tarbat Ness (01/08) and Invergordon (01/09), or in the areas immediately adjacent to these Potentially Vulnerable Areas. It is therefore unlikely that runoff reduction measures would have any significant impact on flood risk within these Potentially Vulnerable Areas. However for the other Potentially Vulnerable Areas in this catchment group (Alness (01/10), Dingwall and Strathpeffer (01/14), Contin and Garve (01/15) and Conon Bridge and Muir of Ord (01/16)) there are significant areas of potential for runoff reduction, either within the Potentially Vulnerable Area or immediately adjacent. Therefore, for these Potentially Vulnerable Areas measures for reducing runoff could be considered further.

### Floodplain storage

There are areas of potential for flood storage throughout the Helmsdale, Shin, and Conon catchment group, including within all the Potentially Vulnerable Areas. Due to the proximity of some of the areas for potential it is possible that floodplain storage measures outside of the Potentially Vulnerable Areas as well as within Potentially Vulnerable Areas may have a beneficial impact on flood risk within the Potentially Vulnerable Areas.

### Sediment management

The River Fleet system is generally in approximate balance particularly in the upstream reaches, however on the Abhainn an t-Sratha Carnaig tributary there is more variation with areas of high erosion and deposition and the Garbh Allt tributary is predominantly erosional. The River Alness system is generally in approximate balance in its upstream reaches with some depositional reaches through the lochs (such as Loch Morie). However through Alness (01/10), the River Alness is much more erosional. The River Peffery, which runs through Dingwall and Strathpeffer (01/14), is generally in approximate balance in the vicinity of Strathpeffer but depositional in the vicinity of Dingwall. The sediment balance of the River Conon system is varied, with the majority in approximate balance however there are significant lengths of erosional and depositional reaches. The reaches through Conon Bridge and Muir of Ord (01/16) have a varied sediment balance, with significant lengths of highly eroding and depositing reaches. The potential for sediment management to provide significant flood risk improvements cannot be ruled out in this catchment group at this stage.

## River flooding Ness and Beauly catchment group

### Catchment overview

The Ness and Beauly river catchment group covers the central eastern area of the Highland and Argyll Local Plan District (Figure 1) and has an area of approximately 3,100km<sup>2</sup>. The largest rivers are the River Beauly and River Ness. The Beauly drains the western part of the catchment group area and the River Ness the south and south west area. The north east of the catchment group area is drained by a series of small watercourses which tend to be flashy in nature and discharge directly into the Moray Firth.

The predominant land cover in the catchment is acid grassland, covering around 22% of the catchment area. Coniferous woodland, heather, and montane habitats all cover between 10-20% of the area.

The catchment contains five Potentially Vulnerable Areas:

- Nairn West and Ardersier (01/17)
- Nairn Central (01/18)
- Inverness Airport (01/19)
- Smithton and Culloden (01/20)
- Inverness and the Great Glen (01/21).

### Flood risk

There are approximately 870 residential properties and 180 non-residential properties at risk of river flooding in this catchment group area. Approximately 83% of residential and 69% of non-residential properties at risk are within Potentially Vulnerable Areas.

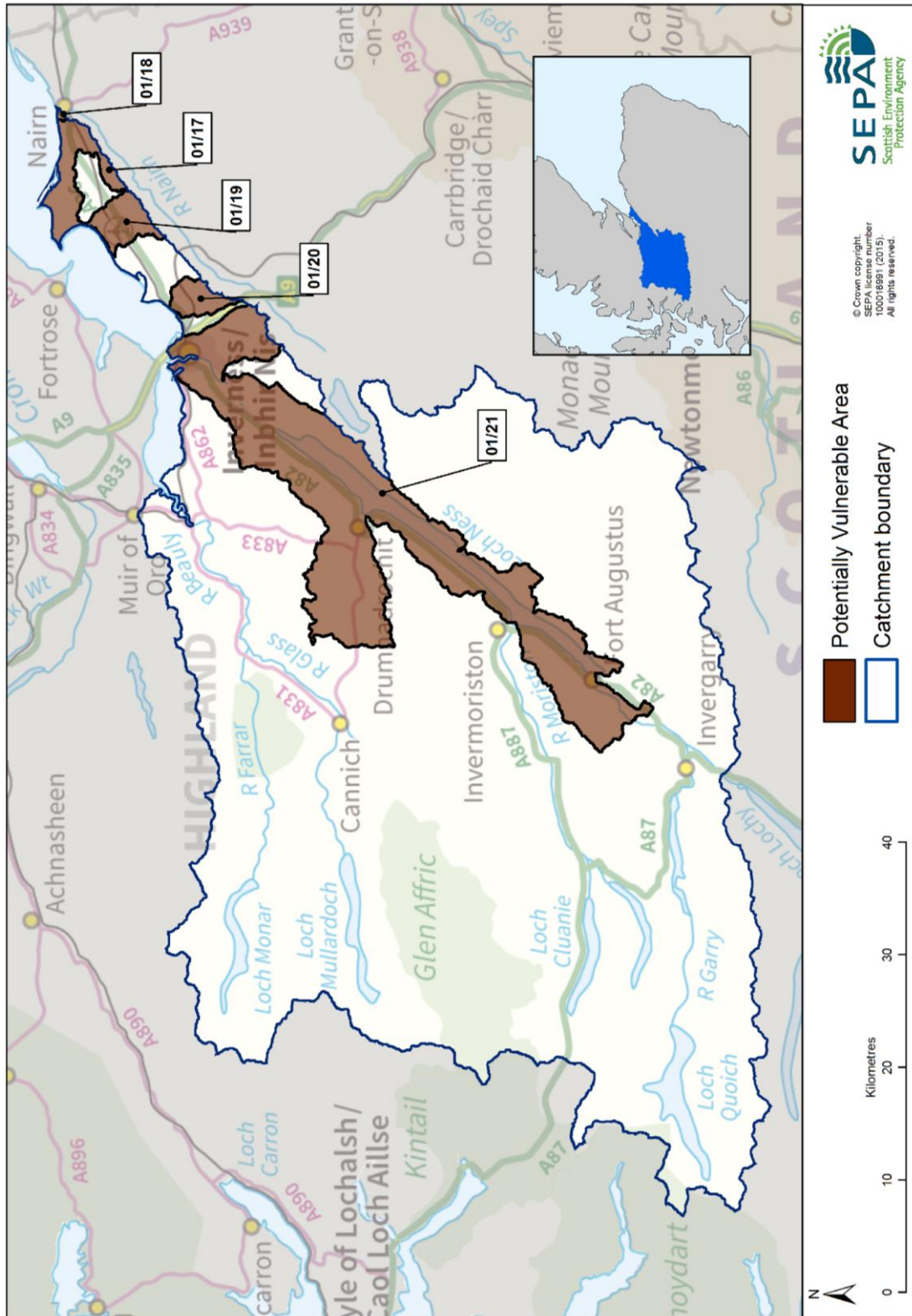
### Main areas at risk

The main areas, which have greater than 20 residential properties at risk of river flooding, are shown in Table 1. Note that the totals in Table 1 include the whole of the town of Nairn however a small part of Nairn is located in the Findhorn, Nairn and Speyside Local Plan District. Most of the properties at risk of river flooding in Nairn are located to the west of the River Nairn and are in the Highland and Argyll Local Plan District.

	Residential and non-residential properties at risk of flooding	Annual Average Damages
Inverness	530	£1,900,000
Nairn (total for Local Plan District 1 and 5) <sup>1</sup>	310	£310,000
Drumnadrochit	60	£87,000

**Table 1:** Main areas at risk of river flooding

<sup>1</sup> Nairn is split between two Local Plan Districts; Highland and Argyll and Findhorn, Nairn and Speyside. The numbers of properties listed in Table 1 as “at risk” in Nairn include the total number located in both Local Plan Districts.



**Figure 1:** Ness and Beaulieu river catchment group area and Potentially Vulnerable Areas

## Economic activity and infrastructure at risk

The Annual Average Damages from river flooding are approximately £2.9 million. This accounts for 11% of the Annual Average Damages for the Highland and Argyll Local Plan District. The damages are distributed as follows:

- 61% residential properties (£1.8 million)
- 24% non-residential properties (£700,000)
- 6% emergency services (170,000)
- 4% agriculture (£130,000)
- 3% roads (£100,000)
- 2% vehicles (£60,000).

Figure 2 shows the location of Annual Average Damages from river flooding across the area. The area of highest damages is in Inverness.

Table 2 shows the approximate numbers of further infrastructure assets which are at risk of flooding within this catchment.

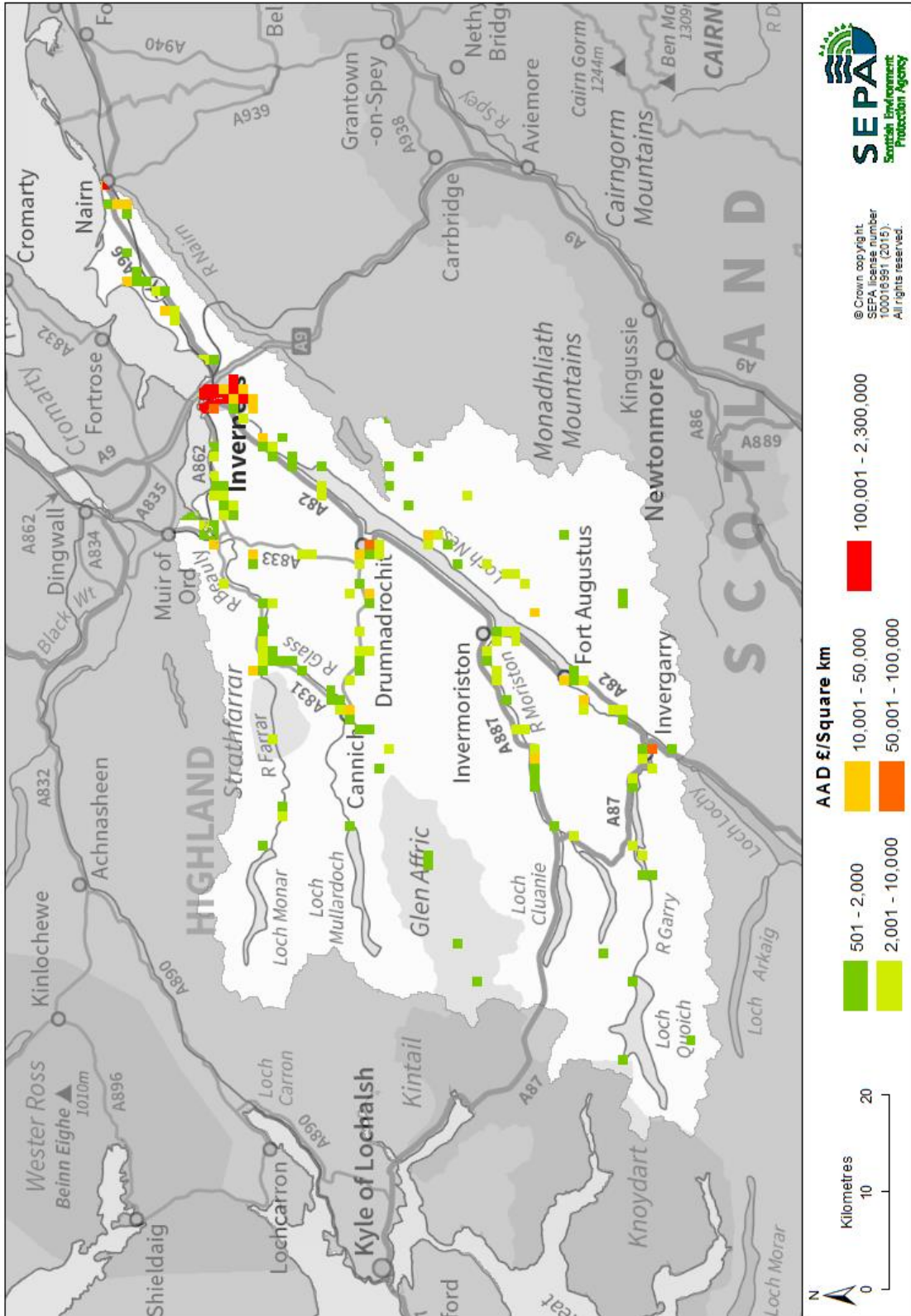
	Number at risk	Further detail
<b>Community facilities</b>	0	n/a
<b>Utility assets</b>	10	Includes; electricity substations, fuel extraction sites and telephone exchanges
<b>Roads (excluding minor roads)</b>	390 locations	Notably the A887, A87 and A831
<b>Railway routes</b>	30 locations	Inverness to Wick, Inverness to Aberdeen, Inverness to Perth.
<b>Agricultural land (km<sup>2</sup>)</b>	68	n/a

**Table 2:** Infrastructure and agricultural land at risk of river flooding

## Designated environmental and cultural heritage sites at risk

There are 56 cultural heritage sites at risk of flooding in the Ness and Beaully river catchment group. The sites include battlefields, gardens and designed landscapes, listed buildings and a large number of scheduled monuments.

Approximately 108km<sup>2</sup> of environmental designated area is at risk of river flooding, including Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Sites of Special Scientific Interest (SSSI). The sites include lochs, forests, glens, firths, hills, and rivers. The designated sites which have the largest areas flooded include West Inverness-shire Lochs, Strathglass Complex, Loch Ruthven, Glen Affric to Strathconon, Glen Strathfarrar, and Knockie Lochs.



**Figure 2:** Annual Average Damages from river flooding

## History of river flooding

Large floods occurred in Inverness in 1956 and 1989. Both floods caused extensive damage to the railway line. Fort Augustus was also affected in 1989. Watercourses, which have caused flooding, include the Mill Burn, River Ness, Culloden Burn and the Lochardil Burn, all located around Inverness. Flood defences since built in Inverness and Fort Augustus worked, as in 2015 (the largest flood since 1989) fewer properties were affected.

Highest recorded level at the SEPA gauge at Fort Augustus is 3.355m on 08/03/2015 (record from 1990-2015). During this flood, water entered the gardens of properties in The Riggs area. No reports of property flooding were received. During this flood, the Caledonian Canal breached at Bridge of Oich due to the spillway overtopping and causing scour to the embankment.

On 8th March 2015, following significant 48 hour rainfall totals combined with snowmelt there was widespread flooding to farmland and to low lying roads in the Beaully catchment, and flooding to Glen Affric Holiday Park, Cannich, and Lovat Bridge Caravan Park, where some residents were evacuated by boat.

On 8th March 2015, levels in the River Ness rose in response to persistent rain and snowmelt in the catchment. Ness Islands and Whin Park were flooded, as was Ladies Walk and Cavell Gardens. There were reports of property flooding at Island Bank Road, and a basement was flooded at a property at Ness Walk. Water was encroaching on Ness Bank and Bought Road.

Further detail about the history of flooding in this area is available in the relevant Potentially Vulnerable Area chapters of this document.

## Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk and that are in addition to the information presented in Section 2 are described below.

### River flood warning schemes

There are twelve flood warning areas for river flooding in the Ness and Beaully river catchment group, which are listed in Table 3. These are the areas where SEPA has detailed models to predict flooding on specific rivers. The flood warning areas are generally in the downstream reaches of the River Ness and River Beaully systems, including some of their tributaries such as the River Glass and the River Enrick. The locations of the flood warning areas are shown in Figure 3.



Flood warning area (FWA)	Number of properties within flood warning areas	% of properties registered January 2014
Aigas to Beaully	32	28%
Cannich	55	20%
Drumnadrochit	27	44%
Fasnakyle	2	100%
Glen Urquhart	16	44%
Invergarry	35	34%
Invermoriston	15	33%
Inverness	1,832	18%
Ness-side	36	42%
Strathglass	57	44%
The Riggs, Fort Augustus	39	41%
Nairn	92	33%
Inverness City (Ness Bridge to Friars Bridge)	692	n/a <sup>2</sup>

**Table 3:** Flood warning areas

The Highland Council also has flood monitors on the following watercourses in this catchment to provide early warning of potential flooding:

- River Ness by the Greg Street footbridge
- Ault na Skiah just before the inlet structure to the South West Inverness Flood Relief Channel.
- Holm Burn on the Dores Road Bridge
- River Foyers on the road bridge over the river.

### Awareness raising campaigns and community groups

The Glen Urquhart Land Use Partnership (GULUP) includes flood risk management in its remit.

<sup>2</sup> Flood warning area not operational until October 2014; sign-up statistics not available.

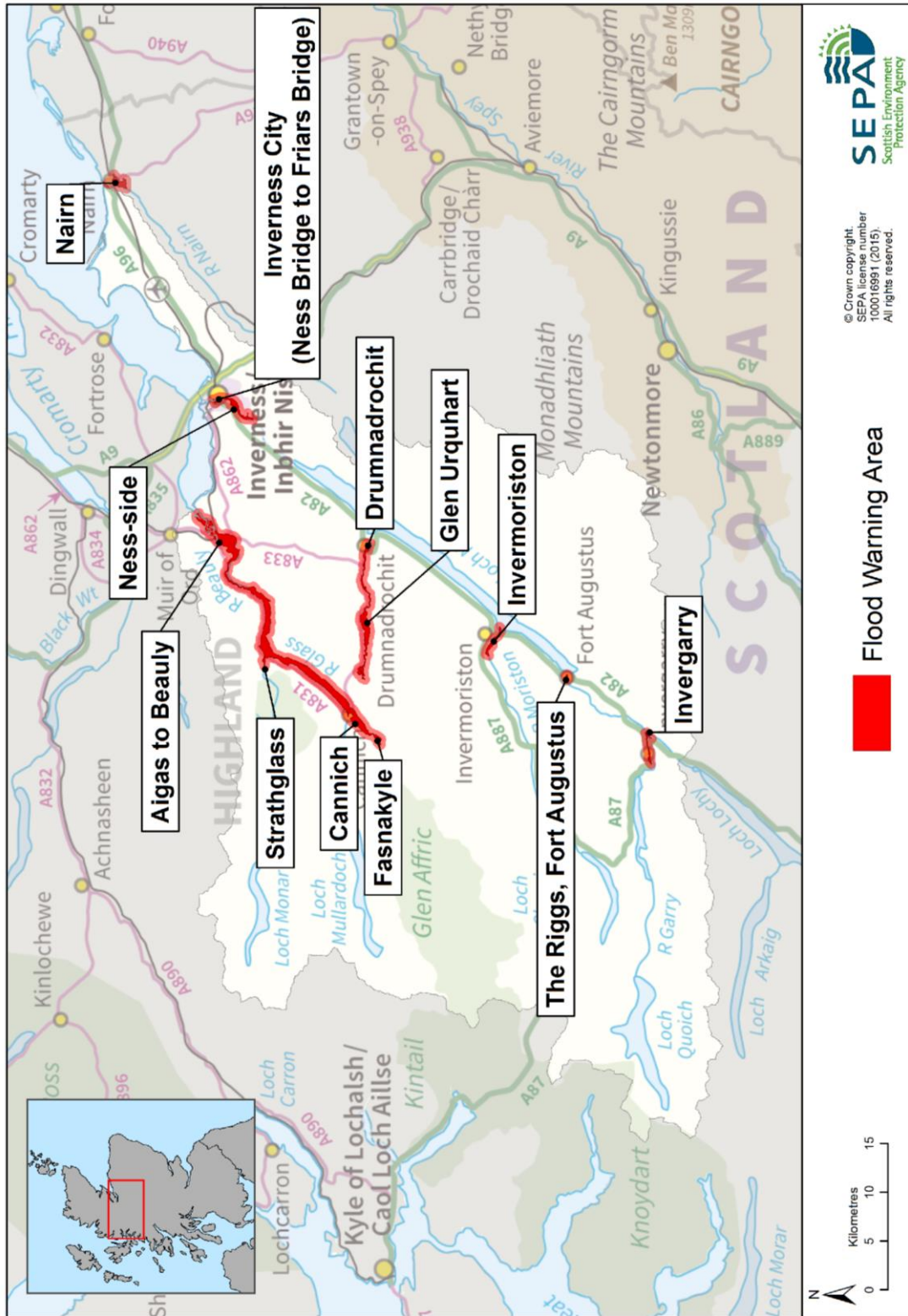


Figure 3: Flood warning areas

## Climate change and future flood risk

The UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall. The predicted increase in rainfall and river flows may increase the potential for river flooding.

Under the UKCP09 high emissions scenario for 2080, average peak river flows for the Ness and Beaully catchment may increase by 37%<sup>3</sup>. This would potentially increase in the number of residential properties at risk of river flooding from approximately 870 to 1,400 and the number of non-residential properties from approximately 180 to 230.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for runoff reduction, floodplain storage and sediment management. They show areas where natural flood management could be effective and where further detailed assessment should take place. This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Runoff reduction

There are widespread areas of potential for runoff reduction within the Ness and Beaully catchment group. The areas of potential for runoff reduction are concentrated in the highland areas in the south-west of the catchment group. There is limited potential for runoff reduction either within the Potentially Vulnerable Areas closest to the coast (Nairn West and Ardersier (01/17), Nairn Central (01/18), Inverness Airport (01/19), or Smithton and Culloden (01/20)) or in the areas immediately adjacent to these Potentially Vulnerable Areas. It is therefore unlikely that runoff reduction measures would have any significant impact on flood risk within these Potentially Vulnerable Areas. However for Inverness and the Great Glen (01/21) there are significant areas of potential for runoff reduction within and immediately adjacent to the southern half of the Potentially Vulnerable Area around Loch Ness.

### Floodplain storage

There are areas of potential for flood storage throughout the Ness and Beaully catchment group, including within all the Potentially Vulnerable Areas. Due to the proximity of some of the areas for potential it is possible that floodplain storage measures outside as well as within the Potentially Vulnerable Areas may have a beneficial impact on flood risk in Potentially Vulnerable Areas. There are areas of potential for floodplain storage along the Loch Ness system including its tributaries

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<sup>3</sup> From the study 'An assessment of the vulnerability of Scotland's river catchments and coasts to the impacts of climate change' (CEH, 2011)

such as the River Enrick at Drumnadrochit and associated lochs such as Loch Garry, Loch Loyne, Loch Cluanie, and Loch Cuaich. There are also areas of floodplain storage potential along the River Beaully and its tributaries and the River Nairn.

### **Sediment management**

The sediment balance of the Loch Ness system is varied, whilst a significant proportion is in approximate balance there are also significant lengths of erosional reaches. Through the urban areas of Inverness the sediment balance of the watercourses tend to be in approximate balance. Localised areas of high erosion and deposition can contribute to flood risk and the potential for sediment management to provide significant flood risk improvements cannot be ruled out in this catchment at this stage.

## River flooding Fyne, Firth Of Clyde, Awe and Etive, and Kintyre catchment group

### Catchment overview

The Fyne, Firth of Clyde, Awe and Etive and Kintyre catchment group covers the south-west of the Highland and Argyll Local Plan District (Figure 1). It includes the islands of Jura, Colonsay, and Islay and has an area of approximately 5,200km<sup>2</sup>. There are a large number of watercourses and burns in the catchment including the Loch Awe system and the River Add.

The predominant land covers in the catchment are heather grassland, coniferous woodland and acid grassland, which each provide around 20% of the total land cover of the area.

There are 10 Potentially Vulnerable Areas in this catchment all of which are located on the mainland:

- Oban (01/31)
- Loch Feochan (01/32)
- Taynuilt (01/33)
- Loch Awe (01/34)
- Craignish (01/35)
- Slockavullin (01/36)
- Inveraray (01/37)
- Lochgilphead (01/38)
- Tarbert (01/39)
- Campbeltown (01/40).

### Flood risk in the catchment

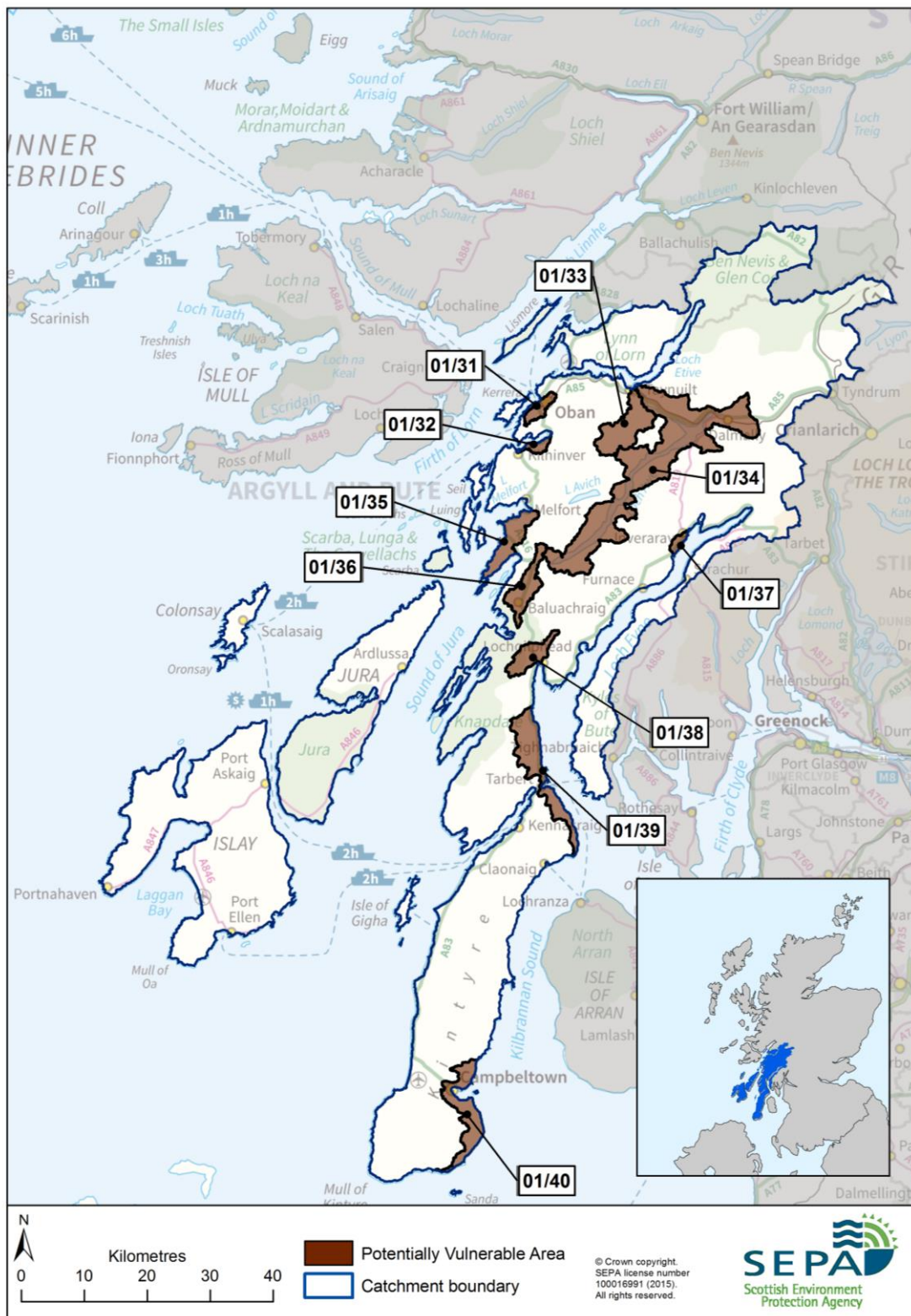
There are approximately 740 residential properties and approximately 510 non-residential properties at risk of river flooding. 70% of the residential properties and 69% of the non-residential properties at risk are located within Potentially Vulnerable Areas.

