

# Flood Risk Management (Scotland) Act 2009:

## Local Flood Risk Management Plan Forth Estuary Local Plan District



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Delivering sustainable flood risk management is important for Scotland's continued economic success and well-being. It is essential that we avoid and reduce the risk of flooding, and prepare and protect ourselves and our communities.

This is the first Local Flood Risk Management Plan for the Forth Estuary Local Plan District, describing the actions which will make a real difference to managing the risk of flooding and recovering from any future flood events.

The task now for us – local authorities, Scottish Water, SEPA, the Scottish Government and all other responsible authorities and public bodies – is to turn our Local Flood Risk Management Plan into action.

## Foreword

The impacts of flooding experienced by individuals, communities and businesses can be devastating and long lasting. It is vital that we continue to reduce the risk of future events and improve Scotland's ability to manage and recover from any events which do occur.

The publication of this Local Flood Risk Management Plan is an important milestone in implementing the Flood Risk Management (Scotland) Act 2009 and improving how we cope with and manage floods in the Forth Estuary Local Plan District. The aim of the Plan is to translate this legislation into actions to reduce the damage and distress caused by flooding. This plan will cover actions identified in the first planning cycle from 2016 to 2022.

Responsible authorities are taking action to manage flood risk in partnership in a more coordinated, sustainable and targeted way, to ensure the benefits of intervention will make the greatest impact. To support this new approach, Scotland has been separated into 14 Local Plan Districts. These districts are based on river catchments and cross administrative and institutional boundaries, therefore some local authorities will be covered in more than one Local Plan District. Each Local Plan District produces a Local Flood Risk Management Plan specific to their area.

The Forth Estuary Local Plan District is led by the City of Edinburgh Council and the Local Flood Risk Management Plan is published by the City of Edinburgh Council on behalf of a partnership comprising 13 local authorities: The City of Edinburgh Council (lead authority), Clackmannanshire Council, East Dunbartonshire Council, East Lothian Council, Falkirk Council, Fife Council, Midlothian Council, North Lanarkshire Council, Perth & Kinross Council, Scottish Borders Council, South Lanarkshire Council, Stirling Council, West Lothian Council as well as Scottish Water, SEPA, Network Rail, Transport Scotland and Forestry Commission Scotland. The Forth Estuary Local Plan District boundary is illustrated in Figure 1.

In summary, there are 29 areas that have been identified as being potentially vulnerable to flood risk across the Forth Estuary Local Plan District (the extent of which is shown in figure 1). These include 14,000 residential and 3,800 non-residential properties. The estimated annual average damage of these flood risks is £36 million.

This Local Flood Risk Management Plan presents actions to avoid and reduce the risk of flooding, and prepare and protect ourselves and our communities within these Potentially Vulnerable Areas and across the Local Plan District. These actions include 10 flood protection schemes or works; 26 flood protection studies; as well as new flood warning schemes, surface water management plans, and natural flood



management studies and works. The delivery of many of these actions may be dependent on the availability of funding.

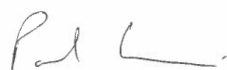
However, we can all play our part in managing flood risk as we are able. Individuals are the first line of defence against flooding and have responsibilities to protect themselves from flooding. The publication of this Local Flood Risk Management Plan shows that the coordinated and collaborative efforts of public bodies can be brought together to deliver sustainable outcomes. However, the actions in this Local Flood Risk Management Plan can only be delivered with the support of all the public bodies, the Scottish Government, and most importantly you and your communities.

This Local Flood Risk Management Plan therefore provides the blueprint upon which SEPA, local authorities and Scottish Water and any other responsible authorities will deliver their flood risk management responsibilities and, in particular, that all steps should be taken to manage flooding in a sustainable manner.

We would like to thank all those who contributed to the development of this Local Flood Risk Management Plan which will help shape the way in which floods and their impacts are managed across the Forth Estuary Local Plan District.



.....  
Lesley Hinds  
Convener of the Transport and Environment Committee  
The City of Edinburgh Council



.....  
Paul Lawrence  
Director of Place  
The City of Edinburgh Council

22 June 2016



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Figure 1: The Forth Estuary Local Plan District Boundary.

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## List of Acronyms and Abbreviations

A full definition of these terms is provided in the Glossary, included in [Annex 8](#).

<b>AAD</b>	Annual Average Damages
<b>FCS</b>	Forestry Commission Scotland
<b>FRM</b>	Flood Risk Management
<b>ICS</b>	Integrated Catchment Study
<b>LA</b>	Local Authority
<b>LPD</b>	Local Plan District
<b>LDP</b>	Local Development Plan
<b>LLA</b>	Lead Local Authority
<b>NFM</b>	Natural Flood Management
<b>NFP3</b>	National Planning Framework
<b>Plan</b>	Local Flood Risk Management Plan for the Forth Estuary
<b>PVA</b>	Potentially Vulnerable Area
<b>SEPA</b>	Scottish Environmental Protection Agency
<b>SWMP</b>	Surface Water Management Plan
<b>SDP</b>	Strategic Development Plan
<b>TIF</b>	Tax Incremental Finance
<b>RBMP</b>	River Basin Management Plans



## Chapter 1: What is a Local Flood Risk Management Plan?

The Local Flood Risk Management Plan (also referred to as the Plan) has been developed to detail the actions adopted to reduce the devastating and costly impact of flooding in the Forth Estuary Local Plan District. The Plan supplements the [Flood Risk Management Strategy](#)<sup>1</sup> for the Forth Estuary Local Plan District developed by SEPA in consultation with local authorities, Scottish Water, and transport and utility companies. This Local Flood Risk Management Plan covers the Forth Estuary Local Plan District. There are fourteen plan areas within Scotland each with their own Strategy and Local Flood Risk Management Plan. The geographical coverage of the Plan areas is governed by river catchments as opposed to Local Authority boundaries. The Flood Risk Management Strategies were developed to coordinate the efforts of all organisations that tackle flooding from all sources and in both urban and rural areas. They set the objectives to tackle flooding and identify actions to deliver these objectives. Objectives and actions have been set and agreed by all responsible authorities and prioritised over six-year planning cycles. The Flood Risk Management Strategies set out the short to long term ambition for flood risk management in Scotland, identifying where the risk of flooding and benefits of investment are greatest.

The Plan takes the actions contained in the Flood Risk Management Strategy and adds details as to who will be responsible for implementing actions, a timetable of when actions will be delivered, a description of the co-ordination requirements and funding arrangements. The Plan covers the first six-year implementation cycle from 2016 to 2022.

By publishing the Plan, individuals and local communities are provided with information that allows them to better manage their own responsibilities. Everyone can take action with the confidence of what others are doing and with the clear knowledge of when they are undertaking these actions. It is through this risk-based and plan-led approach that flood management will improve for the individuals, communities and businesses at risk in the Forth Estuary Local Plan District.

The contents of the Plan have been agreed by the lead authority, all responsible authorities, Scottish Water and SEPA.

This Plan is a requirement of the Flood Risk Management (Scotland) Act 2009.

This Plan is a technical document and whilst