#### Main areas at risk

The main areas, which have greater than 20 residential properties at risk of river flooding, are shown in Table 1. Campbeltown and Oban are the locations where most flood risk is concentrated in this catchment group area.

	Residential and non-residential properties at risk of river flooding	Annual Average Damages
Campbeltown	400	£390,000
Oban	340	£1.5 million
Taynuilt	40	£60,000

**Table 1:** Main areas with a risk of flooding



**Figure 1:** Fyne, Firth of Clyde, Awe and Etive, and Kintyre river catchment group and Potentially Vulnerable Areas

## Economic activity and infrastructure at risk

The Annual Average Damages from river flooding are estimated to be approximately £3.8 million. This accounts for around 14% of the total Annual Average Damages for the Highland and Argyll Local Plan District. The damages are distributed as follows:

- 47% non-residential properties (£1.8 million)
- 32% residential properties (£1.2 million)
- 8% emergency services (£300,000)
- 7% roads (270,000)
- 4% agriculture (£140,000)
- 2% vehicles (£70,000).

Figure 2 shows the location of Annual Average Damages from river flooding across the area. The areas of highest damage are in Oban and Campbeltown.

Table 2 shows the approximate numbers of further infrastructure assets which are at risk of flooding within this catchment.

	Number at risk	Further detail
<b>Community facilities</b>	<10	Includes; educational buildings and emergency services
<b>Utility assets</b>	30	Includes; electricity substations, fuel extraction sites and telephone exchanges
<b>Roads (excluding minor roads)</b>	530 locations	Notably the A816 and A85
<b>Railway routes</b>	30 locations	Oban to Crianlarich
<b>Agricultural land (km<sup>2</sup>)</b>	83	n/a

**Table 2:** Infrastructure and agricultural land at risk of river flooding

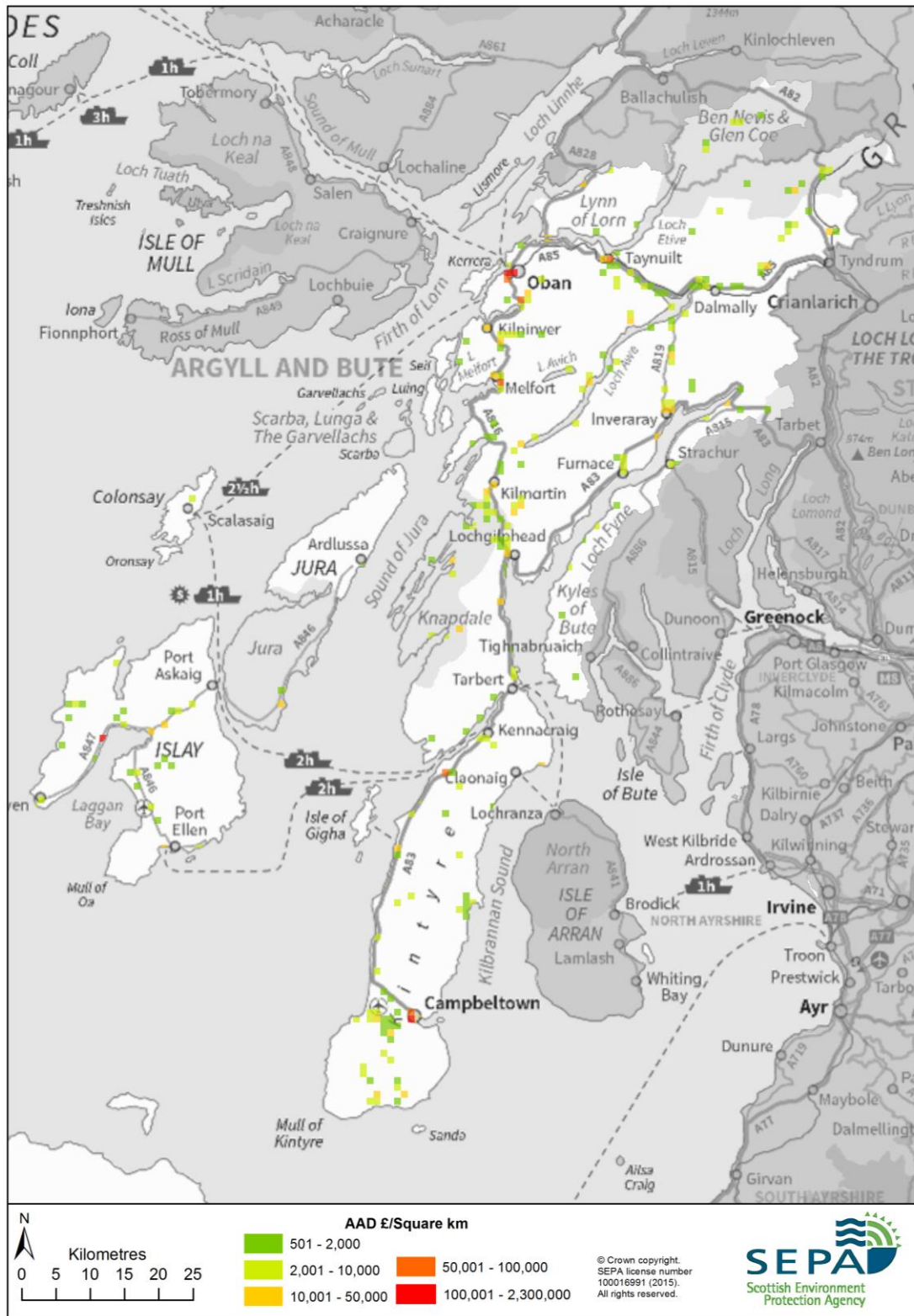
## Designated environmental and cultural heritage sites at risk

There are approximately 96 cultural heritage sites at risk of flooding from rivers. The sites include numerous gardens and designed landscapes, a large number of scheduled monuments and listed buildings.

Approximately 51km<sup>2</sup> of environmental designated area is at risk of river flooding, including Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Sites of Special Scientific Interest (SSSI). The sites affected include lochs, moors, flats, dunes, forests, glens, hills, and coast. The designated sites which have the largest areas flooded include Rhinns of Islay, Glen Etive and Glen Fyne, Jura, Scarba, and the Garvellachs, Kintyre Goose Roosts and Lochs.

## History of river flooding

There have been floods recorded in Oban and Campbeltown that led to significant impacts on properties and infrastructure, most recently in October 2014.



**Figure 2: Annual Average Damages from river flooding**



## Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk in this area are described in Section 2.

## Climate change and future flood risk

The UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall. The predicted increase in rainfall and river flows may increase the potential for river flooding.

Under the UKCP09 high emissions scenario for 2080, average peak river flows for the Fyne, Firth of Clyde, Awe and Etive, and Kintyre catchment may increase by 56%<sup>1</sup>. This would potentially increase in the number of residential properties at risk of river flooding from approximately 740 to 1,200 and the number of non-residential properties from approximately 510 to 720.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for runoff reduction, floodplain storage and sediment management. They show areas where natural flood management could be effective and where further detailed assessment should take place. This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Runoff reduction

Almost all of the catchment group area has potential for runoff reduction. There are significant areas of potential for runoff reduction within and immediately adjacent to all 10 Potentially Vulnerable Areas.

### Floodplain storage

There are scattered areas of potential for flood storage. The largest continuous area of high potential for floodplain storage is located around Loch Awe. Due to the

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<sup>1</sup> From the study 'An assessment of the vulnerability of Scotland's river catchments and coasts to the impacts of climate change' (CEH, 2011)

proximity of some of the areas for potential it is possible that floodplain storage measures outside as well as within the Potentially Vulnerable Areas may have a beneficial impact on flood risk within several of the Potentially Vulnerable Areas (Taynuilt (01/33), Loch Awe (01/34), Kilmartin (01/36), Lochgilphead (01/38) and Campbeltown (01/40)).

For the remaining Potentially Vulnerable Areas there is limited potential for floodplain storage either within or in the upstream areas adjacent to these Potentially Vulnerable Areas and it is unlikely that floodplain storage measures would have any significant impact on flood risk within these Potentially Vulnerable Areas.

### **Sediment management**

The majority of the rivers in the area are in balance or moderately eroding, however there are areas with high erosion and deposition which could affect channel capacity. For example, the Soroba / Black Lynn Burn which passes through Oban has areas of deposition through the town, as well as erosion in the upper reaches.

## River flooding Loch Linnhe, Lochy (Inverness-Shire) and Loch Shiel catchment group

### Catchment overview

The Loch Linnhe, Lochy and Loch Shiel catchment group is located in the west of the Highland and Argyll Local Plan District (Figure 1) and has an area of approximately 3,700km<sup>2</sup>. The largest river is the River Lochy, which flows from Loch Lochy to Loch Linnhe. Additional smaller rivers and burns flow into the many lochs spread across the catchment group or directly to the sea. The most significant lochs are Loch Shiel, Loch Arkaig, Loch Lochy, Loch Trieg, Loch Laggan and Loch Leven.

The predominant land cover in the area is acid grassland, covering around 33% of the catchment group area. Coniferous woodland, heather grassland and montane habitats each provide significant land cover, between 12-16% respectively.

The catchment group contains seven Potentially Vulnerable Areas that are generally located along or at the head of the sea lochs:

- Lochailort (01/22)
- Corpach (01/23)
- Caol and Inverlochy (01/24)
- Fort William (01/25)
- Sunart and Moidart (01/26)
- South Ballachulish (01/27)
- Ballachulish and Glencoe (01/28).

### Flood risk in the catchment

There are approximately 180 residential properties and 90 non-residential properties at risk of river flooding. 31% of the residential and 29% of non-residential properties at risk are located within Potentially Vulnerable Areas.

#### Main areas at risk

The main areas, which have greater than 20 residential properties at risk of river flooding, are shown in Table 1.

	Residential and non-residential properties at risk of river flooding	Annual Average Damages
Ballachulish	40	£140,000
Fort William	20	£42,000

**Table 1:** Main areas with a risk of flooding



## Economic activity and infrastructure at risk

The Annual Average Damages from river flooding in this catchment group area are estimated to be £920,000. This accounts for around 3% of the Annual Average Damages for the Highland and Argyll Local Plan District. The damages are distributed as follows:

- 50% residential properties (£450,000)
- 18% non-residential properties (£170,000)
- 14% roads (£120,000)
- 10% agriculture (£93,000)
- 6% emergency services (£58,000)
- 2% vehicles (£20,000).

Figure 2 shows the location of Annual Average Damages from river flooding across the area.

Table 2 shows the approximate numbers of further infrastructure assets which are at risk of flooding within this catchment.

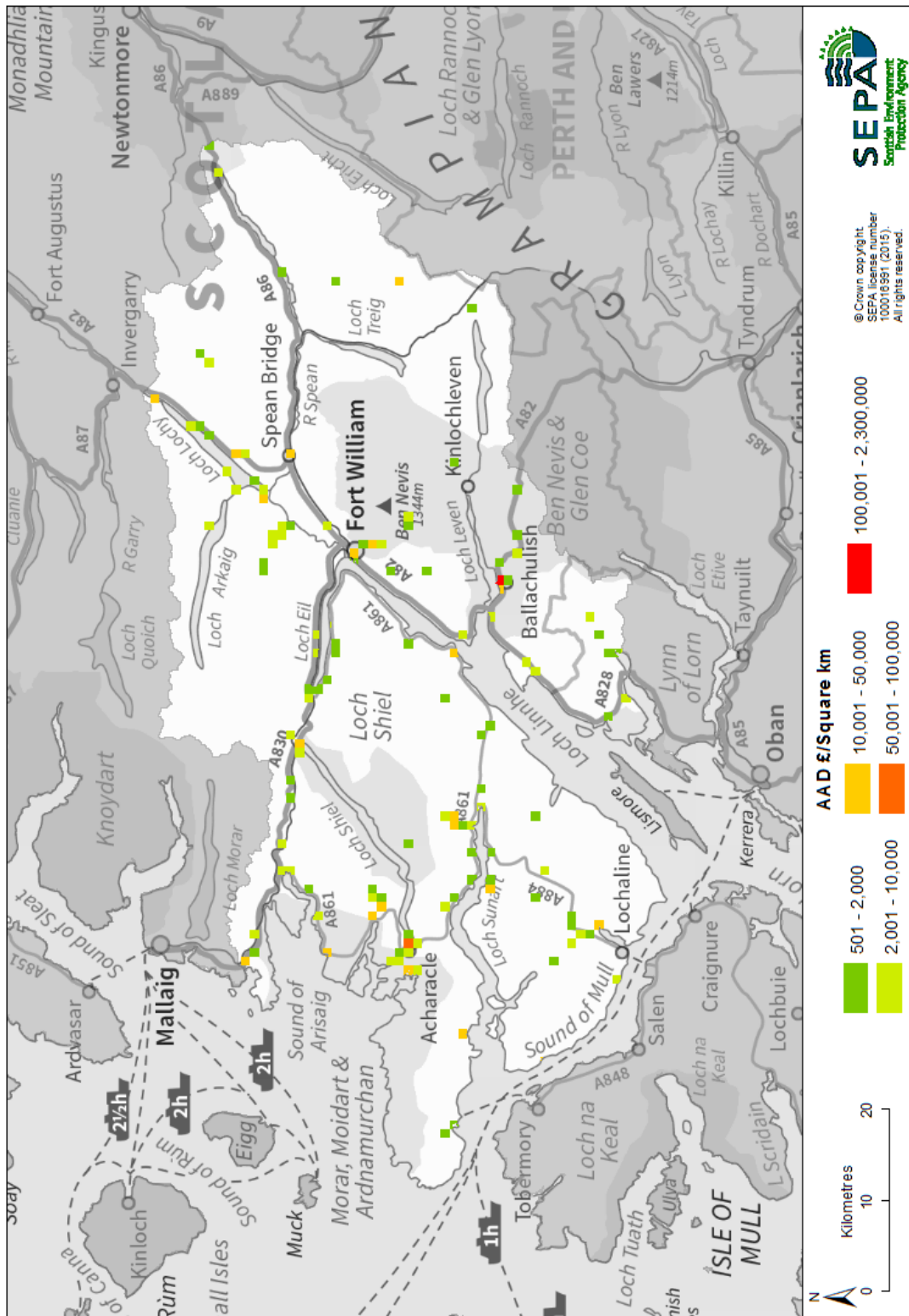
	Number at risk	Further detail
<b>Community facilities</b>	<10	Emergency services.
<b>Utility assets</b>	<10	Includes; electricity substations, fuel extraction sites and telephone exchanges.
<b>Roads (excluding minor roads)</b>	300 locations	Notably the A82 and A86.
<b>Railway routes</b>	50 locations	Crianlarich to Fort William, Fort William to Mallaig.
<b>Agricultural land (km<sup>2</sup>)</b>	60	n/a

**Table 2:** Infrastructure and agricultural land at risk of river flooding

## Designated environmental and cultural heritage sites at risk

There are 63 cultural heritage sites at risk of flooding from rivers. The sites include the battlefields, numerous gardens and designed landscapes, listed buildings and a large number of scheduled monuments.

Approximately 80km<sup>2</sup> of environmental designated area is at risk of river flooding, including Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Sites of Special Scientific Interest (SSSI). The sites potentially affected include lochs, moss, forests, glens, hills, rivers and geological outcrops. The designated sites which have the largest areas potentially flooded include Loch Shiel, Rannoch Lochs, Moidart and Ardgour.



**Figure 2:** Annual Average Damages from river flooding

## History of flooding

In this catchment area there are few records of flooding from rivers. In the past primarily roads have been affected by flooding. There are reports of flooding at Moss near Acharacle and at Lochyside in Fort William.

## Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk and that are in addition to the information presented in Section 2 are described below.

### River flood warning schemes

There are three flood warning areas for river flooding in the Loch Linnhe, Lochy, and Loch Shiel catchment group, which are listed in Table 3. These are the areas where SEPA has detailed models to predict flooding on specific rivers. The flood warning areas are in the Fort William area and are generally associated with the River Lochy and the River Nevis. The locations of the flood warning areas are shown in Figure 3.

Flood warning area (FWA)	Number of properties within flood warning areas	% of properties registered January 2014
Glen Nevis	33	42%
Loch Lochy to Torcastle	11	91%
Lochybridge	263	44%

**Table 3:** Flood warning areas

The Highland Council has two flood monitors in Fort William to provide early warning of potentially flooding.

- Flood monitor on Allt Dhomhnuill an t-Siucair by the Police Station.
- Flood monitor on unnamed burn on the culvert inlet by the leisure centre.

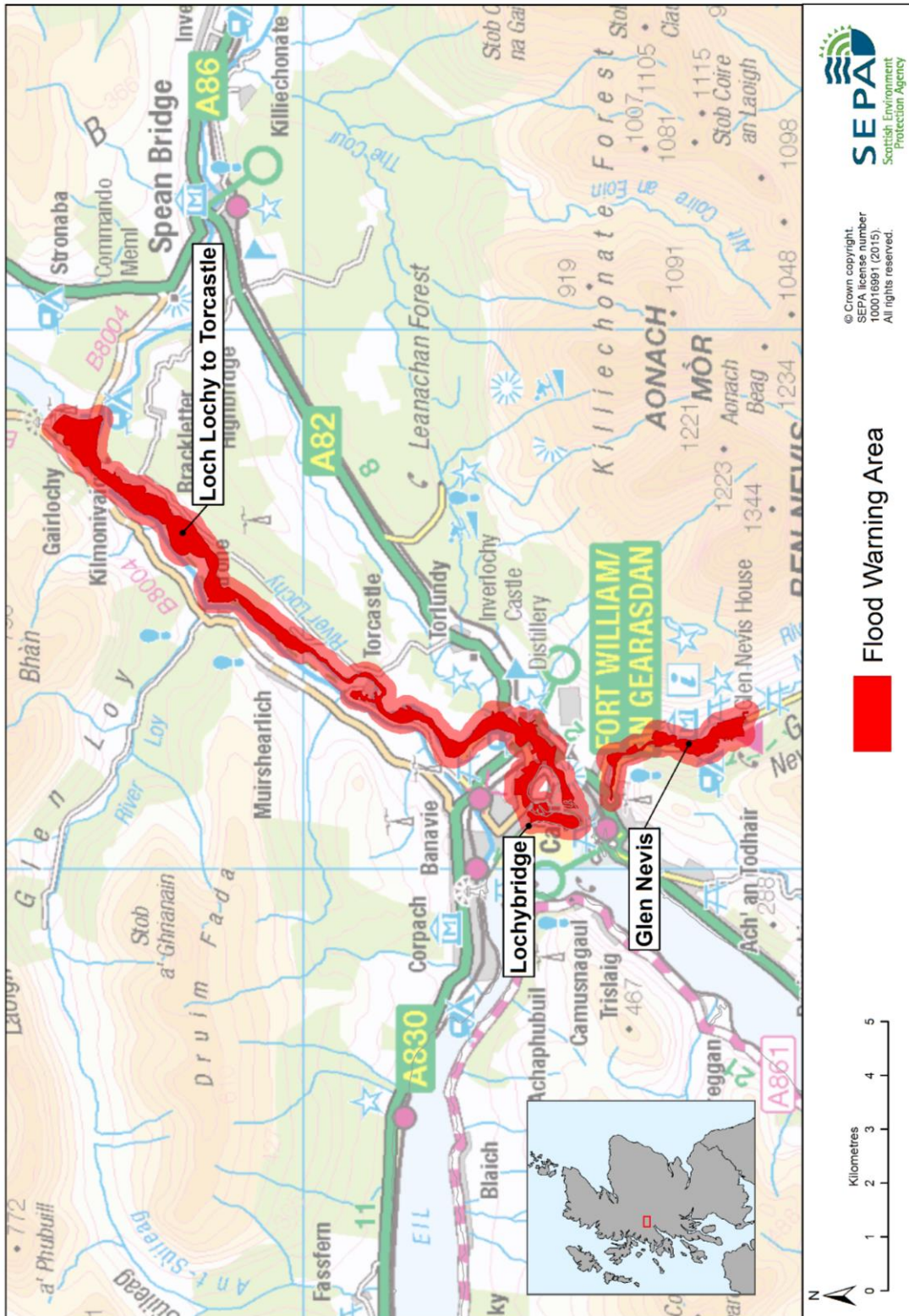


Figure 3: Flood warning areas



## Climate change and future flood risk

The UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall. The predicted increase in rainfall and river flows may increase the potential for river flooding.

Under the UKCP09 high emissions scenario for 2080, average peak river flows for the Loch Linnhe, Lochy (Inverness-shire), and Loch Shiel catchment group area by 2080 may be in the order of 56%<sup>1</sup>. This would potentially increase in the number of residential properties at risk of river flooding from approximately 180 to 330 and the number of non-residential properties from approximately 90 to 120.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for runoff reduction, floodplain storage and sediment management. They show areas where natural flood management could be effective and where further detailed assessment should take place. This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Runoff reduction

Almost the entire catchment group has potential for runoff reduction. There are significant areas with potential for runoff reduction within and immediately adjacent to all seven Potentially Vulnerable Areas in this catchment.

### Floodplain storage

There are small scattered areas of potential for flood storage throughout catchment group. Due to the proximity of some of the areas for potential it is possible that floodplain storage measures outside as well as within the Potentially Vulnerable Areas may have a beneficial impact on flood risk in Lochailort (01/22), Caol and Inverlochy (01/24), and Sunart and Moidart (01/26)). There is limited potential for floodplain storage either within or in the upstream areas adjacent to (Corpach (01/23), Fort William (01/25), South Ballachulish (01/27), and Ballachulish and Glencoe (01/28)) and it is therefore unlikely that floodplain storage measures would have any significant impact on flood risk within these areas.

### Sediment management

The Loch Eilt system passes through Lochailort (01/22) and has a varied sediment balance, with the loch typically undergoing deposition, with the area downstream

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<sup>1</sup> From the study 'An assessment of the vulnerability of Scotland's river catchments and coasts to the impacts of climate change' (CEH, 2011)

eroding. The River Laroach passes through Ballachulish and Glencoe (01/28) and is eroding in its upper reaches and depositing in the lower reaches through the town. The River Nevis system passes through Fort William (01/25) and is generally in approximate balance with some areas of erosion and to a lesser extent deposition. The potential for sediment management measures to provide significant flood risk improvements cannot be ruled out in this catchment group at this stage.

## River flooding Loch Alsh, Loch Maree and Laxford catchment group

### Catchment overview

The Loch Alsh, Loch Maree and Laxford catchment group covers the north-west part of the Highland and Argyll Local District Plan (Figure 1) and has an area of approximately 5,000km<sup>2</sup>. It includes several larger lochs including Loch Morar, Loch Maree and Loch Assynt. There are numerous smaller rivers draining the steep slopes into lochs or directly to the sea.

Heather and grassland dominates the land cover accounting for around 70% of the total land cover in the area.

There are three Potentially Vulnerable Areas in the catchment:

- Lochinver (01/05)
- Poolewe (01/12)
- Kinlochewe (01/13).

### Flood risk in the catchment

#### Main areas at risk

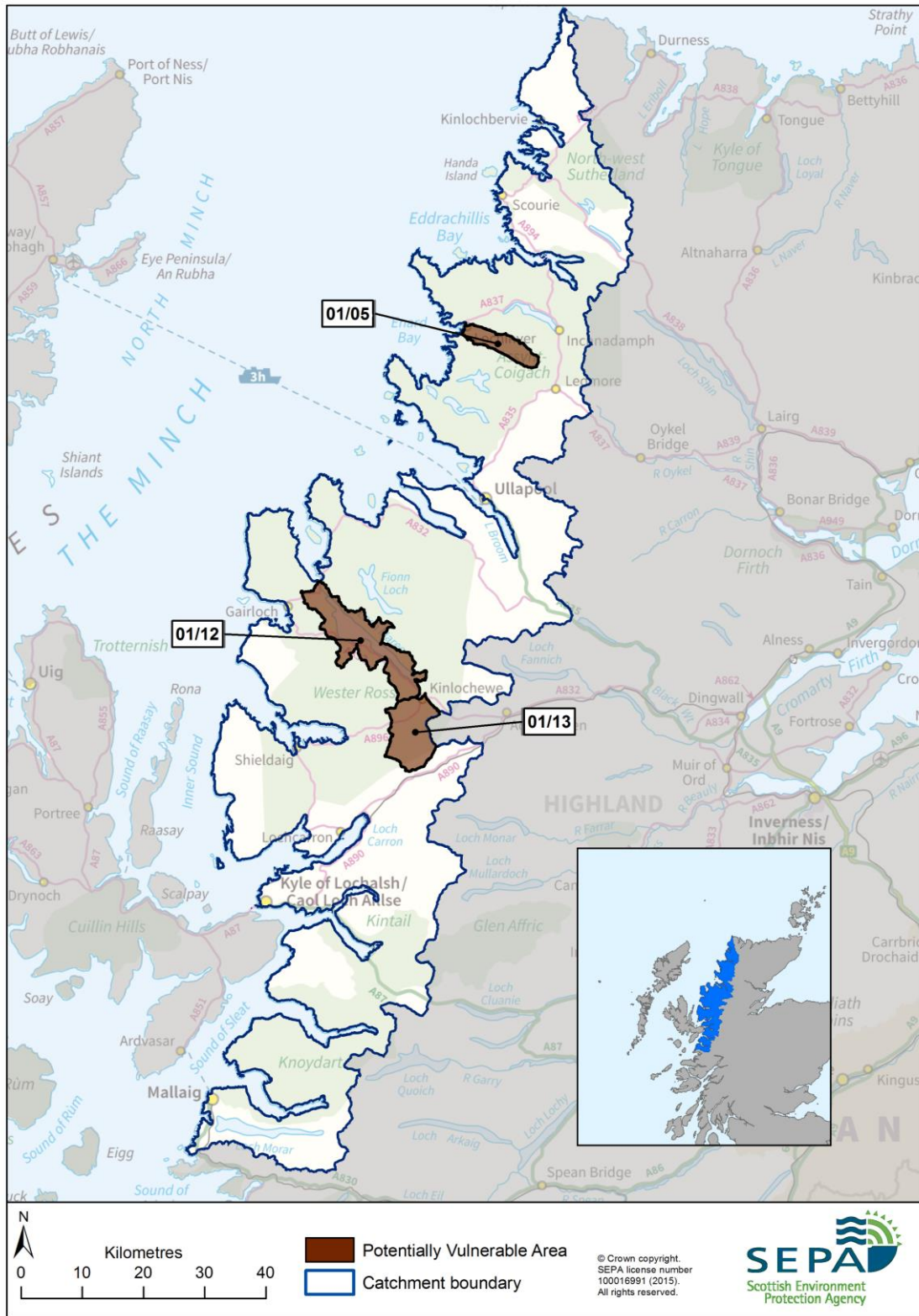
There are 150 residential properties and 90 non-residential properties at risk of river flooding. Properties at risk are dispersed around the catchment group. 10% of residential and 19% of non-residential properties are located within the Potentially Vulnerable Areas.

#### Economic activity and infrastructure at risk

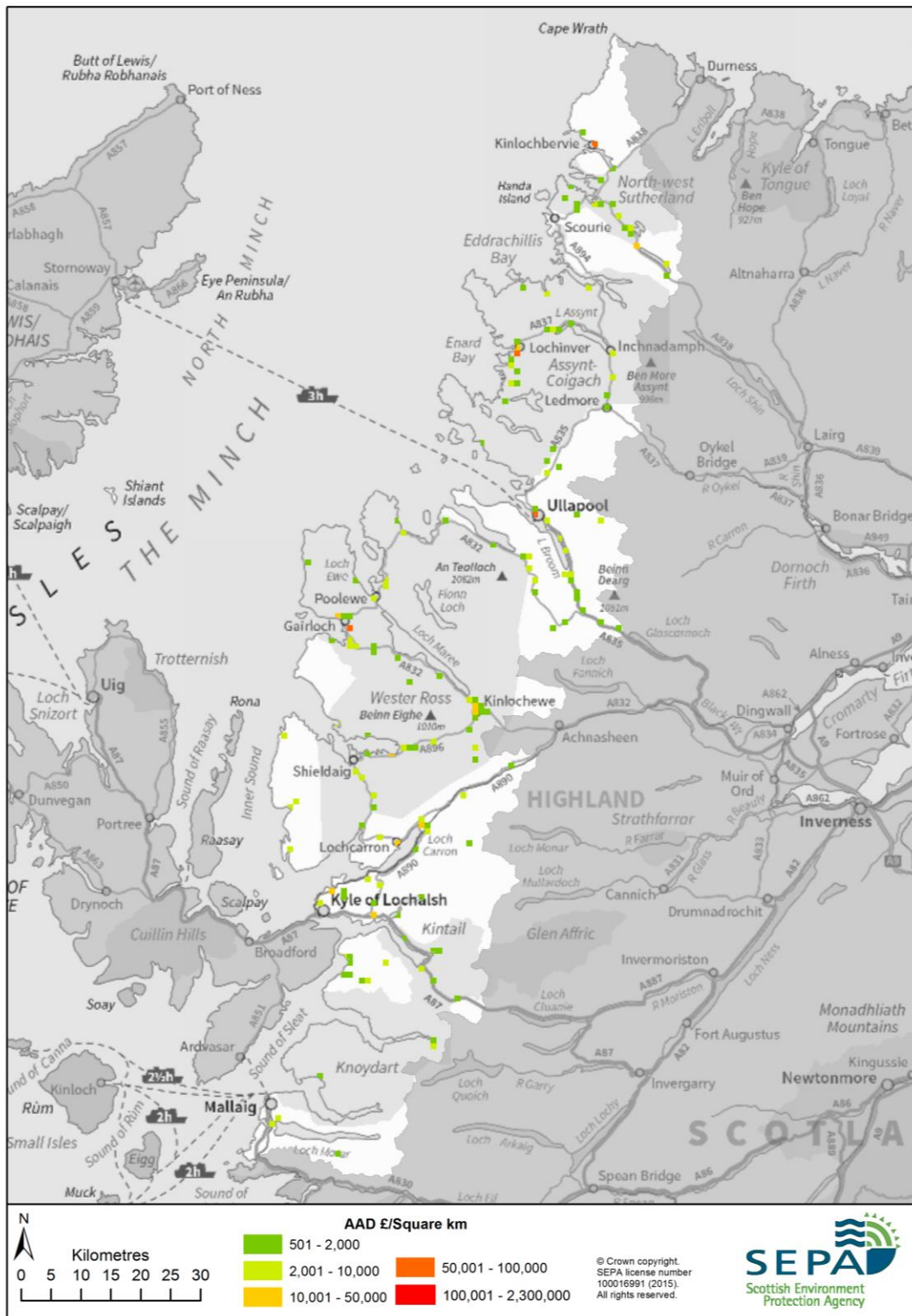
The Annual Average Damages from river flooding in this catchment group are estimated to be approximately £1.0 million. This accounts for around 4% of the Annual Average Damages for the Highland and Argyll Local Plan District. The damages are distributed as follows:

- 32% non-residential properties (£320,000)
- 30% residential properties (£300,000)
- 18% roads (£180,000)
- 14% agriculture (£140,000)
- 6% emergency services (£60,000)
- 1% vehicles (£8,000).

Figure 2 shows the location of Annual Average Damages from river flooding across the area.



**Figure 1:** Loch Alsh, Loch Maree and Laxford catchment group area and Potentially Vulnerable Areas



**Figure 2: Annual Average Damages from river flooding**

Table 2 shows the approximate numbers of further infrastructure assets which are at risk of flooding within this catchment.

	Number at risk	Further detail
Community facilities	<10	Includes; educational buildings and emergency services
Utility assets	<10	Includes; electricity substations, fuel extraction sites and telephone exchanges
Roads (excluding minor roads)	350 locations	Notably the A835 and A896. Flooding to roads in this area can be significant in remote areas as there may be no alternative routes or long diversions
Railway routes	20 locations	Inverness to Kyle of Lochalsh
Agricultural land (km <sup>2</sup> )	91	n/a

**Table 2:** Infrastructure and agricultural land at risk of river flooding

### Designated environment and cultural heritage sites

There are approximately 22 cultural heritage sites at risk of river flooding. The sites include battlefields, gardens and designed landscapes scheduled monuments and listed buildings.

Approximately 280km<sup>2</sup> of environmental designated area is at risk of river flooding, including Special Areas of Conservation, Special Protection Areas, and Sites of Special Scientific Interest. The sites affected include lochs, forests, glens, hills, and rivers. The designated sites which have the largest flooded areas include Loch Maree, Loch Morar, Wester Ross Lochs and Ardlair-Letterewe.

### History of river flooding

There are no records of extensive flooding in this area, however localised river flooding has affected parts of Kinlochewe and Lochinver. In August 2014, a number of properties were flooded and residents trapped in flooded houses after a river burst its banks on the A835 at Loch Broom near Ullapool. Five people were evacuated from Craig Bothy in Torridon by helicopter after being cut off by swollen rivers.

### Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk in this area are described in Section 2.

### Climate change and future flood risk

The UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more

extreme temperature and rainfall. The predicted increase in rainfall and river flows may increase the potential for river flooding.

Under the UKCP09 high emissions scenario for 2080, average peak river flows for the Loch Alsh, Loch Maree and Laxford catchment may increase by 56%<sup>1</sup>. This would potentially increase in the number of residential properties at risk of river flooding from approximately 150 to 180 and the number of non-residential properties from approximately 90 to 110. The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for runoff reduction, floodplain storage and sediment management. They show areas where natural flood management could be effective and where further detailed assessment should take place. This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Runoff reduction

Almost the entire catchment group has potential for runoff reduction due to the steepness of the slopes. There are significant areas of potential for runoff reduction within and immediately adjacent to all Potentially Vulnerable Areas, however even within these there are limited properties and infrastructure affected by flooding to justify significant interventions.

### Floodplain storage

There are small scattered areas of potential for flood storage throughout the catchment group. The largest continuous areas of potential for floodplain storage are located around the lochs including Loch Morar, Loch Maree, Fionn Loch, Loch Assynt, Loch More and Loch Lurgainn. There is a large area of potential for floodplain storage associated with Loch Maree in the Poolewe Potentially Vulnerable Area (01/12) and it is possible that floodplain storage measures may have a beneficial impact on flood risk in this Potentially Vulnerable Area. However for the other Potentially Vulnerable Areas (Lochinver (01/05) and Kinlochewe (01/13)) there is limited potential for floodplain storage either within or adjacent to the Potentially Vulnerable Areas.

### Sediment management

The river system, which passes through Lochinver (01/05), includes several lochs. These are mainly areas of deposition connected by watercourses, which are generally eroding. The Loch Maree system passes through Poolewe (01/12) and Kinlochewe (01/13) and has a highly variable sediment balance, with large sections in approximate balance.

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<sup>1</sup> From the study 'An assessment of the vulnerability of Scotland's river catchments and coasts to the impacts of climate change' (CEH, 2011)

## River flooding Inner Hebrides catchment group

### Catchment overview

The Inner Hebrides catchment covers the islands in the west of the Highland and Argyll Local Plan District. It includes the Isle of Mull and the Isle of Skye (Figure 1) and has an area of approximately 3,000km<sup>2</sup>. Whilst there are no major rivers in this catchment group there are numerous small burns and lochs scattered throughout the catchment area.

The dominant land covers are bog, heather grassland, acid grassland and rough grassland, which between them cover almost 70% of the total area.

There are three Potentially Vulnerable Areas, two on the Isle of Mull and one on the Isle of Skye:

- Uig – Isle of Skye (01/11)
- Isle of Mull – Craignure (01/29)
- Ross of Mull (01/30).

### Flood risk in the catchment

#### Main areas at risk

There are approximately 120 residential properties and approximately 70 non-residential properties at risk of river flooding. These are scattered across the area so that less than 5% of the residential and non-residential properties at risk are located within Potentially Vulnerable Areas.

#### Economic activity and infrastructure at risk

The Annual Average Damages from river flooding are approximately £630,000. This accounts for around 2% of the total damages for the Highland and Argyll Local Plan District. The damages are distributed as follows:

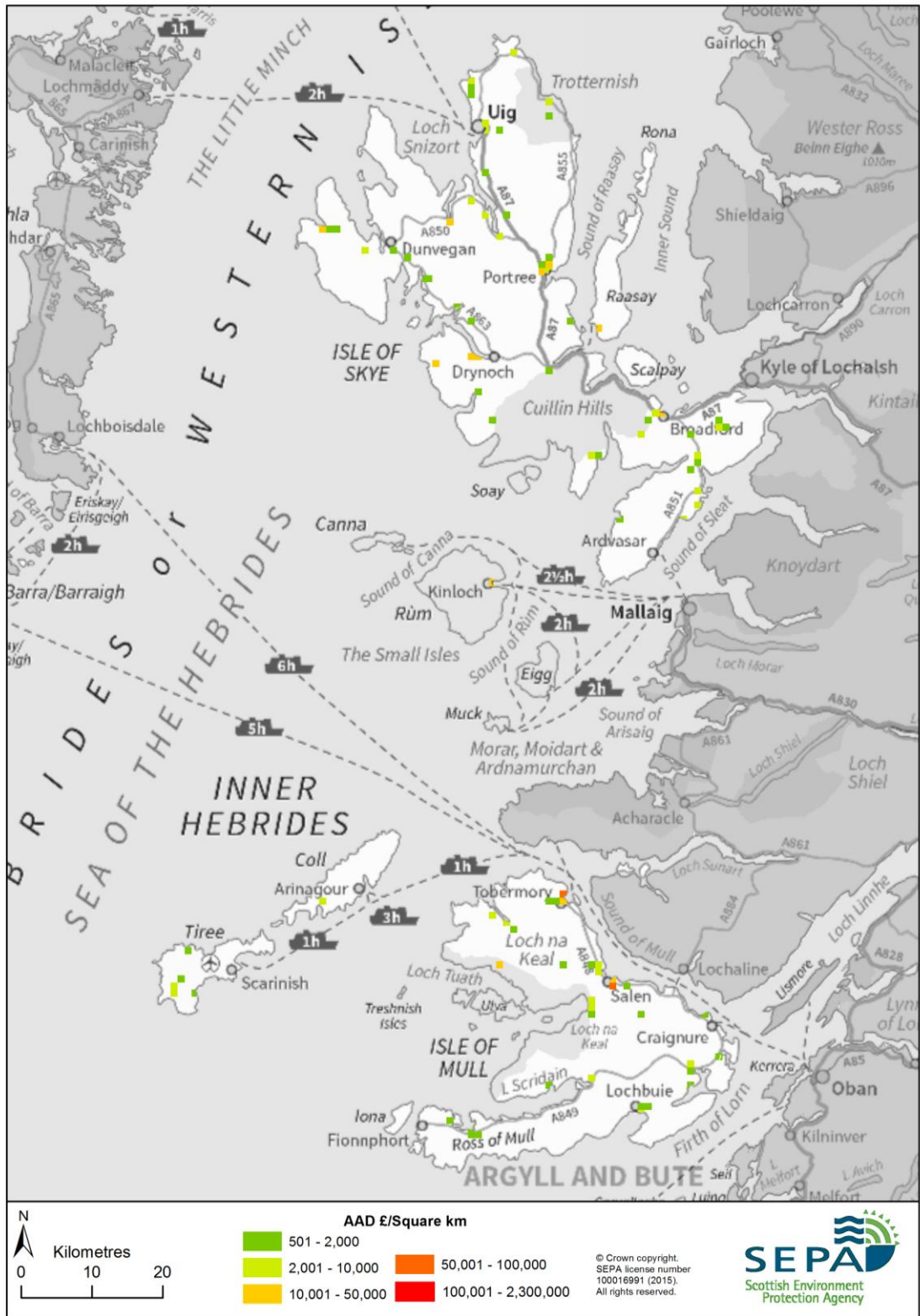
- 51% residential properties (£320,000)
- 18% non-residential properties (£110,000)
- 13% roads (£80,000)
- 8% agriculture (£53,000)
- 6% emergency services (£39,000)
- 4% vehicles (£24,000).

Figure 2 shows the location of Annual Average Damages from river flooding across the area.





**Figure 1:** Inner Hebrides catchment group area and Potentially Vulnerable Areas



**Figure 2: Annual Average Damages from river flooding**

Table 1 shows the approximate numbers of further infrastructure assets which are at risk of flooding within this catchment.

	Number at risk	Further detail
Community facilities	0	n/a
Utility assets	<10	Includes; electricity substations and fuel/mineral extraction sites
Roads (excluding minor roads)	250 locations	Notably the A848 and A849
Railway routes	0	n/a
Agricultural land (km <sup>2</sup> )	36	n/a

**Table 1:** Infrastructure and agricultural land at risk of river flooding

### Designated environmental and cultural heritage sites at risk

There are 21 cultural heritage sites at risk from river flooding. The sites include gardens and designed landscapes, scheduled monuments (including prehistoric domestic/defensive and ritual/funerary sites, monastery, burial grounds, castles, bridges, and settlements) and listed buildings.

Approximately 28km<sup>2</sup> of environmental designated area is at risk of river flooding, including Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Sites of Special Scientific Interest (SSSI). The sites affected include lochs, bogs, peatlands, moors, forests, hills, and islands. The designated sites which have the largest areas at risk include Sligachan Peatlands.

### History of river flooding

There are no records of extensive flooding of property in this area. However, localised river flooding can affect small clusters or individual properties and infrastructure in particular roads.

### Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk in this area are described in Section 2.

### Climate change and future flood risk

The UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall. The predicted increase in rainfall and river flows may increase the potential for river flooding.

Under the UKCP09 high emissions scenario for 2080, average peak river flows for the Inner Hebrides catchment group may increase by 56%<sup>1</sup>. This would potentially increase in the number of residential properties at risk of river flooding from approximately 120 to 140. The number of non-residential properties would not change significantly under these conditions.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for runoff reduction, floodplain storage and sediment management. They show areas where natural flood management could be effective and where further detailed assessment should take place. This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Runoff reduction

Almost the entire catchment group has potential for runoff reduction. There are significant areas of potential for runoff reduction within and immediately adjacent to all Potentially Vulnerable Areas in this catchment. However, even within the Potentially Vulnerable Areas there are limited properties and infrastructure affected by flooding to justify significant interventions.

### Floodplain storage

There are small scattered areas of potential for flood storage throughout the catchment group. There are no large continuous areas of potential for floodplain storage and there is limited potential for floodplain storage, either within or adjacent to Potentially Vulnerable Areas. It is therefore unlikely that floodplain storage measures would have any significant impact on flood risk within these Potentially Vulnerable Areas.

### Sediment management

Due to the small size of river catchments in this area, no assessment of the potential for sediment management was undertaken.

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<sup>1</sup> From the study 'An assessment of the vulnerability of Scotland's river catchments and coasts to the impacts of climate change' (CEH, 2011)

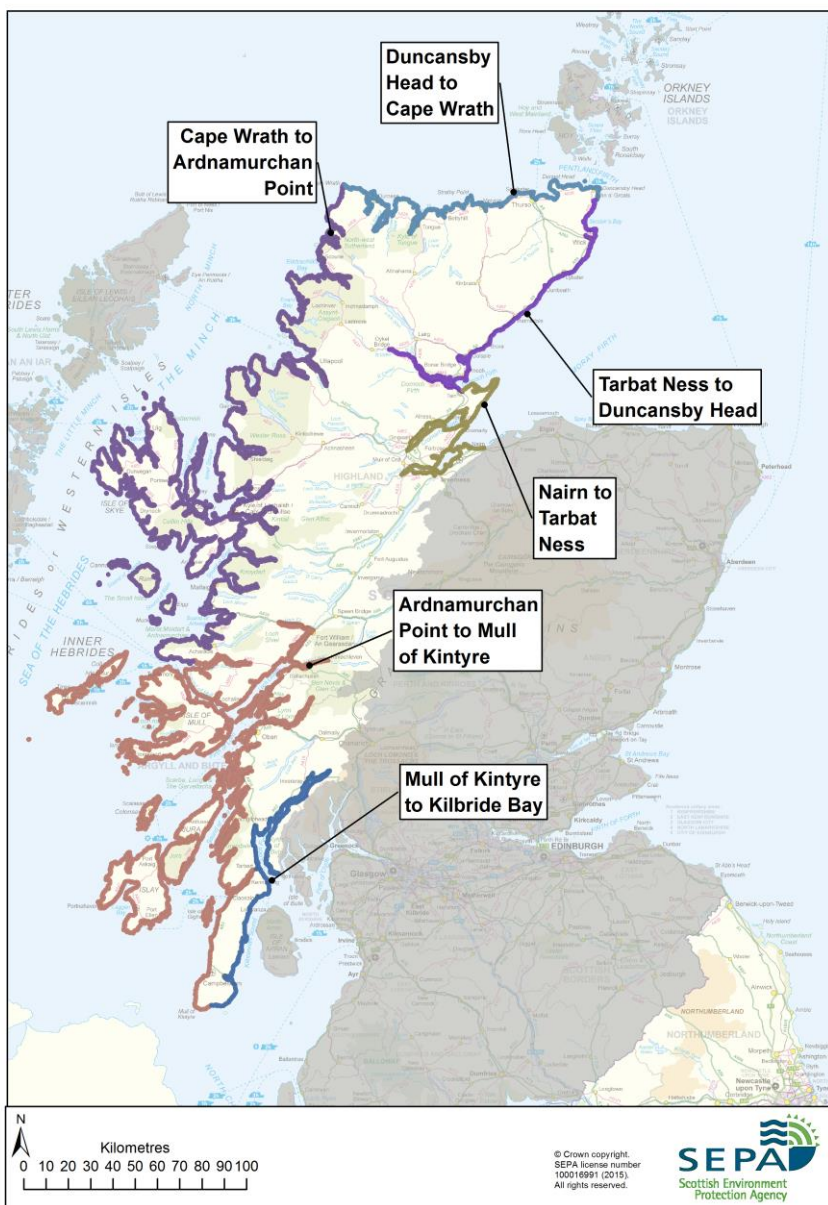
### 3.3 Coastal flooding

## Highland and Argyll Local Plan District

This chapter provides supplementary information on flooding for coastal areas. It provides an overview of the natural characteristics of the coast, a summary of flood risk within the coastal area and a brief history of flooding. It also outlines the likely impact of climate change and the potential for natural flood management.

Information about the objectives and actions to manage flood risk are provided in the relevant Potentially Vulnerable Area chapters in Section 2.

In the Highland and Argyll Local Plan District, coastal flooding is reported across six coastal areas (Figure 1).



**Figure 1:** Coastal areas within the Highland and Argyll Local Plan District

## Coastal flooding Nairn to Tarbat Ness

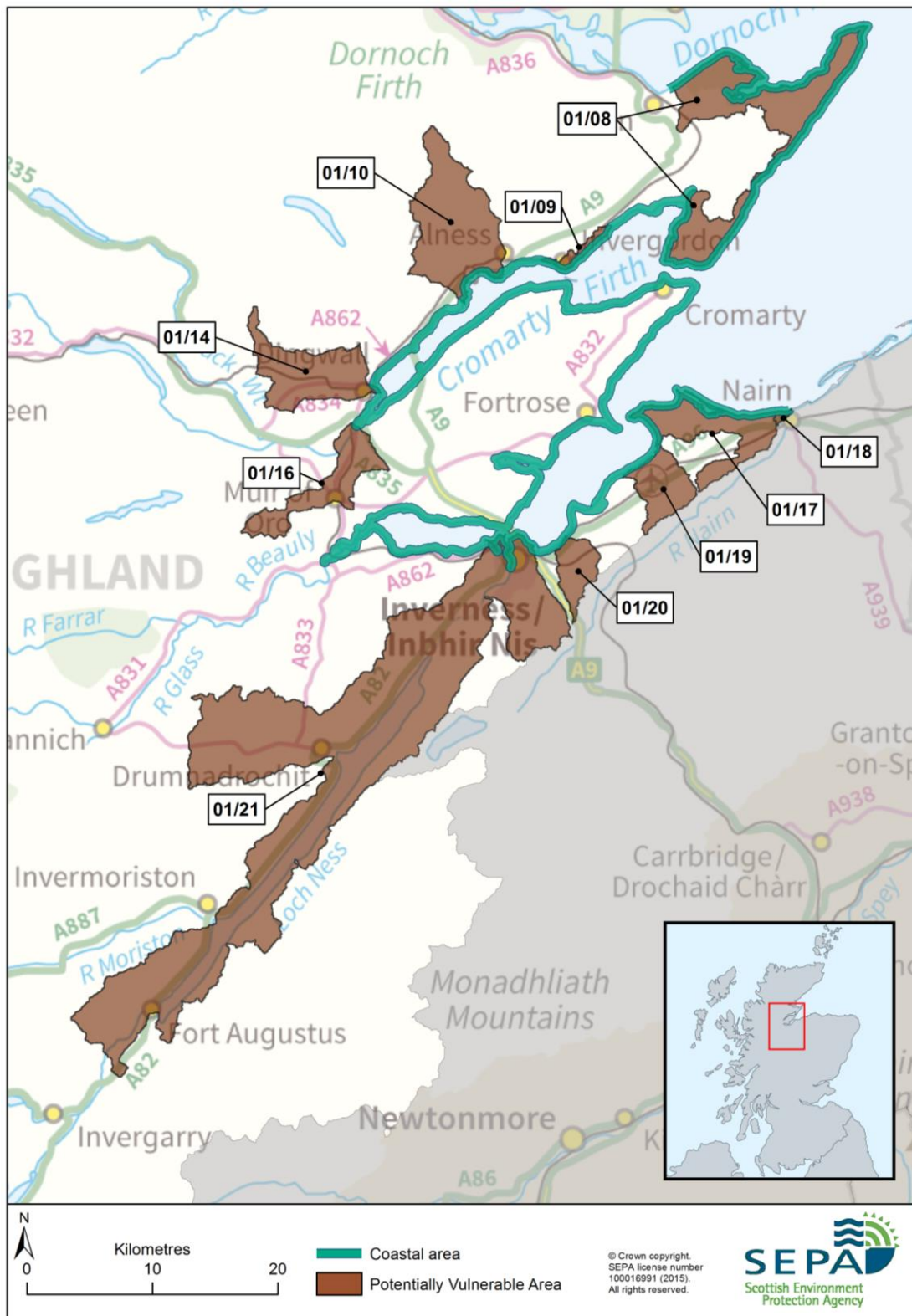
### Coastal overview

The Nairn to Tarbat Ness coastal area is located at the west end of the Moray Firth extending from Nairn to Tain in the Dornoch Firth (Figure 1). It has a length of approximately 230km and includes the Cromarty Firth, Beauly Firth and the tidal section of the River Ness. The coastal area contains just one local authority, The Highland Council.

The Inner Moray Firth, Beauly Firth and Cromarty Firth have a relatively low exposure to waves and typically have a shallow foreshore often with a narrow shingle fringe along the shoreline. In the north, there are thin sand and shingle beaches at Shandwick, Balintore and Hilton of Cadboll which can suffer from episodic erosion during storms. There is significant erosion in the eastern side of this coastal area, at Nairn West Beach for example.

The River Conon flows into the Cromarty Firth and the River Beauly flows into the Beauly Firth. The River Ness flows into the eastern end of the Beauly Firth at South Kessock and is tidal through the northern part of Inverness. There are 10 Potentially Vulnerable Areas:

- 01/08: Tarbat Ness
- 01/09: Invergordon
- 01/10: Alness
- 01/14: Dingwall and Strathpeffer
- 01/16: Conon Bridge and Muir of Ord
- 01/17: Nairn West and Ardersier
- 01/18: Nairn Central
- 01/19: Inverness Airport
- 01/20: Smithton and Culloden
- 01/21: Inverness and the Great Glen.



**Figure 1:** Nairn to Tarbat Ness coastal area and Potentially Vulnerable Areas in the Highland and Argyll Local Plan District

## Flood risk in the coastal area

Within the Nairn to Tarbat Ness coastal area, there are approximately 730 residential properties and 160 non-residential properties at risk of coastal flooding. Approximately 90% of residential and non-residential properties at risk of flooding are located within the Potentially Vulnerable Areas.

### Main areas at risk

The majority of the properties at risk of coastal flooding are located in Inverness and Nairn. Table 1 is a summary of the main areas which have the most properties at risk of coastal flooding within the coastal area. It also includes an estimate of the Annual Average Damages from coastal flooding for each area. Note that the totals in Table 1 include the whole of the town of Nairn however a small part of Nairn is located in the Findhorn, Nairn and Speyside Local Plan District. Most of the properties at risk of coastal flooding in Nairn are located to the west of the River Nairn and are in the Highland and Argyll Local Plan District.

	Number of residential and non-residential properties at risk of flooding	Annual Average Damages
Inverness	590	£3.0 million
Nairn (total for Local Plan Districts 1 and 5).	130	£200,000
Inver (Tarbat Ness)	50	£110,000
Avoch	40	£49,000
Ardersier	30	£14,000
Dingwall	20	£58,000

**Table 1:** Main areas at risk of coastal flooding

### Economic activity and infrastructure at risk

The Annual Average Damages from coastal flooding in the Nairn to Tarbat Ness coastal area are approximately £3.6 million. This accounts for around 14% of the total damages for the Local Plan District. The damages are distributed as follows:

- 52% non-residential properties (£1,900,000)
- 36% residential properties (£1,300,000)
- 5% emergency services (£190,000)
- 4% roads (£160,000)
- 1% vehicles (£51,000)
- 1% agriculture (£48,000).

Figure 2 shows the location of Annual Average Damages from coastal flooding across the area. The areas of highest damage areas are in Inverness and Nairn.



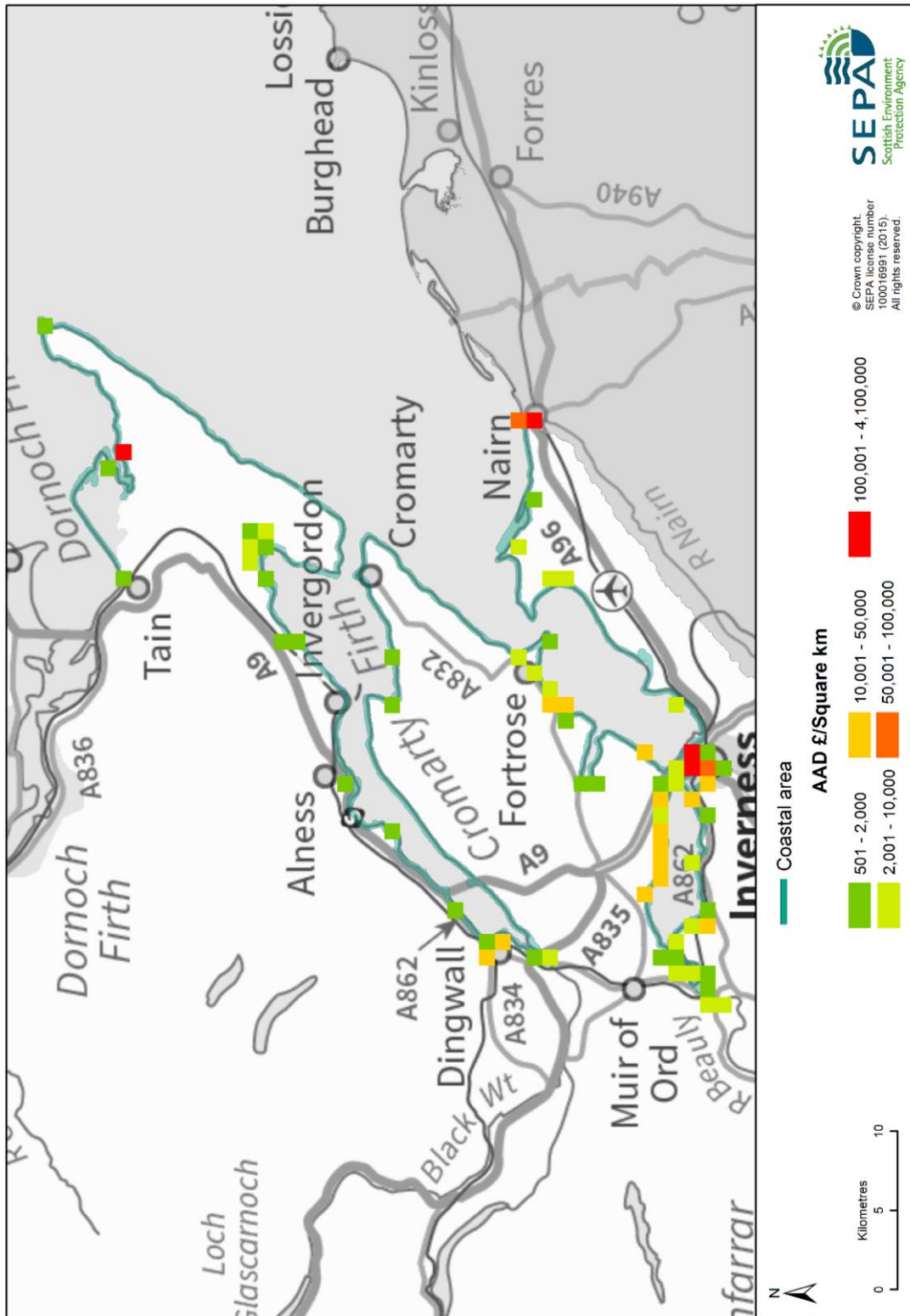


Figure 2: Annual Average Damages from coastal flooding

Table 2 shows further information about infrastructure and agricultural land at risk of coastal flooding.

	Number at risk	Further detail
<b>Community facilities</b>	<10	Includes; educational buildings and healthcare facilities.
<b>Utility assets</b>	30	Includes; electricity substations and fuel extraction sites.
<b>Roads (excluding minor roads)</b>	120	Notably; A96 and A832
<b>Railway routes</b>	27 locations	Aberdeen to Inverness, Inverness to Wick.
<b>Agricultural land (km<sup>2</sup>)</b>	14	n/a

**Table 2:** Infrastructure and agricultural land at risk of coastal flooding

### Designated environmental and cultural heritage sites at risk

There are 13 designated cultural heritage sites at risk of coastal flooding. These sites include scheduled monuments, gardens and designed landscapes and listed buildings.

Approximately 26km<sup>2</sup> of environmentally designated area is at risk of coastal flooding, including Special Areas of Conservation, Special Protection Areas and Sites of Special Scientific Interest. The sites affected include Dornoch Firth and Morrich More, Whiteness Head, and Cromarty Firth.

### History of coastal flooding

Large coastal floods were recorded in Inverness in 1956 and 1989 with both causing extensive damage to the railway line. There is a long history of smaller, more localised floods on the tidal sections of the River Ness and River Nairn, particularly when high tides coincide with high river flows.

Further detail about the history of flooding in this area is available in the relevant Potentially Vulnerable Area chapter in section 2 of this document.

### Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk and that are in addition to the information presented in Section 2 are described below.

### Coastal flood warning schemes

The Nairn to Tarbat Ness coastal area benefits from the Moray Firth Coastal Flood Warning Scheme. There are six flood warning areas: Portmahomack to Inver,

Rockfield to Balintore, Cromarty Firth, Rosemarkie to Avoch, Beaully Firth, Inverness Harbour and South Kessock and Ardersier to Nairn (Figure 3).

## Climate change and future flood risk

UK Climate Projections (UKCP09) predicts that climate change may increase sea levels. The magnitude of sea level rise varies around the coastline.

For the UKCP09 high emissions scenario, the predicted average sea level increase for the Nairn to Tarbat Ness coastal area is 0.5m by 2080. This may increase the number of residential properties at risk of coastal flooding from approximately 730 to 1,300 and the number of non-residential from approximately 160 to 670. Coastal flood modelling by SEPA has not taken into account the impacts of a future climate on wave overtopping or storminess, which could increase the number of properties affected by coastal flooding.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for wave attenuation and estuarine surge attenuation. They show areas where natural flood management could be effective and where further detailed assessment should take place.

This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Estuarine surge

The main area of potential for estuarine surge attenuation within the Cromarty Firth is on the north bank around Invergordon (01/09). Additionally there is a small area of potential around Nigg Ferry (Tarbat Ness - 01/08). Within the Beaully Firth the north bank shows more potential than the south bank. There are areas of potential along the coastlines of Inverness and the Great Glen (01/21) and Nairn West and Ardersier (01/17).

### Wave energy

There is potential for wave energy dissipation along the majority of the coastline in this coastal area. There are significant areas of potential for wave energy dissipation around Inverness Airport, Inverness, the Beaully Firth, and the Cromarty Firth. The south-east facing stretches of coast such as Longman Point to Blue Head, and North Sutor to Tarbat Ness show scattered potential. The urban areas of Nairn and Invergordon also have potential for wave energy dissipation.

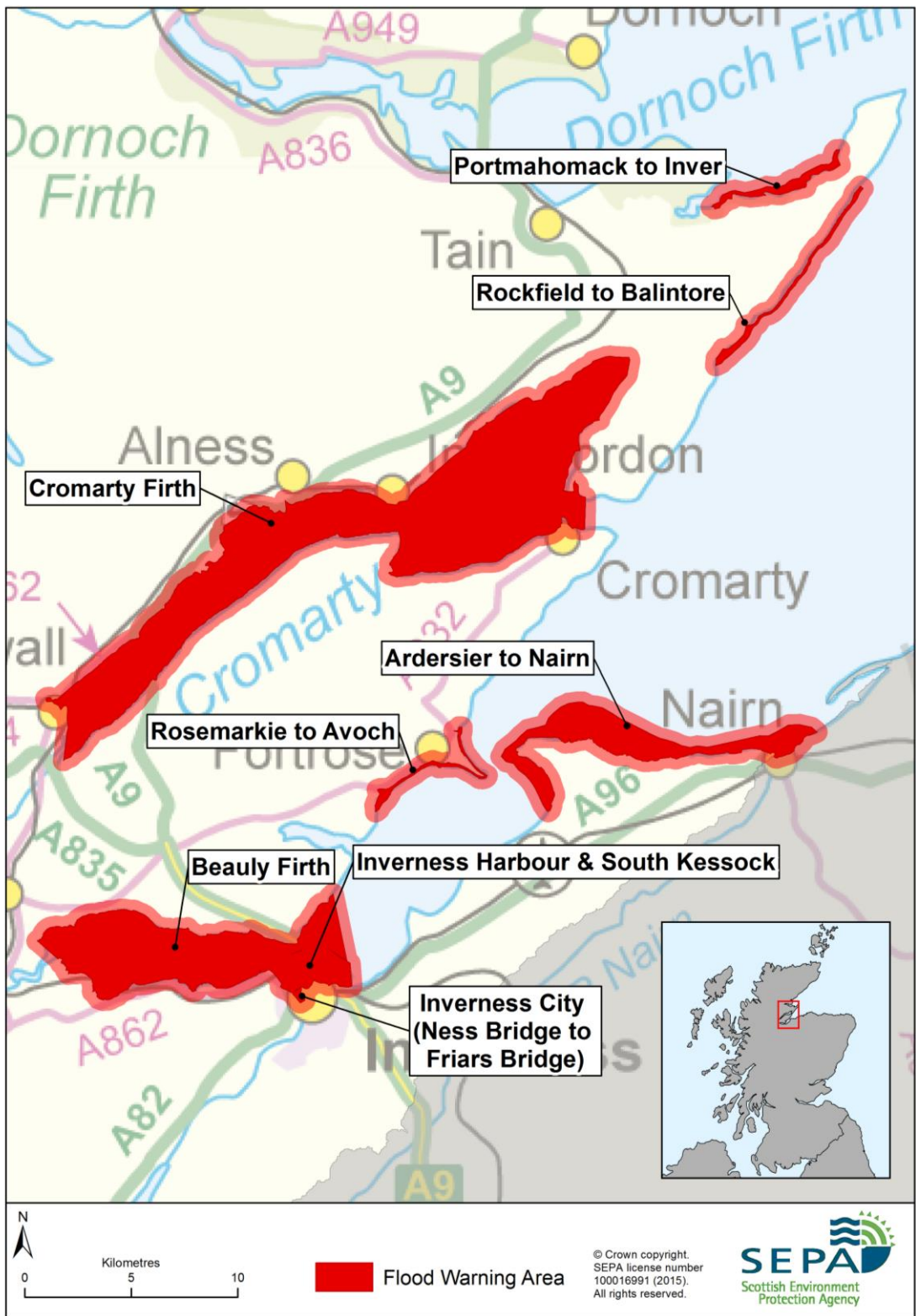


Figure 3: Coastal flood warning areas

## Coastal flooding Tarbat Ness to Duncansby Head

### Coastal overview

The Tarbat Ness to Duncansby Head coastal area has a length of approximately 180km and extends from Tarbat Ness at the mouth of the Dornoch Firth in the south to Duncansby Head (Freswick Bay) in the north (Figure 1). There are several towns and villages located close to the coastline including Wick, Lybster, Dunbeath, Helmsdale, Brora, Golspie, Dornoch and Tain.

In the south, the Dornoch Firth is an area of relatively sheltered coastline with extensive sand and mudflats with some saltmarsh. North of the Dornoch Firth are long sandy beaches, for example at Dornoch, Golspie and Brora. Further north still, the coastline typically comprises cliffs with a series of small coastal bays and rocky outcrops.

The Wick River, Dunbeath Water, Langwell Water, River Helmsdale, River Brora and the Kyle of Sutherland (Dornoch Firth) all discharge to the North Sea along this stretch of coastline.

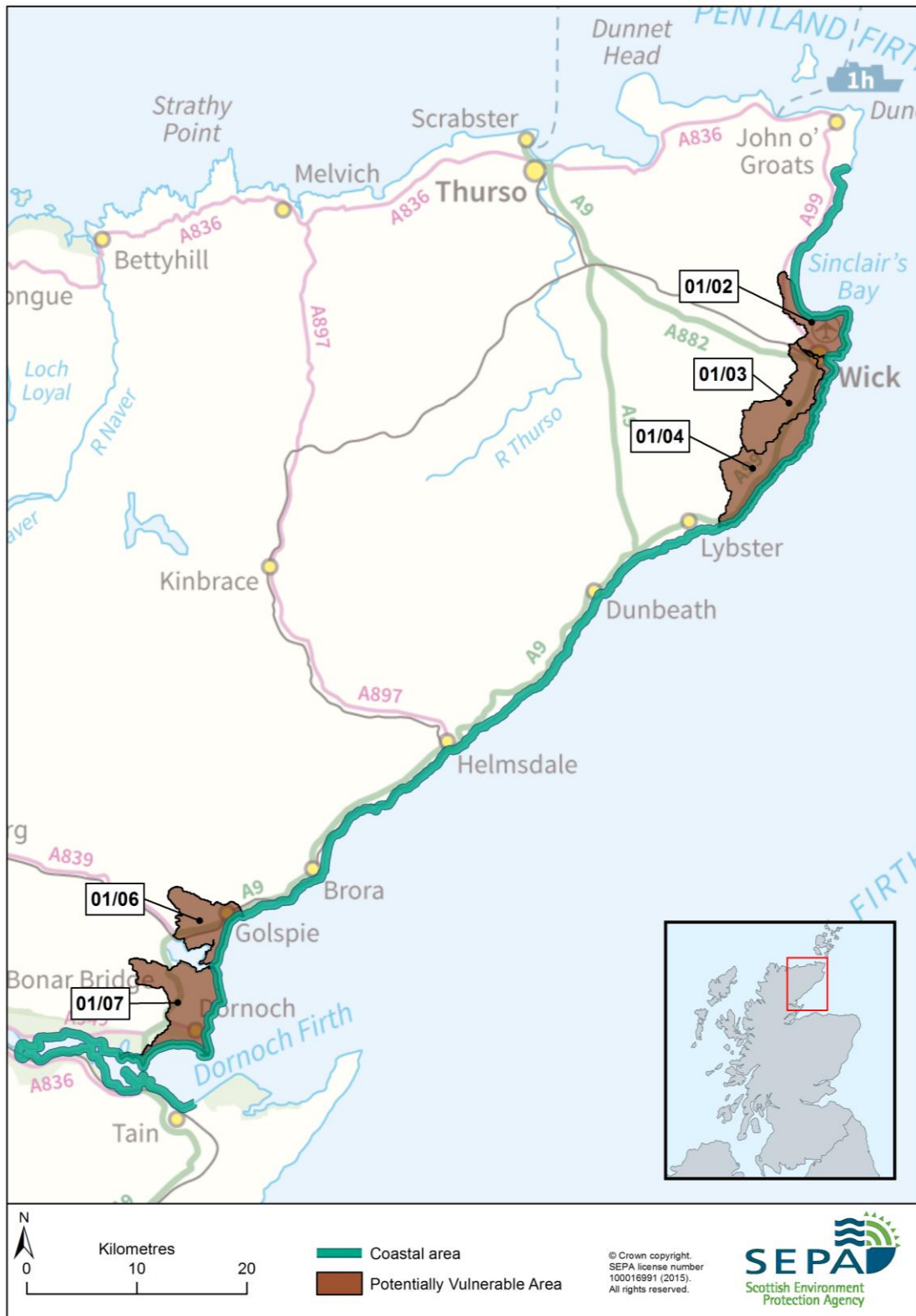
There are five Potentially Vulnerable Areas:

- 01/02: Wick Airport
- 01/03: Wick: Burn of Newton
- 01/04: Wick Coastal
- 01/06: Golspie
- 01/07: Dornoch.

### Flood risk in the coastal area

#### Main areas at risk

Within the Tarbat Ness to Duncansby Head coastal area, there are approximately 20 residential properties and 20 non-residential properties at risk of coastal flooding. Approximately 95% of residential properties and 50% of the non-residential properties at risk of flooding are located within Potentially Vulnerable Areas. All the residential properties are located within the Golspie Potentially Vulnerable Area (01/06).



**Figure 1:** Tarbat Ness to Duncansby Head coastal area and Potentially Vulnerable Areas

## Economic activity and infrastructure at risk

The Annual Average Damages caused by coastal flooding within the Tarbat Ness to Duncansby Head coastal area are approximately £230,000. This accounts for around 1% of the total damages for the Local Plan District. The damages are distributed as follows:

- 37% non-residential properties (£86,000)
- 31% residential properties (£72,000)
- 17% roads (£39,000)
- 7% emergency services (£16,000)
- 5% agriculture (£12,000)
- 2% vehicles (£5,300).

Figure 2 shows the Annual Average Damages throughout the coastal area. The area with the highest damages is in Golspie.

Table 1 shows further information about infrastructure and agricultural land at risk of coastal flooding.

	Number at risk	Further detail
Community facilities	<10	Emergency services
Utility assets	0	n/a
Roads (excluding minor roads)	40	Notably the A9
Railway routes	20 locations	Inverness to Wick
Agricultural land (km <sup>2</sup> )	7	n/a

**Table 1:** Infrastructure and agricultural land at risk of coastal flooding

## Designated environmental and cultural heritage sites at risk

Within the coastal area there are approximately 24 cultural heritage sites at risk of coastal flooding. These include scheduled monuments, gardens and designed landscapes and listed buildings.

Approximately 17km<sup>2</sup> of environmental designated area is at risk of coastal flooding including Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Sites of Special Scientific Interest (SSSI). The sites affected include Dornoch Firth, Loch Fleet and Morrich More, and Kyle of Sutherland Marshes.

## History of coastal flooding

There were a number of localised floods recorded around Wick during the 1960s and 1970s, when property and infrastructure were damaged. Wick, Golspie and other communities along the east coast were flooded December 2012.

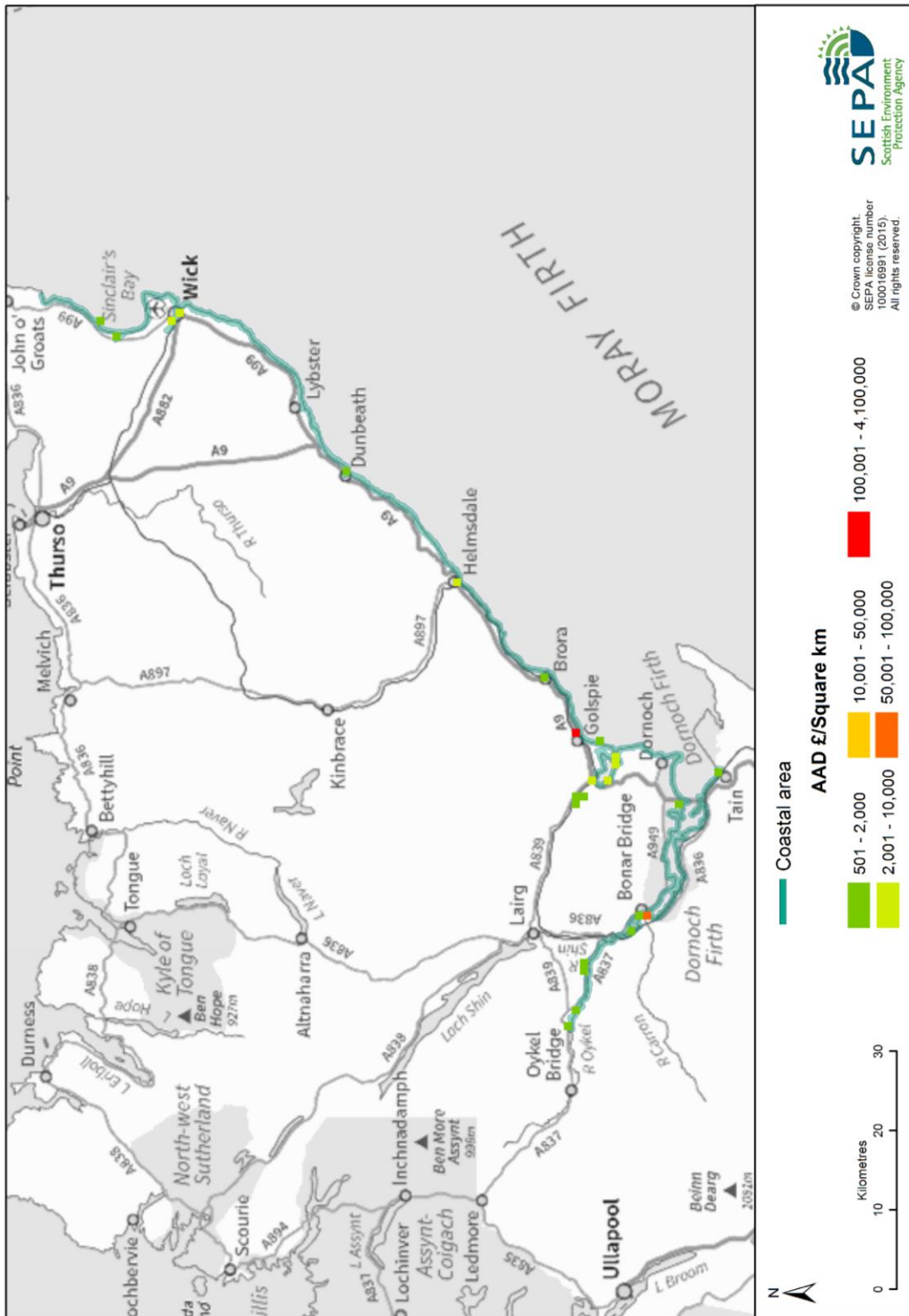


Figure 2: Annual Average Damages from coastal flooding



## Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk and that are in addition to the information presented in Section 2 are described below.

### Coastal flood warning schemes

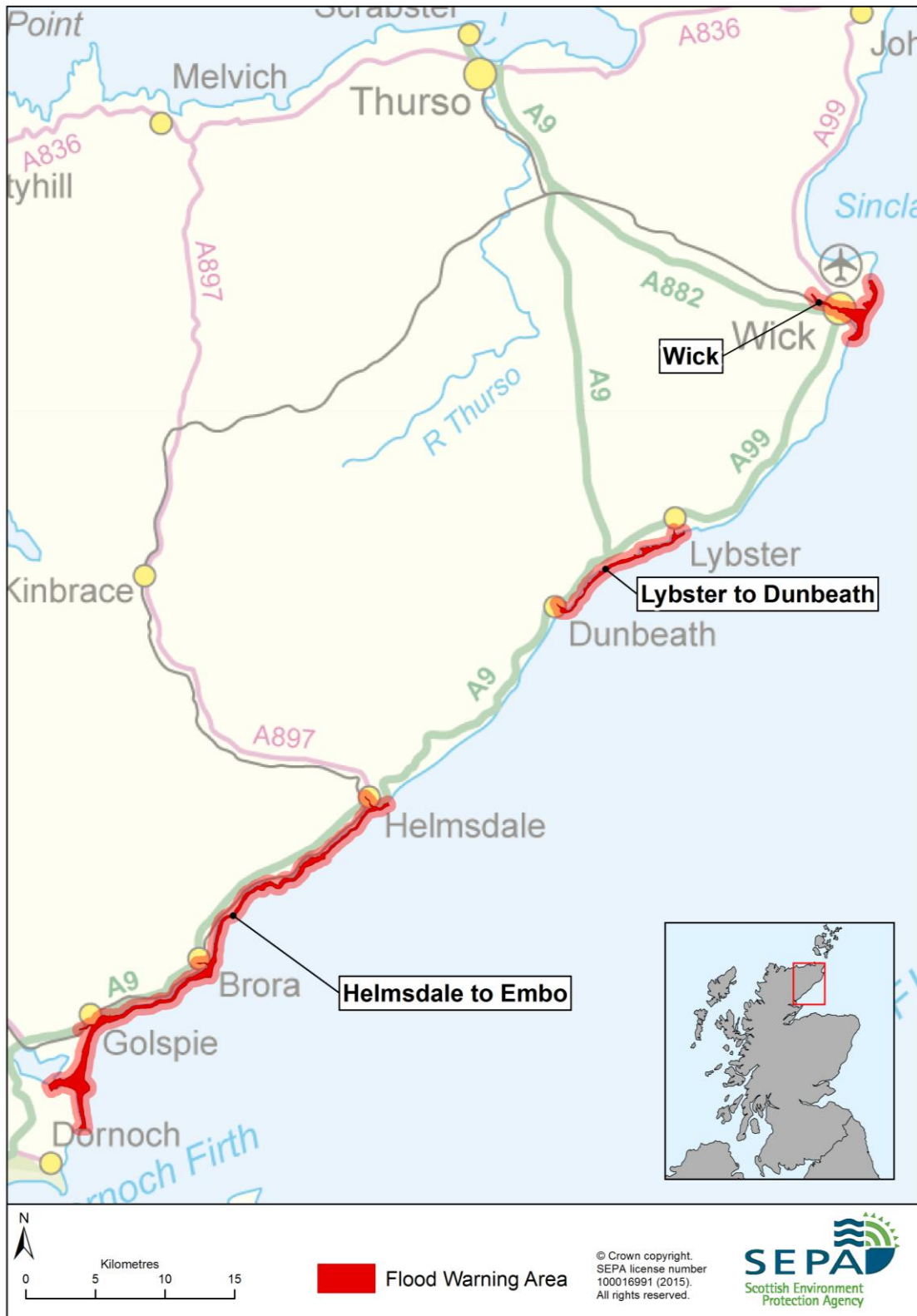
The Nairn to Tarbat Ness coastal area benefits from the Moray Firth Coastal Flood Warning Scheme. There are three flood warning areas in the coastal area: 'Wick', 'Lybster to Dunbeath' and 'Helmsdale to Embo' (Figure 3).

## Climate change and future flood risk

UK Climate Projections (UKCP09) predicts that climate change may increase sea levels. The magnitude of sea level rise varies around the coastline.

For the UKCP09 high emissions scenario, the predicted average sea level increase for the Tarbat Ness to Duncansby Head coastal area is 0.5m by 2080. This may increase the number of residential properties at risk of coastal flooding from approximately 20 to 40 and the number of non-residential from approximately 20 to 50. Coastal flood modelling by SEPA has not taken into account the impacts of a future climate on wave overtopping or storminess, which could increase the number of properties affected by coastal flooding.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.



**Figure 3: Flood warning areas**

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for wave attenuation and estuarine surge attenuation. They show areas where natural flood management could be effective and where further detailed assessment should take place.

### Estuarine surge

There is limited opportunity for estuarine surge attenuation in the Tarbat Ness to Duncansby Head coastal area. There is only one area which has any potential, the Dornoch Firth where the majority of the potential is upstream of the Dornoch Firth Bridge, through the Kyle of Sutherland and up to the railway bridge between Culrain and Invershin.

### Wave energy dissipation

The area around the Dornoch Firth has potential for wave energy dissipation, including the urban area of Tain. Elsewhere there are significant lengths of potential for dissipating wave energy such as at Golspie, Dornoch, Brora, Wick Bay, Sinclair's Bay and Freswick Bay.

## Coastal flooding Duncansby Head to Cape Wrath

### Coastal overview

The Duncansby Head to Cape Wrath coastal area has a length of approximately 250km and is located on the north coast between Duncansby Head (Freswick Bay) in the east and Cape Wrath in the west (Figure 1). The towns of Thurso, Scrabster and Durness, along with several smaller settlements are located along this coastline.

The coastline is rocky with a series of bays, including Balnakeil Bay, Tongue Bay and Dunnet Bay and the inlet of Loch Eriboll. There are occasional large sandy beaches for example at Dunnet Bay. The River Thurso, Halladale River and the River Naver outflow into the Atlantic Ocean. The coastal area contains just one Potentially Vulnerable Area which is Thurso (01/01).

### Flood risk

#### Main areas at risk

There are fewer than 10 residential properties and fewer than 10 non-residential properties at a risk of coastal flooding. Approximately 50% of residential properties and 40% of non-residential properties are located within the Thurso Potentially Vulnerable Area (01/01).

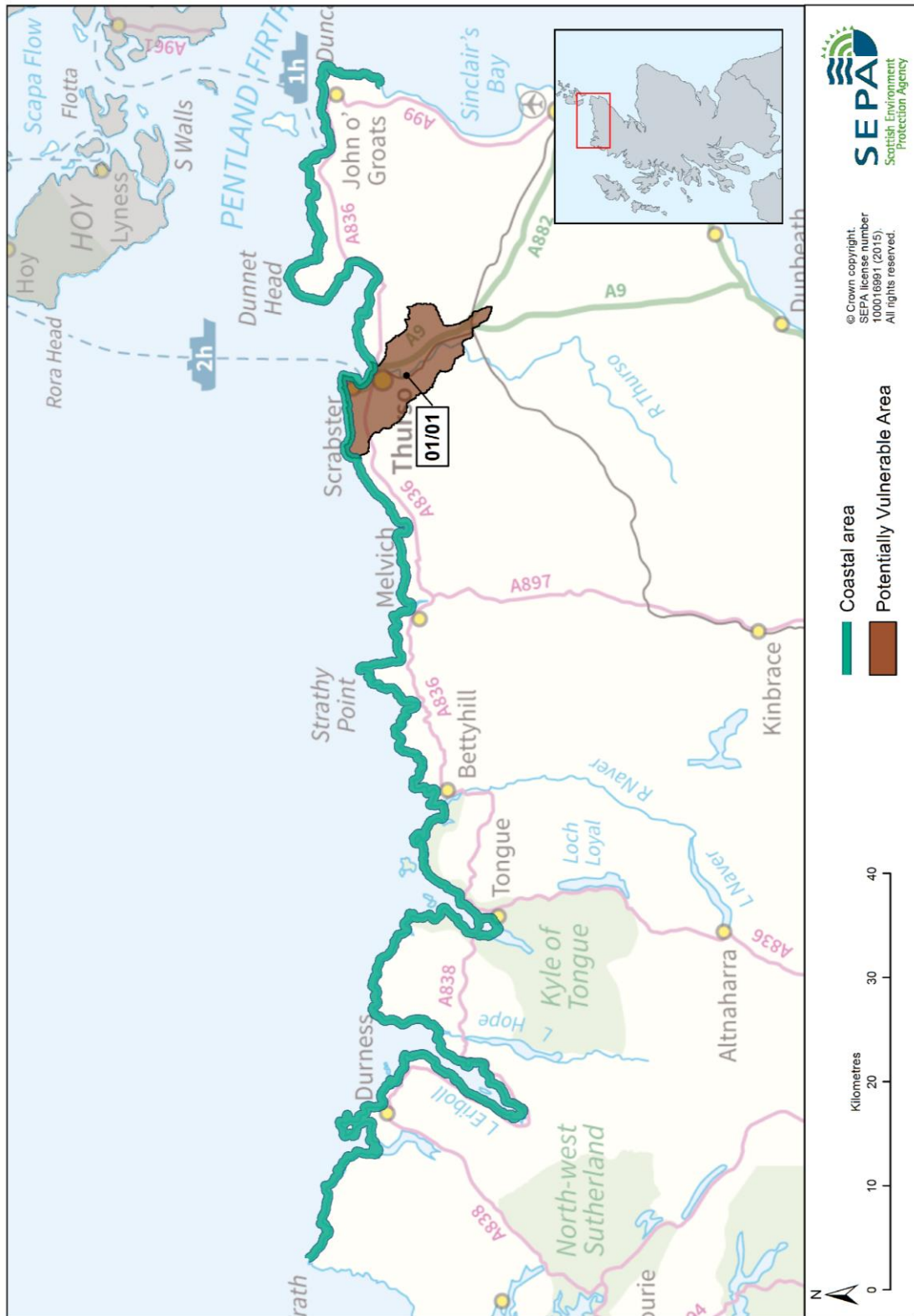
#### Economic activity and infrastructure at risk

The Annual Average Damages from coastal flooding in the Duncansby Head to Cape Wrath coastal area are estimated to be approximately £62,000. This accounts for less than 1% of the total damages for the Local Plan District. The damages are distributed as follows:

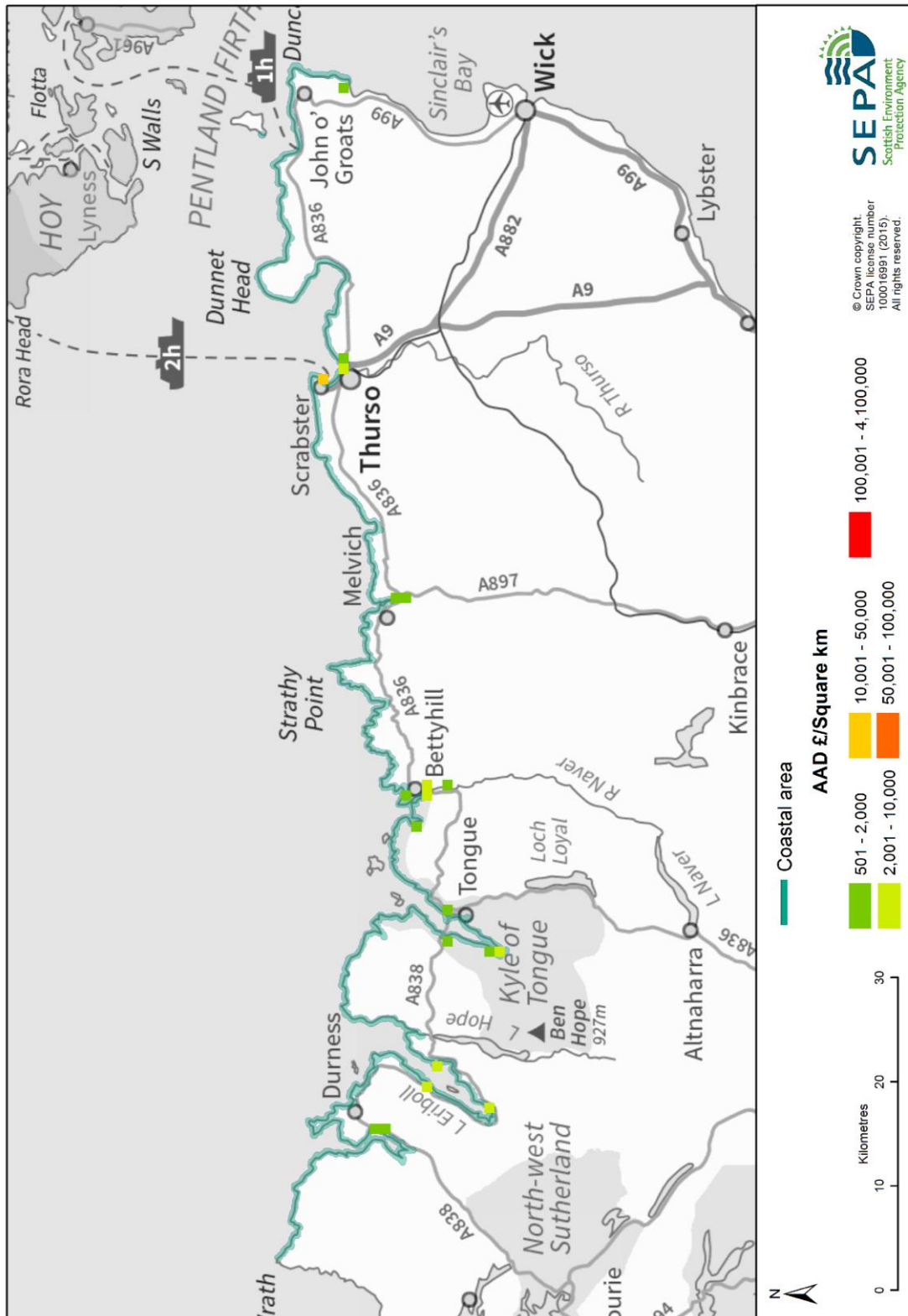
- 43% roads (£27,000)
- 34% residential properties (£21,000)
- 11% non-residential properties (£7,300)
- 5% agriculture (£3,100)
- 4% emergency services (£2,400)
- 3% vehicles (£1,500).

Figure 2 shows the Annual Average Damages throughout the coastal area.

Overall, there are around 2km<sup>2</sup> of agricultural land and 24 road locations at risk of coastal flooding.



**Figure 1:** Duncansby Head to Cape Wrath coastal area and Potentially Vulnerable Areas



**Figure 2:** Annual Average Damages from coastal flooding

## Designated environmental and cultural heritage sites at risk

There are ten cultural heritage sites at risk of coastal flooding in this coastal area. The sites include scheduled monuments, garden and designed landscapes and listed buildings.

Approximately 3km<sup>2</sup> of environmental designated area is at risk of coastal flooding including Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Sites of Special Scientific Interest (SSSI). The sites affected include Cape Wrath, Strathy Coast, Invernaver, and Durness.

## History of flooding

In 2005 coastal flooding affected a number of residential and non-residential properties and a road in Thurso. Flooding was potentially exacerbated due to the interaction of high tides and high river levels.

## Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk in this area are described in Section 2.

## Climate change and future flood risk

UK Climate Projections (UKCP09) predicts that climate change may increase sea levels. The magnitude of sea level rise varies around the coastline.

For the UKCP09 high emissions scenario, the predicted average sea level increase for the Duncansby Head to Cape Wrath coastal area is 0.5m by 2080. Under these conditions it is estimated that the number of residential and non-residential properties at risk of coastal flooding does not change significantly. Coastal flood modelling by SEPA has not taken into account the impacts of a future climate on wave overtopping or storminess, which could increase the number of people affected by coastal flooding.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for wave attenuation and estuarine surge attenuation. They show areas where natural flood management could be effective and where further detailed assessment should take place.

### **Estuarine surge**

The coastline between Duncansby Head and Cape Wrath has no potential for estuarine surge attenuation.

### **Wave energy dissipation**

There is potential for wave energy dissipation along most of the coastline between Duncansby Head and Cape Wrath. The areas of potential wave energy dissipation tend to be within the bays such as Dunnet Bay, Thurso Bay, Sandside Bay, Melvich Bay, and the Kyle of Tongue. Thurso (01/01) has potential for wave energy dissipation along its Thurso Bay frontage, but limited potential along its other coastal boundaries.



## Coastal flooding Cape Wrath to Ardnamurchan Point

### Coastal overview

The Cape Wrath to Ardnamurchan coastal area has a length of approximately 1,500km extending from Cape Wrath at the north-west tip of mainland Scotland to Ardnamurchan Point on the western coast (Figure 1). It includes the islands of Skye, Rum, Eigg, Canna, and Muck. The coastline is heavily indented with numerous lochs and sounds and there are numerous towns and villages located close to the coastline such as Lochinver, Ullapool, Kyle of Lochalsh, Uig, and Mallaig. The coastal area contains five Potentially Vulnerable Areas:

- 01/05: Lochinver
- 01/11: Uig – Isle of Skye
- 01/12: Poolewe
- 01/22: Lochailort
- 01/26: Sunart and Moidart.

### Flood risk

#### Main areas at risk

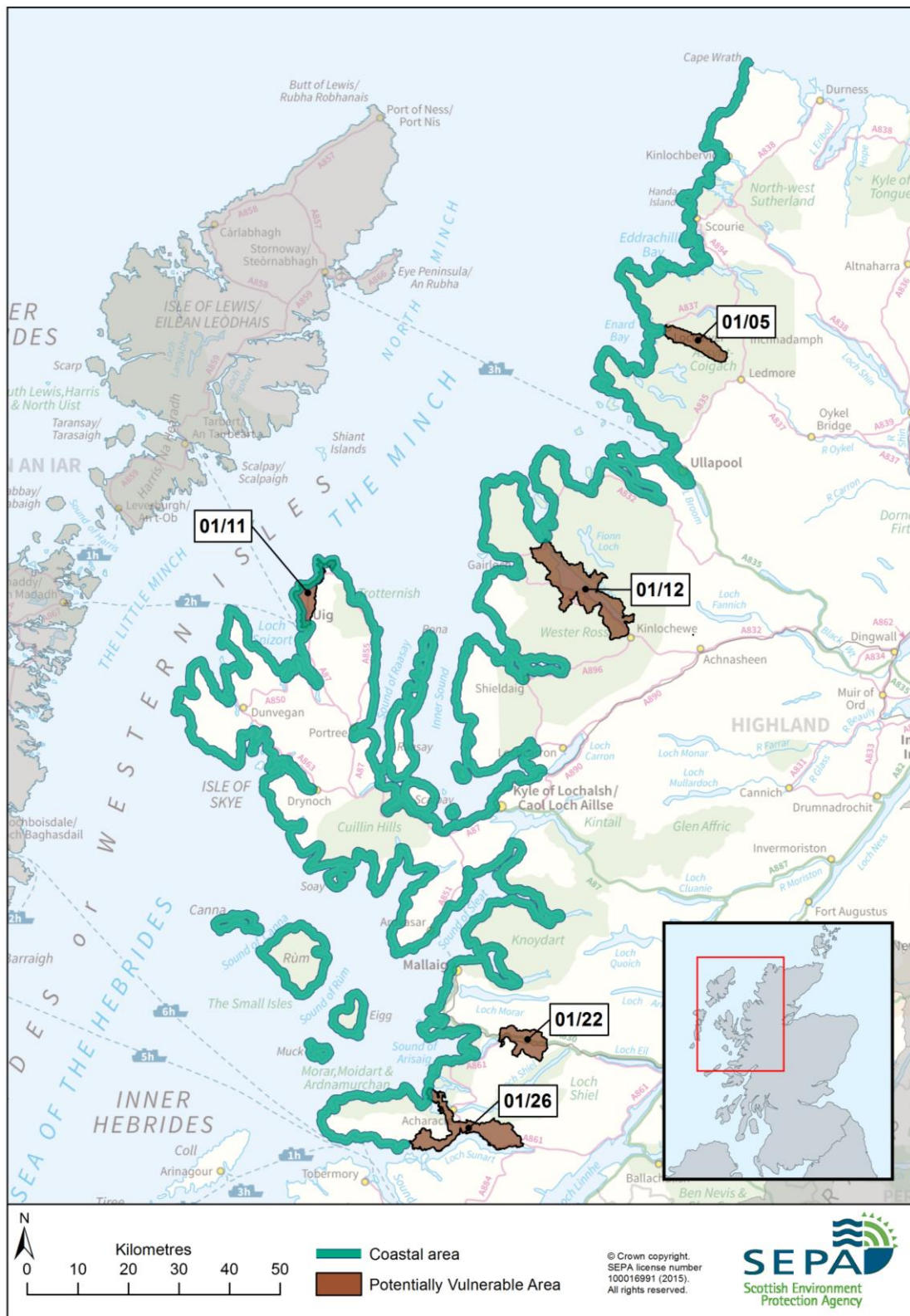
Within the Cape Wrath to Ardnamurchan Point coastal area, there are approximately 190 residential and 130 non-residential properties at risk of coastal flooding. Only around 5% of residential properties and 7% of non-residential properties at risk are located within Potentially Vulnerable Areas.

#### Economic activity and infrastructure at risk

The Annual Average Damages from coastal flooding in the Cape Wrath to Ardnamurchan Point coastal area are estimated to be £2.3 million. This accounts for around 9% of the total damages for the Local Plan District. The damages are distributed as follows:

- 40% non-residential properties (£930,000)
- 26% residential properties (£610,000)
- 25% roads (£580,000)
- 7% emergency services (£150,000)
- 2% vehicles (£55,000)
- 1% agriculture (£18,000).

Figure 2 shows the location of Annual Average Damages from coastal flooding across the area.



**Figure 1:** Cape Wrath to Ardnamurchan Point coastal area and Potentially Vulnerable Areas

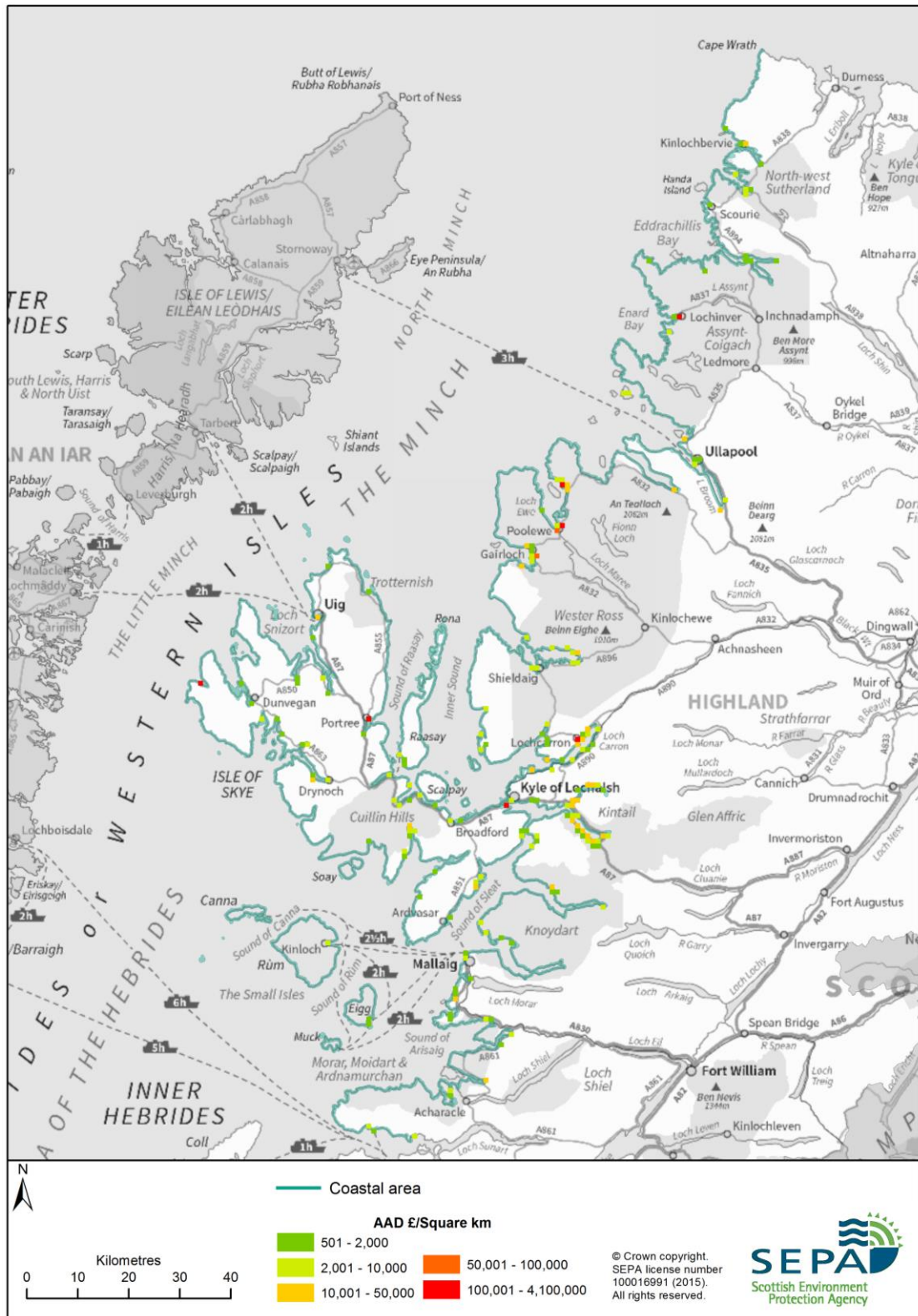


Figure 2: Annual Average Damages from coastal flooding

Table 1 shows further information about infrastructure and agricultural land at risk of coastal flooding.

	Number at risk	Further detail
<b>Community facilities</b>	0	n/a
<b>Utility assets</b>	<10	Electricity sub-stations
<b>Roads (excluding minor roads)</b>	320	Including A838 and A894
<b>Railway routes</b>	26 locations	Fort William to Mallaig
<b>Agricultural land (km<sup>2</sup>)</b>	12	n/a

**Table 1:** Infrastructure and agricultural land at risk of coastal flooding

### Designated environmental and cultural heritage sites at risk

There are around 56 cultural heritage sites at risk of coastal flooding in this coastal area. The sites include castles and towers, ecclesiastical sites, and prehistoric domestic/defensive and ritual/funerary sites (such as brochs, duns, forts, and cairns), which are all Scheduled Monuments. There are also gardens and designed landscapes and listed buildings at risk.

Approximately 11km<sup>2</sup> of environmentally designated area is at risk of coastal flooding including Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Sites of Special Scientific Interest (SSSI). Some of the sites with the largest areas of flooding include Rum, Canna and Sanday, Sunart, and the Loch Moidart and Loch Shiel Woods.

### History of coastal flooding

Coastal flooding occurred at Ullapool, Gairloch, Uig, and Mallaig in 2005. Flooding was also reported at Dalacalldich in Lochcarron in 2006. Roads were affected but there are no details of how many properties were affected.

### Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk in this area are described in Section 2.

### Climate change and future flood risk

UK Climate Projections (UKCP09) predicts that climate change may increase sea levels. The magnitude of sea level rise varies around the coastline.

For the UKCP09 high emissions scenario, the predicted average sea level increase for the Cape Wrath to Ardnamurchan coastal area is 0.5m by 2080. This may increase the number of residential properties at risk of coastal flooding from approximately 190 to 300 and the number of non-residential from approximately 130

to 190. Coastal flood modelling by SEPA has not taken into account the impacts of a future climate on wave overtopping or storminess, which could increase the number of properties affected by coastal flooding.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for wave attenuation and estuarine surge attenuation. They show areas where natural flood management could be effective and where further detailed assessment should take place.

This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Estuarine surge

There are no opportunities identified for estuarine surge attenuation in the Cape Wrath to Ardnamurchan Point coastal area.

### Wave energy dissipation

The potential for wave energy dissipation along the majority of the coast in this coastal area tends to be scattered rather than continuous. There tends to be areas of continuous potential around the inner lochs including Upper Loch Torridon, Loch Gairloch, Loch Alsh, and Loch Hourn. Around the northern tip of the Isle of Skye there are continuous stretches of high potential in Staffin Bay and along the western coastline of Skye there are several stretches of potential for wave energy dissipation. The islands of the Inner Hebrides also have scattered potential for wave energy dissipation.

## Coastal flooding Ardnamurchan Point to Mull Of Kintyre

### Coastal overview

This Ardnamurchan Point to the Mull of Kintyre coastal area is located on the west coast and includes the Inner Hebrides (Mull, Coll, Tiree, Iona, Jura, Islay, Gigha, Colonsay, Scarba, Lunga and the Garvellachs). The coastal area is approximately 1,500km in length and is heavily indented with lochs and sounds, including Loch Linnhe, Figure 1.

There are numerous towns and smaller settlements located close to the coastline including Fort William, Ballachulish, and Oban. There are 13 Potentially Vulnerable Areas:

- 01/23: Corpach
- 01/24: Caol and Inverlochy
- 01/25: Fort William
- 01/26: Sunart and Moidart
- 01/27: South Ballchulish
- 01/28: Ballachulish and Glencoe
- 01/29: Isle of Mull – Craignure
- 01/30: Ross of Mull
- 01/31: Oban
- 01/32: Loch Feochan
- 01/33: Taynuilt
- 01/34: Loch Awe
- 01/35: Craignish.

### Flood risk

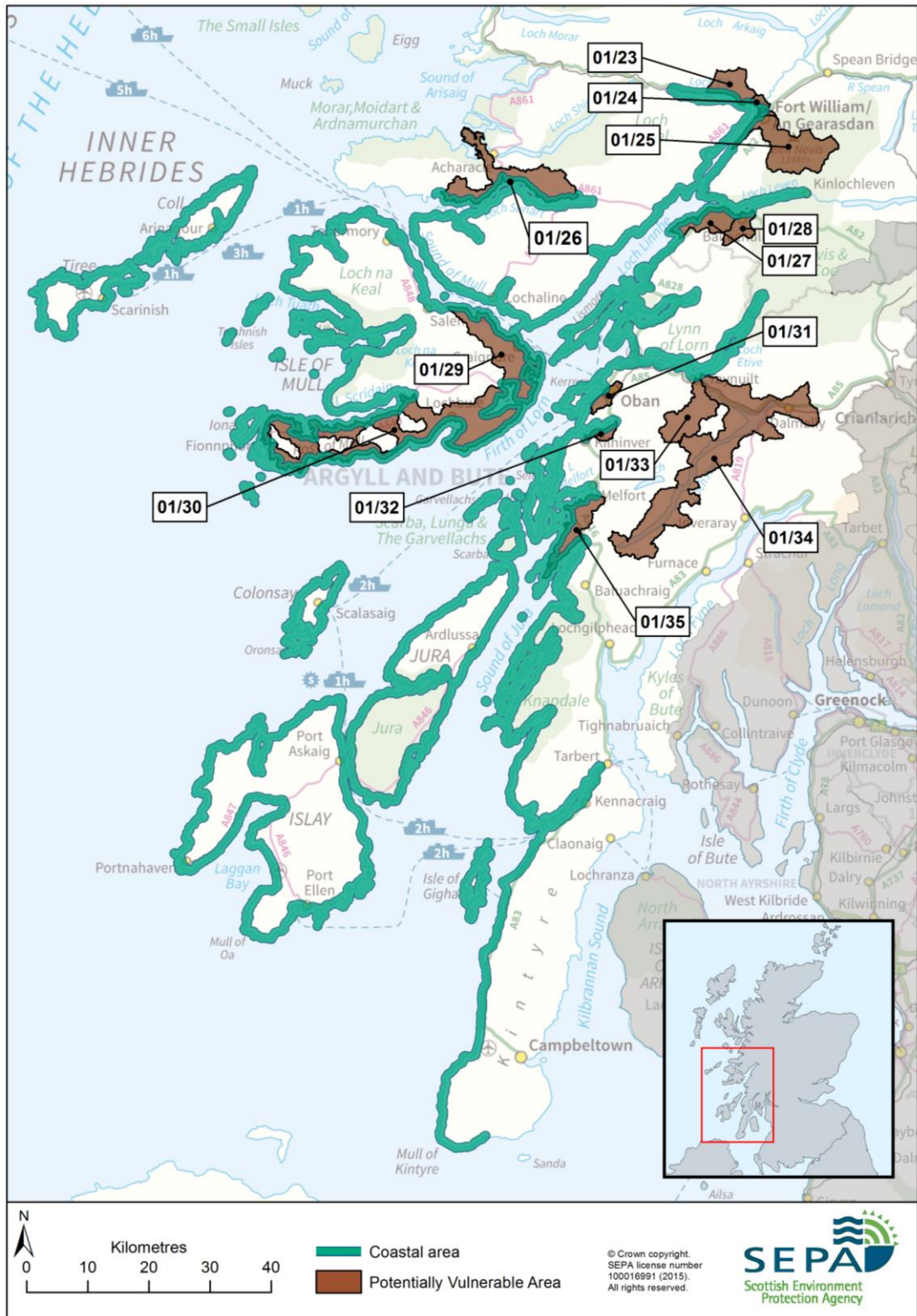
#### Main areas at risk

Within the Ardnamurchan Point to Mull of Kintyre coastal area, there are approximately 470 residential and 310 non-residential properties at risk of coastal flooding. Approximately 75% of residential properties and 50% of non-residential properties at risk are located within Potentially Vulnerable Areas, with the majority of these in Caol and Inverlochy (01/24) and in Oban (01/31).

Table 1 is a summary of the main areas which have the most properties at risk of coastal flooding within the coastal area.

	Number of residential and non-residential properties at risk of coastal flooding	Annual Average Damages
Caol and Inverlochy	170	£240,000
Oban	240	£270,000
Fort William	80	£140,000
Ballachulish and Glencoe	40	£73,000

**Table 1:** Main areas at risk of coastal flooding



**Figure 1:** Ardnamurchan Point to Mull of Kintyre coastal area and Potentially Vulnerable Areas

## Economic activity and infrastructure at risk

The Annual Average Damages from coastal flooding in the Ardnamurchan Point to Mull of Kintyre coastal area are approximately £4.4million. This accounts for around 17% of the Annual Average Damages for the Local Plan District. The damages are distributed as follows:

- 52% non-residential properties (£2.3million)
- 27% roads (£1.2million)
- 12% residential properties (£550,000)
- 7% emergency services (£290,000)
- 1% agriculture (£36,000)
- 1% vehicles (£34,000).

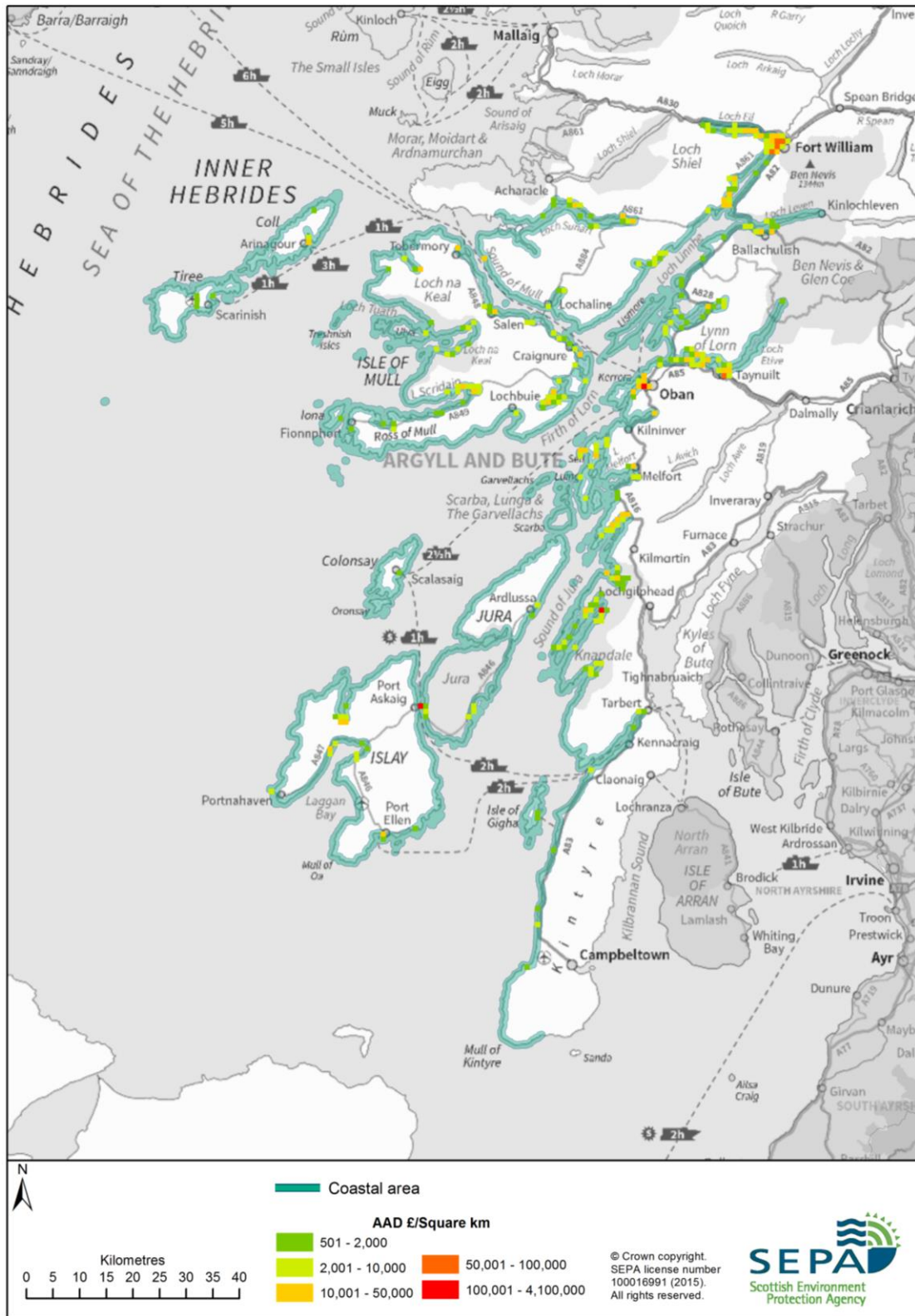
Figure 2 shows the location of Annual Average Damages from coastal flooding across the area. The areas with greatest damages are Oban and Fort William.

Table 2 shows further information about infrastructure and agricultural land at risk of coastal flooding.

	Number at risk	Further detail
<b>Community facilities</b>	<10	Includes; educational buildings and emergency services.
<b>Utility assets</b>	10	Includes; electricity substations, telephone exchanges and mineral/fuel extraction sites.
<b>Roads (excluding minor roads)</b>	470	Notably; A83, A85, A816, A828, A861
<b>Railway routes</b>	19 locations	Crianlarich to Fort William, Crianlarich to Oban.
<b>Agricultural land (km<sup>2</sup>)</b>	24	n/a

**Table 2:** Infrastructure and agricultural land at risk of coastal flooding





**Figure 2: Annual Average Damages from coastal flooding**

## Designated environmental and cultural heritage sites at risk

There are around 80 cultural heritage sites at risk of coastal flooding. The sites include Scheduled Monuments, listed buildings and gardens and designed landscapes.

Approximately 40km<sup>2</sup> of environmentally designated area is at risk of coastal flooding including Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Sites of Special Scientific Interest (SSSI). Some of the sites with the largest areas of flooding include Gruinart Flats, Tiree Wetlands, Moine Mhor, Tiree Machair, and Tayvallich Juniper.

## History of flooding

There have been a number of localised coastal floods. A storm surge in November 2005 on Loch Linnhe affected Caol and other communities as well as road infrastructure in northern and western Scotland. Tobermory sea front has been subject to a number of floods due to high water levels and wave action. Flooding of the main road and car park occurs and properties adjacent to the road are regularly threatened with inundation of seawater.

## Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1

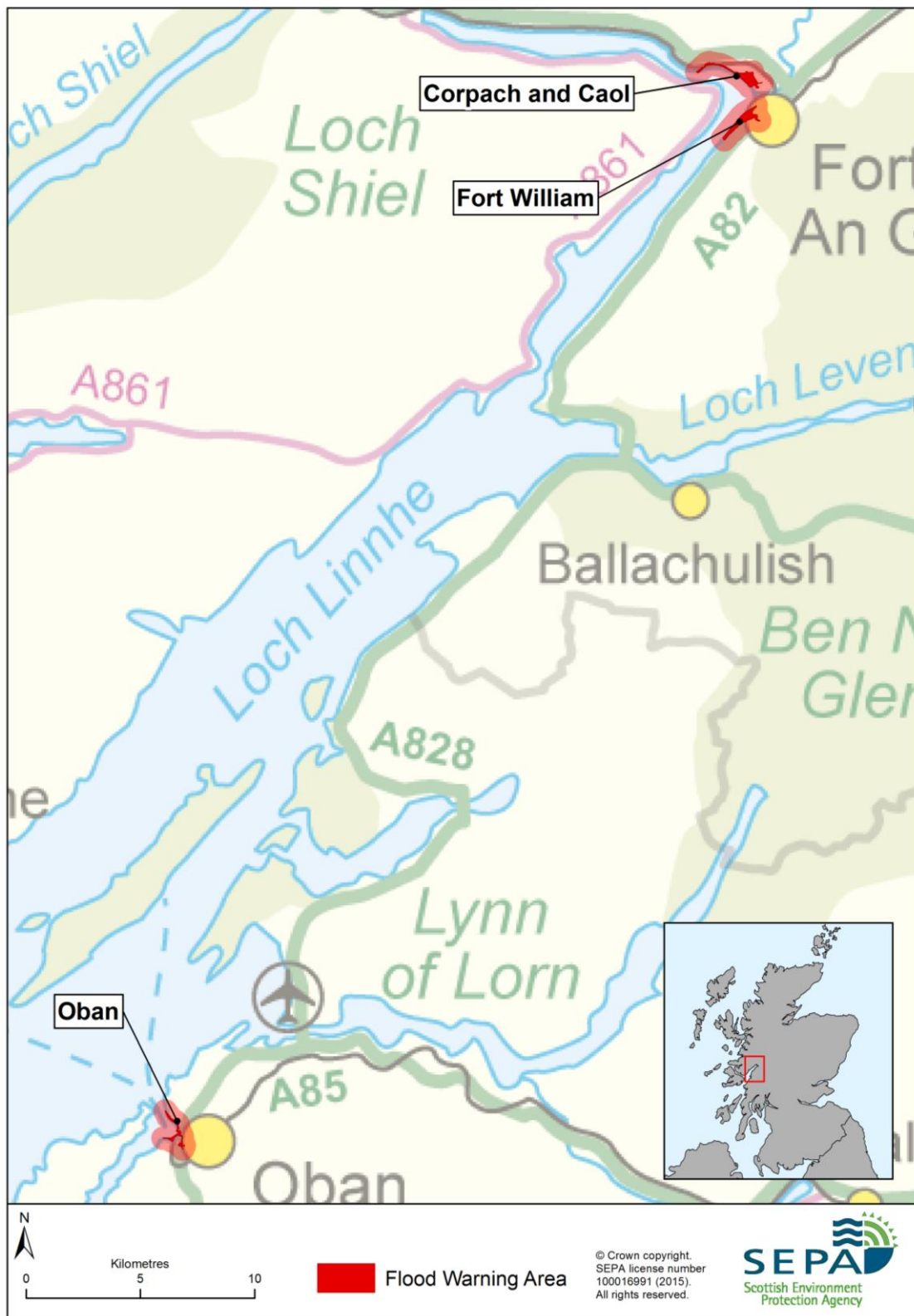
Existing actions that are in place to manage flood risk and that are in addition to the information presented in Section 2 are described below.

## Coastal flood warning schemes

The Ardnamurchan Point to the Mull of Kintyre coastal area benefits from the Firth of Lorn and Loch Linnhe Coastal Flood Warning Scheme. There are three coastal flood warning areas details of which are listed in Table 3 and their locations are shown in Figure 3.

Flood warning area (FWA)	Number of properties within FWA	% of properties registered January 2014
Corpach and Caol	690	16%
Fort William	136	11%
Oban	77	3%

**Table 3:** Flood warning areas



**Figure 3:** Flood warning areas

## Climate change and future flood risk

UK Climate Projections (UKCP09) predicts that climate change may increase sea levels. The magnitude of sea level rise varies around the coastline.

For the UKCP09 high emissions scenario, the predicted average sea level increase for the Ardnamurchan Point to Mull of Kintyre coastal area is 0.5m by 2080. This may increase the number of residential properties at risk of coastal flooding from approximately 470 to 950 and the number of non-residential from approximately 310 to 630. Coastal flood modelling by SEPA has not taken into account the impacts of a future climate on wave overtopping or storminess, which could increase the number of properties affected by coastal flooding.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for wave attenuation and estuarine surge attenuation. They show areas where natural flood management could be effective and where further detailed assessment should take place.

This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Estuarine surge

In the Ardnamurchan Point to Mull of Kintyre Coastal Area the only areas of potential for estuarine surge attenuation are along Loch Linnhe and Loch Etive in the north of the area. There is continuous potential along the majority of both shores of Loch Etive, from Connel to Gualachulain. On Loch Linnhe the areas of continuous potential extend from the Corran Narrows up into Loch Eil. Potentially Vulnerable Areas Corpach (01/23), Caol and Inverlochy (01/24), Fort William (01/25), and Taynuilt (01/33) all have potential for estuarine surge attenuation along their coastal boundaries.

### Wave energy

There is scattered potential for wave energy dissipation along the majority of the coast in this catchment, although there are few continuous stretches of potential. The potential for wave energy dissipation tends to be located within open bays, with less potential located within the inner lochs, such as Loch Linnhe. The Kintyre Peninsula shows less potential for wave energy dissipation than the rest of the catchment, with the Isle of Mull having several continuous sections of potential along the west and south coasts.

## Coastal flooding Mull of Kintyre to Kilbride Bay

### Coastal overview

This Mull of Kintyre to Kilbride Bay coastal area includes approximately 510km of coastline extending from the Mull of Kintyre to Kilbride Bay in the Sound of Bute, (Figure 1). There are numerous towns and smaller settlements located close to the coastline including Campbeltown, Tarbert, Lochgilphead and Inveraray.

The coastline, which includes Loch Fyne, is heavily indented and the area is generally sheltered from the Atlantic swell and Irish Sea waves. Beaches are generally located on the eastern coastline of the Kintyre Peninsula and are in a relatively stable state. Along the edges of the sea lochs narrow shingle fringe beaches are common. There are four Potentially Vulnerable Areas:

- 01/37: Inveraray
- 01/38: Lochgilphead
- 01/39: Tarbert
- 01/40: Campbeltown.

### Flood risk

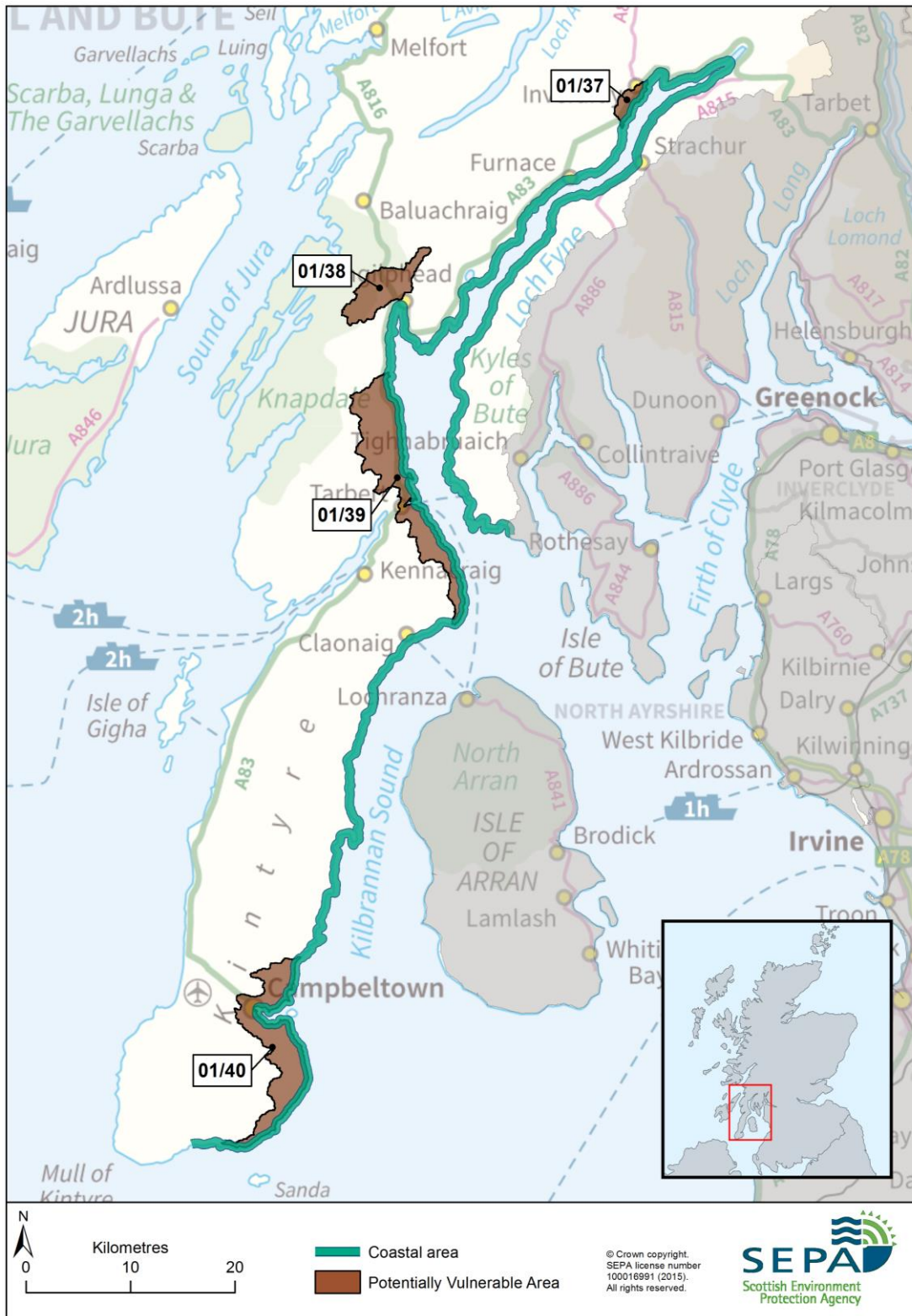
#### Main areas at risk

There are approximately 200 residential and 310 non-residential properties at risk of coastal flooding in the Mull of Kintyre to Kilbride coastal area. Approximately 74% of residential properties and 76% of non-residential properties at risk are located within Potentially Vulnerable Areas, with the majority in Campbeltown and Inveraray.

Table 1 is a summary of the main areas which have the most properties at risk of coastal flooding within the coastal area.

	Number of residential and non-residential properties at risk of flooding	Annual Average Damages
Campbeltown	270	£75,000
Inveraray	90	£370,000

**Table 1:** Main areas at risk of coastal flooding



**Figure 1:** Mull of Kintyre to Kilbride Bay coastal area and Potentially Vulnerable Areas

## Economic activity and infrastructure at risk

The Annual Average Damages from coastal flooding in the Mull of Kintyre to Kilbride coastal area are approximately £900,000. This accounts for around 3% of the Annual Average Damages for the whole Local Plan District. The damages are distributed as follows:

- 32% non-residential properties (£280,000)
- 30% residential properties (£270,000)
- 29% roads (£260,000)
- 6% emergency services (£56,000)
- 3% vehicles (£25,000)
- <1% agriculture (£2,700).

Figure 2 shows the location of Annual Average Damages from coastal flooding across the area.

Table 2 shows further information about infrastructure and agricultural land at risk of coastal flooding.

	Number at risk	Further detail
Community facilities	<10	Emergency services
Utility assets	<10	Electricity substations
Roads (excluding minor roads)	130	Notably; A83
Railway routes	0	n/a
Agricultural land (km <sup>2</sup> )	2	n/a

**Table 2:** Infrastructure and agricultural land at risk of coastal flooding

## Designated environmental and cultural heritage sites at risk

There are approximately 37 cultural heritage sites at risk of coastal flooding in this coastal area. The sites include bridges, castles, and prehistoric domestic/defensive and ritual/funerary sites (such as duns, forts, and cairns), which are all scheduled monuments. There are also gardens and designed landscapes and listed buildings at risk.

Less than 1km<sup>2</sup> of environmental designated area is at risk of coastal flooding including Special Areas of Conservation (SAC) and Sites of Special Scientific Interest (SSSI). The sites affected include Tarbert Woods, Claonaig Wood, Balnabraid Glen, Strone Point, and Artilligan and Abhainn Strathain Burns.

## History of flooding

There have been a number of localised coastal floods, including in 2010 on Loch Fyne.

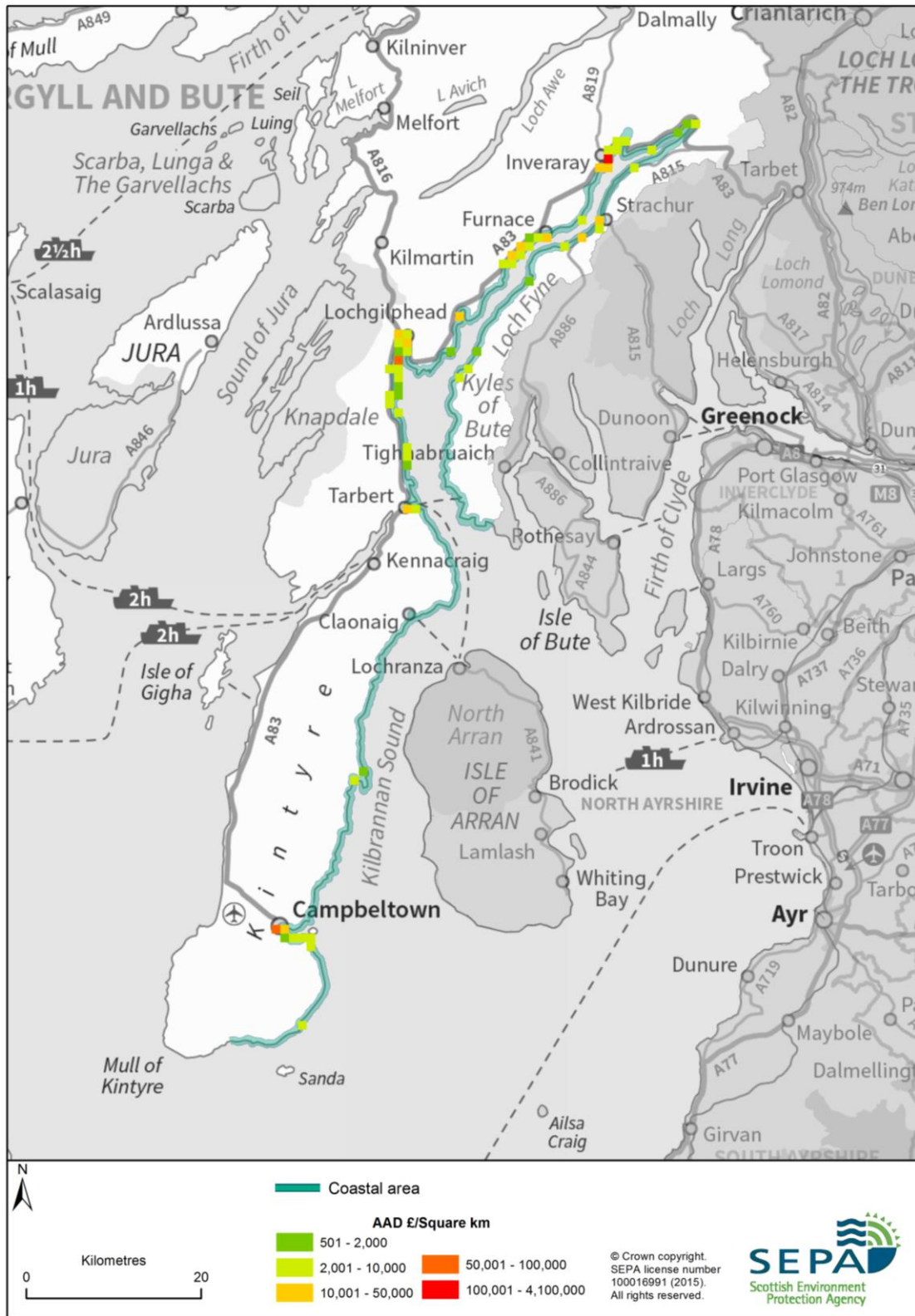


Figure 2: Annual Average Damages from coastal flooding



## Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk and that are in addition to the information presented in Section 2 are described below.

### Coastal flood warning schemes

The Mull of Kintyre to Kilbride Bay coastal area benefits from the Firth of Lorn and Loch Linnhe Coastal Flood Warning Scheme. There are four coastal flood warning areas, which are shown in Figure 3. The flood warning areas cover parts of Campbeltown, Lochgilphead, Lochgair and Tarbert and are listed in Table 3.

Flood warning area (FWA)	Number of properties within FWA	% of properties registered January 2014
Campbeltown Hall Street and Esplanade	756	10%
Lochgair Village Road	4	50%
Lochgilphead A83	34	21%
Tarbert Harbour	53	23%

**Table 3:** Flood warning areas



**Figure 3:** Flood warning areas

## Climate change and future flood risk

UK Climate Projections (UKCP09) predicts that climate change may increase sea levels. The magnitude of sea level rise varies around the coastline.

For the UKCP09 high emissions scenario, the predicted average sea level increase for the Mull of Kintyre to Kilbride Bay coastal area is 0.5m by 2080. This may increase the number of residential properties at risk of coastal flooding from approximately 200 to 490 and the number of non-residential from approximately 310 to 600. Coastal flood modelling by SEPA has not taken into account the impacts of a future climate on wave overtopping or storminess, which could increase the number of properties affected by coastal flooding.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

## Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>). The maps indicate the potential for wave attenuation and estuarine surge attenuation. They show areas where natural flood management could be effective and where further detailed assessment should take place.

This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

### Estuarine surge

There are no opportunities for estuarine surge attenuation in the Mull of Kintyre to Kilbride Bay coastal area.

### Wave energy

There is scattered potential for wave energy dissipation along the majority of the coast in this area although there are a few continuous stretches of potential. The areas with potential include the coastline of the Campbeltown Potentially Vulnerable Area (01/40) and the inner section of Loch Fyne to the north of Lochgilphead.

## 3.4 Surface water flooding

### Highland and Argyll Local Plan District

This chapter provides supplementary information on surface water flooding across the Local Plan District. It provides an overview of the main areas at risk and a history of surface water flooding. The predicted impacts on infrastructure are also identified. Due to the nature of surface water flooding, the impacts on environmental sites and agricultural land have not been assessed.

Information about the objectives and actions to manage flood risk are provided in the relevant Potentially Vulnerable Area chapters in Section 2.

#### Flood risk

Within the Highland and Argyll Local Plan District there are approximately 1,100 residential properties and 1,000 non-residential properties at risk of surface water flooding. Of the residential properties at risk, 68% are located within Potentially Vulnerable Areas with around 40% of those located in Inverness and the Great Glen (01/21).

#### Main areas at risk

The areas which have greater than 50 residential properties at risk of surface water flooding are shown in Table 1. The main areas at risk are around Inverness and in Dingwall. Table 1 also shows the estimated economic impact of surface water flooding in each area expressed as Annual Average Damages.

	Residential and non-residential properties at risk of surface water flooding	Annual Average Damages
Inverness	550	£470,000
Dingwall	120	£190,000
Fort William	80	£320,000
Oban	80	£140,000
Strathpeffer	20	£21,000

**Table 1:** Main areas at risk of surface water flooding

## Economic activity and infrastructure at risk

The Annual Average Damages in the Highland and Argyll Local Plan District from surface water flooding are estimated to be £2.9 million. This accounts for 11% of the total flood damages for the Local Plan District. The damages are distributed as follows:

- 52% non-residential properties (£1.5 million)
- 38% residential properties (£1.1 million)
- 5% roads (£140,000)
- 4% emergency services (£130,000)
- 1% vehicles (£17,000).

Figures 1a and 1b show the location of Annual Average Damages from surface water flooding across the Local Plan District. The most significant contributing areas to the Annual Average Damages are Inverness, Dingwall, Fort William and Oban.

Table 2 shows the approximate numbers of further infrastructure assets which are at risk of flooding within this catchment.

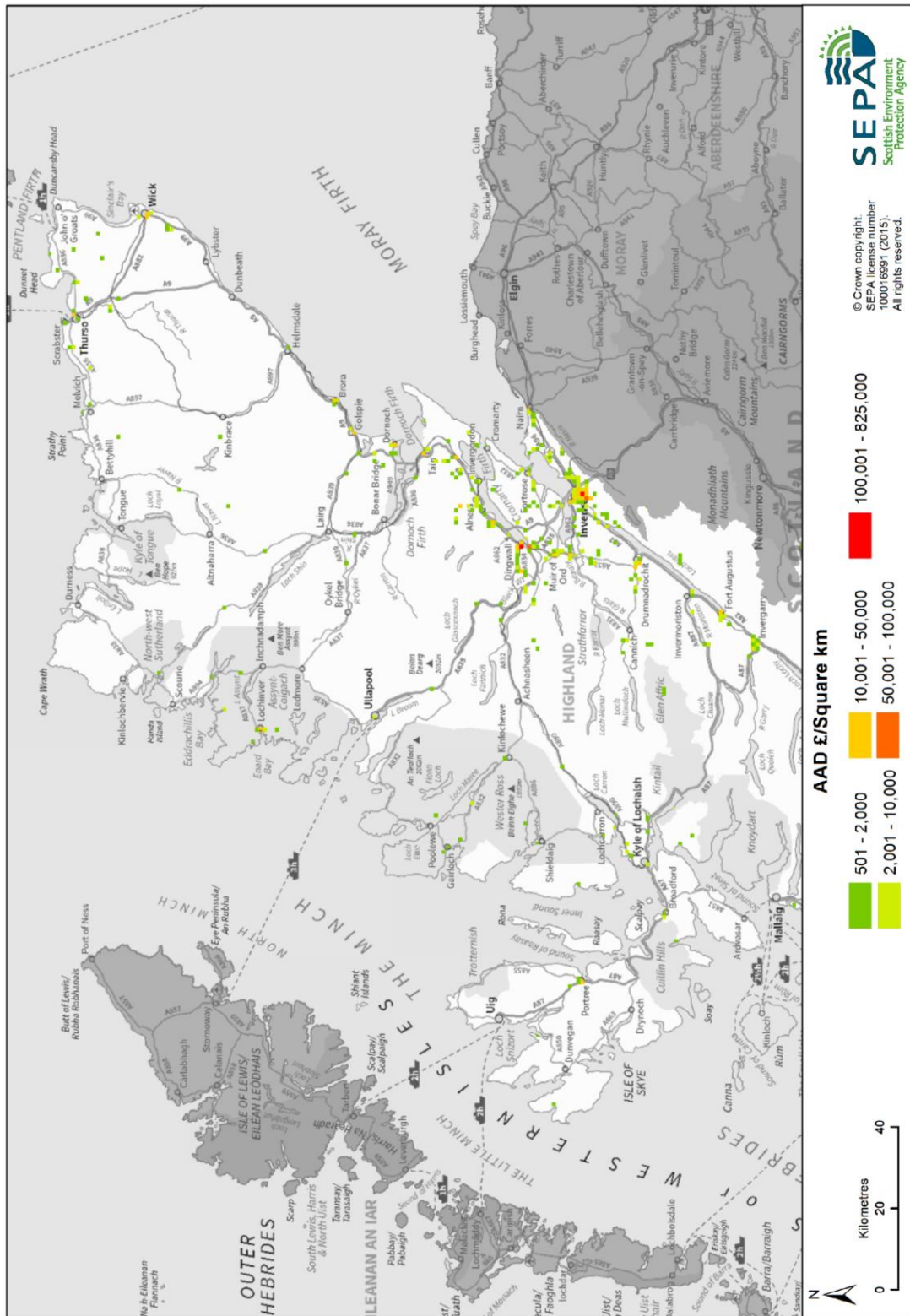
	Number at risk	Further detail
<b>Community facilities</b>	10	Includes: educational buildings, healthcare facilities and emergency services.
<b>Utility assets</b>	170	Includes: electricity substations, fuel extraction sites and telephone exchanges.
<b>Roads (excluding minor roads)</b>	3,800 locations	Notably parts of the A9
<b>Railway routes</b>	560 locations	Inverness to Aberdeen, Inverness to Wick, Crianlarich to Fort William, Crianlarich to Oban.
<b>Airports</b>	2	Inverness airport, Wick airport.

**Table 2:** Infrastructure at risk of surface water flooding

## Designated environmental and cultural heritage sites at risk

There are approximately 50 cultural heritage sites at risk of surface water flooding. Sites at risk include battlefields, gardens and designed landscapes, scheduled monuments (chapels, castles, forts, mottes, bridges, settlements, and prehistoric domestic/defensive and ritual/funerary sites) and listed buildings.

The impact of surface water flooding on environmental sites has not been assessed and is assumed to be relatively low.



**Figure 1a:** Annual Average Damages from surface water flooding

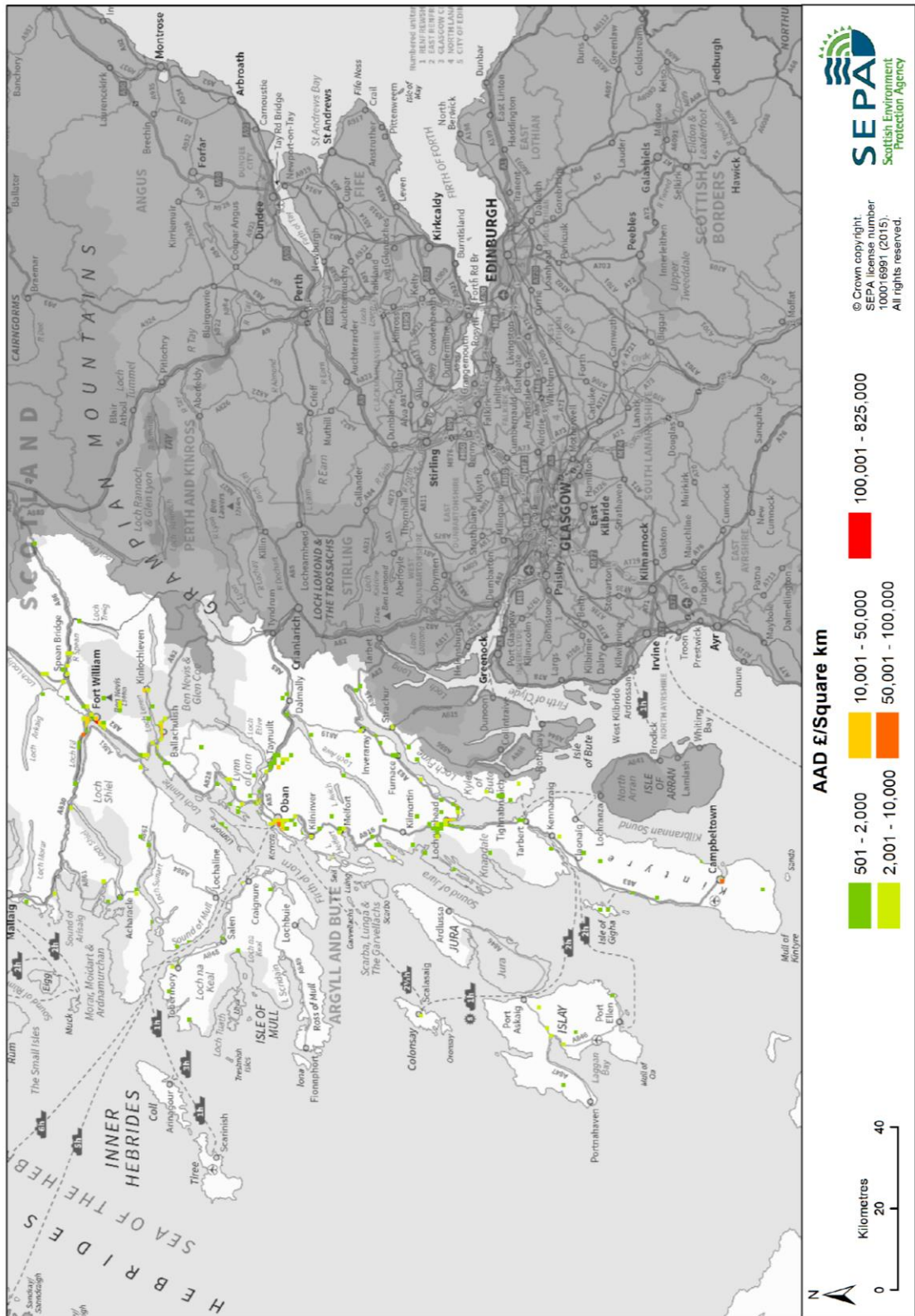


Figure 1b: Annual Average Damages from surface water flooding

## History of flooding

In 1916 flooding damaged roads and sections of a railway line and in 1956 sections of the Inverness to Elgin railway line were washed away.

There have been a number of localised floods, which can be attributed to surface water flooding. Smithton and Culloden suffered flooding in 2001. Inverness, including Millburn and the Inshes Retail Park, and Smithton and Culloden flooded in 2002. In 2005 there was surface water flooding in Oban. Smithton and Culloden and rural parts of Nairnshire were affected by surface water flooding in 2011. Fort William has also been affected by surface water flooding in the past.

## Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Existing actions that are in place to manage flood risk in this area are described in Section 2.

### Surface water management priority areas

The areas at highest risk from surface water flooding have been identified as priority areas. These priority areas were identified using SEPA flood models, supplemented with evidence from historic surface water floods and, where available, more detailed modelling carried out by local authorities. These priority areas require surface water management plans to be prepared, the details of which can be found within the Potentially Vulnerable Area chapters in Section 2.

## Climate change and future flood risk

UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall. The surface water modelling undertaken considered climate change scenarios with a 20% increase in rainfall intensity.

Under these conditions it is estimated that the number of residential properties at risk of surface water flooding may increase from approximately 1,100 to 1,400 and the number of non-residential properties from approximately 1,000 to 1,200.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.



## Annex 1: Glossary

Term	Definition
Accretion	Accumulation of sediment.
Actions	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 has been based on a detailed assessment and comparison of economic, social and environmental criteria.
Annual Average Damages (AAD)	Depending on its size or severity each flood will cause a different amount of damage to a given area. Annual Average Damages are the theoretical average economic damages caused by flooding when considered over a very long period of time. It does not mean that damage will occur every year: in many years there will be no damages, in some years minor damages and in a few years major damages may occur. High likelihood events, which occur more regularly, contribute proportionally more to AADs than rarer events. Within the Flood Risk Management Strategies AADs incorporate economic damages to the following receptors: residential properties, non-residential properties, vehicles, emergency services, agriculture and roads. They have been calculated based on the principles set out in the Flood Hazard Research Centre Multi-Coloured Handbook (2010).
Appraisal	Appraisal is the process of defining objectives, examining options and weighing up the costs, benefits, risks and uncertainties before a decision is made. The FRM Strategy appraisal method is designed to set objectives and identify the most sustainable combination of actions to tackle flooding from rivers, sea and surface water.
Appraisal baseline	Defines the existing level of flood risk under the current flood risk management regime.
Awareness raising	Public awareness, participation and community support are essential components of sustainable flood risk management. SEPA and the responsible authorities have a duty to raise public awareness of flood risk. This is undertaken both individually and collaboratively by a range of organisations. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact.
Bathing waters	Bathing waters are classed as protected areas under Annex IV of the Water Framework Directive (WFD). There are 84 designated bathing waters in Scotland. <sup>i</sup>
Benefit cost ratio (BCR)	A benefit cost ratio summarises the overall value for money of an action or project. It is expressed as the ratio of benefits to costs (both expressed as present value monetary values). A ratio of greater than 1:1 indicates that the economic benefits associated with an action are greater than the economic costs of implementation; therefore this is taken as the threshold of economic viability. It should be acknowledged that it is not always possible to accurately estimate economic values for all elements of benefit, and BCR is just one a number of techniques used in appraisal.
Blue infrastructure	Blue infrastructure is often complementary to 'green infrastructure' and includes sustainable drainage systems, swales (shallow, broad and vegetated channels designed to store and/or convey runoff and remove pollutants <sup>ii</sup> ), wetlands, rivers, canals (and their banks) and other watercourses <sup>iii</sup>
Candidate Potentially Vulnerable Area (PVAc)	Candidate PVAs are those areas identified after the National Flood Risk Assessment (2011), as a result of new information, where the impact of flooding is potentially sufficient to justify further assessment and appraisal. They will be considered for inclusion as new PVAs in the next flood risk management planning cycle.
Catchment	All the land drained by a river and its tributaries.

Term	Definition
Category 1 and 2 Responders (Cat 1 / 2)	Category 1 and 2 Responders are defined as part of the Civil Contingencies Act 2004 which seeks to minimise disruption in the event of an emergency. Category 1 Responders are 'core' responders: local authorities, police, fire and rescue services, ambulance service, NHS health boards, SEPA and the Maritime and Coastguard Agency. Category 2 Responders are key co-operating responders in support of Category 1 Responders. These include gas and electricity companies, rail and air transport operators, harbour authorities, telecommunications providers, Scottish Water, the Health and Safety Executive and NHS National Services Scotland <sup>iv</sup> .
Channel improvement	Where work has been carried out on a river channel allowing an increase in the volume of water it can carry.
Characterisation	Provides a description of the natural characteristics of catchments, coastlines and urban areas in terms of hydrology, geomorphology, topography and land use. It also includes the characterisation of existing levels of flood risk and existing flood risk management activity.
Coastal flooding	Flooding that results from high sea levels or a combination of high sea levels and stormy conditions. The term coastal flooding is used under the Flood Risk Management (Scotland) Act 2009, but in some areas it is also referred to as tidal flooding and covers areas such as estuaries and river channels that are influenced by tidal flows.
Combined sewer	Combined sewers transport sewage from homes and industry as well as carrying surface water runoff from gutters, drains and some highways. Heavy or prolonged rainfall can rapidly increase the flow in a combined sewer until the amount of water exceeds sewer capacity.
Combined sewer (overflow) (CSO)	Combined sewer overflows are purposely designed structures to ensure any excess water from sewerage systems is discharged in a controlled way and at a specific managed location.
Community facility	Within the FRM Strategies this term includes: Emergency Services (Police, Fire, Ambulance, Coastguard, Mountain Rescue) Educational Buildings (crèche, nursery, primary, secondary, further, higher and special education premises) Healthcare facilities: hospitals, health centres and residential care homes
Community flood action groups	Community flood action groups are community based resilience groups which, on behalf of local residents and business, help to prepare for and minimise the effects of flooding. They reflect the interests of their local communities and may differ in composition and remit. There are over 60 groups already established in Scotland. The Scottish Flood Forum provides support for both new and existing groups.
Confluence	Where two or more rivers meet.
Conveyance	Conveyance is a measure of the carrying capacity of a watercourse. Increasing conveyance enables flow to pass more rapidly and reducing conveyance slows flow down. Both actions can be effective in managing flood risk depending on local conditions.
Cultural heritage site	Historic Environment Scotland maintains lists of buildings of special architectural or historic interest; these buildings are referred to as 'listed buildings'. The highest level of designation is a World Heritage Site. Other designations included in this assessment are scheduled monuments, gardens and designed landscapes, and battlefields.
Culvert	A pipe, channel or tunnel used for the conveyance of a watercourse or surface drainage water under a road, railway, canal or other obstacle.
Damages	Flood damages are categorised as direct or indirect i.e. as a result of the flood water itself, or subsequent knock on effects. Damage to buildings and contents caused by flood water are an example of direct damages, whilst loss of industrial production, travel disruption or stress and anxiety are indirect. Some damages can be quantified in monetary terms, and others can only be described.

Term	Definition
	<p>The potential damages avoided by implementation of a flood risk management action are commonly referred to as the benefits of that action. When comparing the effectiveness of different actions, it is useful to consider estimated damages and damages avoided across the lifespan of the action. Within the FRM Strategies, a 100 year appraisal period has been used as standard. This allows costs, damages and benefits across this time frame to be compared in present value terms.</p> <p>See also 'Annual Average Damages'</p>
Demountable defences	<p>A temporary flood barrier is one that is only installed when the need arises, that is, when flooding is forecast. A demountable flood defence is a particular type of temporary defence that requires built-in parts and therefore can only be deployed in one specific location.<sup>v</sup></p>
Deposition	<p>A natural process leading to an accumulation of sediment on a river bed, floodplain or coastline.</p>
Economic impact	<p>An assessment of the economic value of the positive and negative effects of flooding and / or the actions taken to manage floods.</p>
Embankment	<p>Flood embankments are engineered earthfill structures designed to contain high river levels or protect against coastal flooding. They are commonly grass-covered, but may need additional protection against erosion by swiftly flowing water, waves or overtopping.</p>
Emergency plans / response	<p>Emergency response plans are applicable for all types of flooding. They set out the steps to be taken during flooding in order to maximise safety and minimise impacts where possible. Under the Civil Contingencies Act, Category 1 Responders have a duty to maintain emergency plans. Emergency plans may also be prepared by individuals, businesses, organisations or communities.</p>
Environmental impact	<p>A change in the environment as a result of an action or activity. Impacts can be positive or negative and may vary in significance, scale and duration.</p>
Environmental Impact Assessment (EIA)	<p>Environmental Impact Assessment (EIA) is a process which identifies the potential environmental impacts, both negative and positive, of a proposal.</p>
Environmental sites / environmental designated areas/ environmentally designated sites	<p>Areas formally designated for environmental importance, such as Sites of Special Scientific Interest (SSSI), Special Protection Area (SPA) or Special Areas of Conservation (SAC).</p>
Episodic erosion	<p>Erosion induced by a single event, such as a storm.</p>
Erosion	<p>A natural process leading to the removal of sediment from a river bed, bank or floodplain or coastline.</p>
Estuarine surge attenuation	<p>A reduction in the wave energy caused by storm surge. Breakwaters (barriers built out into the sea to protect a coast or harbour from the force of waves) or habitats such as saltmarsh can slow down and reduce the inland impact of storm surges (the rising of the sea due to wind and atmospheric pressure changes associated with storms), thereby reducing coastal flood risk.</p>
Estuary	<p>A coastal body of water usually found where a river meets the sea; the part of the river that is affected by tides.</p>
Fault (fault line)	<p>A break or fracture in the earth's crust as a result of the displacement of one side with respect to the other. In Scotland the Great Glen Fault is a major geological fault line cutting diagonally across the Highlands from Fort William to Inverness.</p>
Flash flood	<p>A flood that occurs a short period of time after high intensity rainfall or a sudden snow melt. A sudden increase in the level and velocity of the water body is often characteristic of these events, leaving a short time for warning or actions.</p>
Flashy watercourse	<p>A 'flashy' river or watercourse has a short lag time (the delay between peak rainfall intensity and peak river discharge), high peak discharge, and quickly returns to average flow. Rivers with these characteristics</p>

Term	Definition
	can be prone to flooding and leave a short time for warning or actions.
Flood	In the terms of the FRM Act, 'flood' means a temporary covering by water, from any source, of land not normally covered by water. This does not include a flood solely from a sewerage system, as a result of normal weather or infrastructure drainage. A flood can cause significant adverse impacts on people, property and the environment. drainage.
Flood bund	A constructed retaining wall, embankment or dyke designed to protect against flooding to a specified standard of protection.
Flood defence	Infrastructure, such as flood walls, embankments or flood storage intended to protect an area against flooding to a specified standard of protection.
Flood extent	The area that has been affected by flooding, or is at risk of flooding from one or more sources for a particular likelihood.
Flood forecasting	SEPA operates a network of over 250 rainfall, river and coastal monitoring stations throughout Scotland that generate data 24 hours a day. This hydrological information is combined with meteorological information from the Met Office. A team of experts then predict the likelihood and timing of river, coastal and surface water flooding. This joint initiative between SEPA and the Met Office forms the Scottish Flood Forecasting Service.
Flood frequency	The probability that a particular size/severity of flood will occur in a given year (see likelihood).
Flood gate	An adjustable, sometimes temporary, barrier used as a flood defence to control the flow of water within a water system or during a flood. Flood gates can also be part of operational flood defences or protect individual buildings or sites.
Flood guard	Flood guards cover a variety of types of door and window barriers that can be fitted to individual properties and operated by the owners / occupiers prior to a flood event. They act as a physical barrier to water entering the property and can provide protection against frequent and relatively shallow flooding.
Flood hazard	In terms of the FRM Act, hazard refers to the characteristics (extent, depth, velocity) of a flood.
Flood hazard map	Flood hazard maps are required by the FRM Act to show information that describes the nature of a flood in terms of the source, extent, water level or depth and, where appropriate, velocity of water. Flood hazard and risk maps are referred to collectively as flood maps and are available on the SEPA website.
Flood Prevention Scheme / Flood Protection Scheme (FPS)	A flood protection scheme, as defined by the FRM Act, is a scheme by a local authority for the management of flood risk within the authority area. This includes defence measures (flood prevention schemes) formerly promoted under the Flood Prevention (Scotland) Act 1961.
Flood protection study	Flood protection studies aim to refine understanding of the hazard and risk associated with flooding in a particular area, catchment or coastline. They will involve detailed assessment of flood hazard and / or risk and may develop options for managing flood risk.
Flood protection works	Flood protection works can include the same flood defence measures that would make up a formal Flood Protection Scheme but without the legal process, protections and requirements that would come by delivering the works as a scheme.
Flood risk	A measure of the combination of the likelihood of flooding occurring and the associated impacts on people, the economy and the environment.
Flood Risk Assessment (FRA)	Flood Risk Assessments are detailed studies of an area where flood risk may be present. These are often used to inform planning decisions, may help to develop flood schemes and have also contributed to the National Flood Risk Assessment.

Term	Definition
Flood Risk Management (Scotland) Act 2009 (FRM Act)	The flood risk management legislation for Scotland. It transposes the EC Floods Directive into Scots Law and aims to reduce the adverse consequences of flooding on communities, the environment, cultural heritage and economic activity.
Flood risk management cycle	Under the FRM Act flood risk management planning is undertaken in six year cycles. The first planning cycle is 2015 – 2021. The first delivery cycle is lagged by approximately 6 months and is from 2016 - 2022.
Flood Prevention (Scotland) Act 1961	The Flood Prevention (Scotland) Act 1961 gave local authorities discretionary powers to make and build flood prevention schemes. It was superseded by the Flood Risk Management (Scotland) Act 2009.
Flood Risk Management Local Advisory Groups	FRM Local Advisory Groups are stakeholder groups convened to advise SEPA and lead local authorities in the preparation of Flood Risk Management Plans. SEPA and lead local authorities must have regard to the advice they provide.
Flood Risk Management Plans (FRM Plans)	A term used in the FRM Act. FRM Plans set out the actions that will be taken to reduce flood risk in a Local Plan District. They comprise Flood Risk Management Strategies, developed by SEPA, and Local Flood Risk Management Plans produced by lead local authorities.
Flood Risk Management Strategy (FRM Strategy)	Sets out a long-term vision for the overall reduction of flood risk. They contain a summary of flood risk in each Local Plan District, together with information on catchment characteristics and a summary of objectives and actions for Potentially Vulnerable Areas.
Flood risk map	Complements the flood hazard maps published on the SEPA website providing detail on the impacts of flooding on people, the economy and the environment. Flood hazard and risk maps are referred to collectively as flood maps and are available on the SEPA website.
Flood wall	A flood defence feature used to defend an area from flood water to a specified standard of protection.
Flood Warning area (FWA)	A Flood Warning area is where SEPA operates a formal Flood Monitoring Scheme to issue targeted Flood Warning messages for properties located in the area. <sup>vi</sup>
Flood warning scheme	A flood warning scheme is the network of monitoring on a coastal stretch or river, which provides SEPA with the ability to issue Flood Warnings.
Floods Directive	European Directive 2007/60/EC on the Assessment and Management of Flood Risks builds on and is closely related to the Water Framework Directive (see river basin management planning). It was transposed into Scots Law by the Flood Risk Management (Scotland) Act 2009. The Directive requires Member States to assess if all watercourses and coastlines are at risk from flooding, to map the flood extent, assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk <sup>vii</sup> .
Floodplain	Area of land that borders a watercourse, an estuary or the sea, over which water flows in time of flood, or would naturally flow but for the presence of flood defences and other structures where they exist.
Floodplain storage	Floodplains naturally store water during high flows. Storage can be increased through natural or man-made features to increase flood depth or slow flows in order to reduce flooding elsewhere.
Gabion	A metal cage filled with rocks often used in river bank protection.
Green infrastructure	The European Commission defines green infrastructure as “the use of ecosystems, green spaces and water in strategic land use planning to deliver environmental and quality of life benefits. It includes parks, open spaces, playing fields, woodlands, wetlands, road verges, allotments and private gardens. Green infrastructure can contribute to climate change mitigation and adaptation, natural disaster risk mitigation, protection against flooding and erosion as well as biodiversity conservation.” See also ‘blue infrastructure’ <sup>viii</sup>

Term	Definition
Groundwater flooding	This type of flooding is caused by water rising up from underlying rocks or flowing from springs. In Scotland groundwater is generally a contributing factor to flooding rather than the primary source.
Integrated catchment study (ICS)	In urban areas, the causes of flooding are complex because of the interactions between rivers, surface water drainage and combined sewer systems and tidal waters. Scottish Water works with SEPA and local authorities to assess these interactions through detailed studies.
Land use planning (LUP)	The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, including consideration of long term economic, social and environmental objectives and the implications for different communities and interest groups.
Lead local authority	A local authority responsible for leading the production, consultation, publication and review of a Local Flood Risk Management Plan.
Likelihood of flooding	The chance of flooding occurring. <b>High likelihood:</b> A flood is likely to occur in the defined area on average once in every ten years (1:10). Or a 10% chance of happening in any one year. <b>Medium likelihood:</b> A flood is likely to occur in the defined area on average once in every two hundred years (1:200). Or a 0.5% chance of happening in any one year. <b>Low likelihood:</b> A flood is likely to occur in the defined area on average once in every thousand years (1:1000). Or a 0.1% chance of happening in any one year.
Local Flood Risk Management Plans (Local FRM Plan)	Local Flood Risk Management Plans, produced by lead local authorities, will take forward the objectives and actions set out in Flood Risk Management Strategies. They will provide detail on the funding, timeline of delivery, arrangements and co-ordination of actions at the local level during each six year FRM planning cycle.
Local Nature Reserve (LNR)	A Local Nature Reserve is a protected area of land designated by a local authority because of its local special natural interest and / or educational value. Local authorities select and designate local nature reserves using their powers under the National Parks and Access to the Countryside Act 1949 <sup>ix</sup> .
Local Plan District	Geographical areas for the purposes of flood risk management planning. There are 14 Local Plan Districts in Scotland.
Local Plan District Partnerships	Each LPD has established a local partnership comprised of local authorities, SEPA, Scottish Water and others as appropriate. These partnerships are distinct from the FRM Local Advisory Groups and they retain clear responsibility for delivery of the FRM actions set out in the Local Flood Risk Management Plans. It is the local partnership that makes decisions and supports the delivery of these plans.
Maintenance	Sections 18 and 59 of the Flood Risk Management (Scotland) Act 2009 put duties of watercourse inspection, clearance and repair on local authorities. In addition, local authorities may also be responsible for maintenance of existing flood protection schemes or defences.
Montane habitat	This habitat encompasses a range of natural or near-natural vegetation occurring in the montane zone, lying above or beyond the natural tree-line.
National Flood Management Advisory Group (NFMAG)	The National Flood Management Advisory Group provides advice and support to SEPA and, where required, Scottish Water, local authorities and other responsible authorities on the production of FRM Strategies and Local FRM Plans.
National Flood Risk Assessment (NFRA)	A national analysis of flood risk from all sources of flooding which also considers climate change impacts. Completed in December 2011 this provides the information required to undertake a strategic approach to flood management that identifies areas at flood risk that require further appraisal. The NFRA will be reviewed and updated for the second cycle of FRM Planning by December 2018.

<b>Term</b>	<b>Definition</b>
Natural flood management (NFM)	A set of flood management techniques that aim to work with natural processes (or nature) to manage flood risk.
Non-residential properties	Properties that are not used for people to live in, such as shops or other public, commercial or industrial buildings.
Objectives	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.
One in 200 year flood	See 'likelihood of flooding' and 'return period'.
Planning policies	Current national planning policies, Scottish Planning Policy and accompanying Planning Advice notes restrict development within the floodplain and limit exposure of new receptors to flood risk. In addition to national policies, local planning policies may place further requirements within their area of operation to restrict inappropriate development and prevent unacceptable risk.
Potentially Vulnerable Areas (PVA)	Catchments identified as being at risk of flooding and where the impact of flooding is sufficient to justify further assessment and appraisal. There were 243 PVAs identified by SEPA in the National Flood Risk Assessment and these are the focus of the first FRM planning cycle.
Property level protection	Property level protection includes flood gates, sandbags and other temporary barriers that can be used to prevent water from entering individual properties during a flood.
Property level protection scheme	Some responsible authorities may have a formal scheme to provide, install and maintain property level protection for properties.
Ramsar sites	Ramsar sites are wetlands of international importance designated under the Ramsar Convention.
Receptor	Refers to the entity that may be impacted by flooding (a person, property, infrastructure or habitat). The vulnerability of a receptor can be reduced by increasing its resilience to flooding.
Residual risk	The risk that remains after risk management and mitigation. This may include risk due to very severe (above design standard) storms or risks from unforeseen hazards.
Resilience	The ability of an individual, community or system to recover from flooding.
Responsible authority	Designated under the FRM (Scotland) Act 2009 and associated legislation as local authorities, Scottish Water and, from 21 December 2013, the National Park Authorities and Forestry Commission Scotland. Responsible authorities, along with SEPA and Scottish Ministers, have specific duties in relation to their flood risk related functions.
Return period	A measure of the rarity of a flood event. It is the statistical average length of time separating flood events of a similar size. (see likelihood)
Revetment	Sloping structures placed on banks or at the foot of cliffs in such a way as to deflect the energy of incoming water.
Riparian	The riparian area is the interface between land and a river or stream. For the purposes of FRM this commonly refers to the riparian owner, which denotes ownership of the land area beside a river or stream.
River basin management planning (RBMP)	The Water Environment and Water Services (Scotland) Act 2003 transposed the European Water Framework Directive into Scots law. The Act created the River Basin Management Planning process to achieve environmental improvements to protect and improve our water environment. It also provided the framework for regulations to control the negative impacts of all activities likely to have an impact on the water environment.
Runoff reduction	Actions within a catchment or sub-catchment to reduce the amount of runoff during rainfall events. This can include intercepting rainfall,

Term	Definition
	storing water, diverting flows or encouraging infiltration.
Scottish Advisory and Implementation Forum for Flooding (SAIFF)	The stakeholder forum on flooding set up by the Scottish Government to ensure legislative and policy aims are met and to provide a platform for sharing expertise and developing common aspirations and approaches to reducing the impact of flooding on Scotland's communities, environment, cultural heritage and economy.
Sediment balance	Within a river where erosion and deposition processes are equal over the medium to long-term resulting in channel dimensions (width, depth, slope) that are relatively stable.
Sediment management	Sediment management covers a wide range of activities that includes anything from the small scale removal of dry gravels to the dredging of whole river channels and the reintroduction of removed sediment into the water environment. Historically, sediment management has been carried out for several reasons, including reducing flood risk, reducing bank erosion, for use as aggregate and to improve land drainage.
Self help	Self help actions can be undertaken by any individuals, businesses, organisations or communities at risk of flooding. They are applicable to all sources, frequency and scales of flooding. They focus on awareness raising and understanding of flood risk.
Sewer flooding (and other artificial drainage system flooding)	Flooding as a result of the sewer or other artificial drainage system (e.g. road drainage) capacity being exceeded by rainfall runoff or when the drainage system cannot discharge water at the outfall due to high water levels (river and sea levels) in receiving waters.
Site protection plans	Site protection plans are developed to identify whether normal operation of a facility can be maintained during a flood. This may be due to existing protection or resilience of the facility or the network.
Shoreline Management Plan (SMP)	A Shoreline Management Plan is a large scale assessment of the coastal flood and erosion risks to people and the developed, historic and natural environment. It sets out a long-term framework for the management of these risks in a sustainable manner.
Site of Special Scientific Interest (SSSI)	Sites of Special Scientific Interest are protected by law under the Nature Conservation (Scotland) Act 2004 to conserve their plants, animals and habitats, rocks and landforms <sup>x</sup> .
Source of flooding	The type of flooding. This can be coastal, river, surface water or groundwater.
Special Area of Conservation (SAC)	Special Areas of Conservation are strictly protected sites designated under the European Habitats Directive. The Directive requires the establishment of a European network of protected areas which are internationally important for threatened habitats and species <sup>xi</sup> .
Special Protection Areas (SPA)	Special Protection Areas are strictly protected sites classified in accordance with the European Birds Directive. They are classified for rare and vulnerable birds (as listed in the Directive), and for regularly occurring migratory species <sup>xii</sup> .
Standard of protection (SoP)	All flood protection structures are designed to be effective up to a specified flood likelihood (Standard of Protection). For events beyond this standard, flooding will occur. The chosen Standard of Protection will determine the required defence height and / or capacity.
Storage area	A feature that can be used to store floodwater, this can be natural in the form of low lying land or manmade such as a reservoir or modified landform.
Strategic Environmental Assessment (SEA)	A process for the early identification and assessment of the likely significant environmental effects, positive and negative, of activities. Often considered before actions are approved or adopted.
Strategic Flood Risk Assessment (SFRA)	A Strategic Flood Risk Assessment is designed for the purposes of specifically informing the Development Plan Process. A SFRA involves the collection, analysis and presentation of all existing and readily available flood risk information (from any source) for the area of interest. It constitutes a strategic overview of flood risk.



Term	Definition
Strategic mapping and modelling	Strategic mapping and modelling actions have been identified in locations where SEPA is planning to undertake additional modelling or analysis of catchments and coastlines, working collaboratively with local authorities where appropriate, to improve the national understanding of flood risk.
Surcharge	Watercourses and culverts can carry a limited amount of water. When they can no longer cope, they overflow, or 'surcharge'.
Surface water flooding	Flooding that occurs when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead <sup>xiii</sup>
Surface water management plan (SWMP)	A plan that takes an integrated approach to drainage accounting for all aspects of urban drainage systems and produces long term and sustainable actions. The aim is to ensure that during a flood the flows created can be managed in a way that will cause minimum harm to people, buildings, the environment and business.
Surface water plan/study	The management of flooding from surface water sewers, drains, small watercourses and ditches that occurs, primarily in urban areas, during heavy rainfall. FRM Strategy actions in this category include: Surface Water Management Plans, Integrated Catchment Studies and assessment of flood risk from sewerage systems (FRM Act Section 16) by Scottish Water. These have been selected as appropriate for each Potentially Vulnerable Area.
Sustainable flood risk management	The sustainable flood risk management approach aims to meet human needs, whilst preserving the environment so that these needs can be met not only in the present, but also for future generations. The delivery of sustainable development is generally recognised to reconcile three pillars of sustainability – environmental, social and economic.
Sustainable drainage systems (SuDS)	A set of techniques designed to slow the flow of water. They can contribute to reducing flood risk by absorbing some of the initial rainfall and then releasing it gradually, thereby reducing the flood peak and helping to mitigate downstream problems. SuDS encourage us to take account of quality, quantity and amenity / biodiversity.
UK Climate Change Projections (UKCP09)	The leading source of climate change information for the UK. It can help users to assess their climate risks and plan how to adapt to a changing climate. The high emissions scenario refers to the SRES A1F1 emission scenario. See Annex 1 of the UKCP09 Climate change projections report for details. <sup>xiv</sup>
Utility assets	Within the FRM Strategies this refers to electricity sub stations, mineral and fuel extraction sites, telephone assets, television and radio assets.
Voe	A dialect term, common in place names and used to refer to a small bay or creek in Orkney or Shetland.
Vulnerability	A measure of how likely someone or something is to suffer long-term damage as a result of flooding. It is a combination of the likelihood of suffering harm or damage during a flood (susceptibility) and the ability to recover following a flood (resilience).
Wave energy dissipation	Process by which a wave loses its energy.
Wave overtopping	Wave overtopping occurs when water passes over a flood wall or other structure as a result of wave action. Wave overtopping may lead to flooding particularly in exposed coastal locations.

<sup>i</sup> <http://apps.sepa.org.uk/bathingwaters/> accessed 14/10/2015 last updated 2015

<sup>ii</sup> <http://www.susdrain.org/delivering-suds/using-suds/suds-components/swales-and-conveyance-channels/swales.html> accessed 12/10/2015 last updated 2012

<sup>iii</sup> <http://www.gov.scot/Resource/Doc/362219/0122541.pdf> accessed 12/10/2015 last updated 2011

<sup>iv</sup> <http://www.legislation.gov.uk/ukpga/2004/36/schedule/1> accessed 12/10/2015 last updated 2004

<sup>v</sup> <http://evidence.environment-agency.gov.uk/FCERM/en/FluvialDesignGuide/Chapter9.aspx?pagenum=10> accessed 12/10/2015 last update 07/03/2012

<sup>vii</sup> [http://ec.europa.eu/environment/water/flood\\_risk/](http://ec.europa.eu/environment/water/flood_risk/) accessed 12/10/2015 last updated 17/09/2015

<sup>viii</sup> <http://www.gov.scot/Resource/Doc/362219/0122541.pdf> accessed 12/10/2015 last updated 2011

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- <sup>ix</sup> <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/local-designations/lmr/> accessed 12/10/2015 last updated 12/07/2015
- <sup>x</sup> <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/sssis/> accessed 12/10/2015 last updated 21/01/2015
- <sup>xi</sup> <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/sac/> accessed 12/10/2015 last updated 01/03/2013
- <sup>xii</sup> <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/spa/> accessed 12/10/2015 last updated 01/03/2013
- <sup>xiii</sup> <http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfs#wx=357683&y=355134&scale=2> accessed 12/10/2015 last updated 12/10/2015
- <sup>xiv</sup> <http://ukclimateprojections.metoffice.gov.uk> Document © Crown copyright 2009 accessed 01/12/15 last updated 30/04/2012

## Annex 2: Land use planning

Flood risk management actions from national planning policies
<p><b>AVOID DEVELOPMENT IN MEDIUM TO HIGH RISK AREAS</b></p> <p>a) <b>Planning authorities</b> work in partnership undertaking catchment-wide Strategic Flood Risk Assessments to inform their development plan allocations in line with SEPA's guidance and Land Use Vulnerability.</p> <p>b) <b>Planning authorities and SEPA</b> require the submission of flood risk assessments that accord with SEPA's <i>Technical Flood Risk Guidance for Stakeholders</i>, to support planning applications where there is a potential flood risk. The flood risk assessment should be used to demonstrate as far as possible that the development will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, takes opportunities to reduce flood risk overall.</p> <p>c) <b>SEPA</b> ensures that its flood risk advice to planning authorities is clear and appropriate. SEPA, in consultation with planning authorities, undertakes an annual assessment of planning advice and its contribution to flood risk.</p> <p>d) <b>SEPA and planning authorities</b> engage at an early stage of the development plan process to agree appropriate forms of development to help inform the preparation and implementation of Strategic Flood Risk Assessments.</p>
<p><b>REDUCE IMPACTS TO EXISTING BUILDINGS</b></p> <p>a) <b>SEPA, planning authorities and local communities</b> are required to engage at an early stage of the development plan process to agree the best long term land uses for areas where relocation, abandonment and/or change of use have been identified to deliver sustainable flood risk management. Where possible, new land uses should aim to achieve multiple benefits for local communities such as the creation of blue / green infrastructure and increased resilience to climate change.</p>
<p><b>PROTECT AND ENHANCE NATURAL FEATURES THAT HAVE A POSITIVE IMPACT ON REDUCING OVERALL FLOOD RISK</b></p> <p>a) <b>SEPA and planning authorities</b> are required to engage early in the development plan process to identify opportunities for the restoration and protection of natural features which help manage flood risk. Opportunities should be maximised to achieve multiple benefits such as the development of green / blue infrastructure and improved place making. Areas of land that may contribute to flood management should be identified and protected.</p>
<p><b>NEW DEVELOPMENTS ARE DESIGNED TO ENSURE THAT SURFACE WATER DRAINAGE DOES NOT INCREASE FLOOD RISK ON OR OFF SITE</b></p> <p>a) <b>SEPA</b> prepares guidance for planning authorities and developers on the use of surface water hazard maps for land use planning purposes.</p> <p>b) <b>Planning authorities</b> support the implementation of Surface Water Management Plans, developed by the local authorities, through development plan allocations and policies. Surface Water Management Plans should take account of development opportunities that could contribute to the reduction of surface water flood risk.</p> <p>c) <b>SEPA</b> engages at an early stage of the development plan process to progress exemplar projects that demonstrate the potential for land use planning to mitigate surface water flooding and contribute to wider environmental benefits.</p>
<p>a) <b>NEW DEVELOPMENT IS RESILIENT TO PREDICTED FUTURE CHANGES IN CLIMATE</b> <b>Planning authorities</b> ensure that climate change is considered in Strategic Flood Risk Assessments and Flood Risk Assessments, based upon the best scientific evidence and the information requirements of planners to make informed decisions.</p>

Table 1: Objectives and actions that reflect national Land Use Planning policies and guidance

## Annex 3: Acknowledgements

SEPA gratefully acknowledges the cooperation and input that various parties have provided, including *inter alia*, the following organisations:

### **Ordnance Survey**

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### **Local authorities**

SEPA acknowledges the provision of flood models and other supporting data and information from local authorities in Scotland and their collaboration in the production of flood risk management information.

### **Scottish Water**

SEPA acknowledges the inclusion of surface water flooding data generated by Scottish Water in preparation of flood risk information.

Further detail on the datasets that have been used in the development of the Flood Risk Management Strategies can be found in the Strategic Appraisal Methodology, which is available from the SEPA webpage.

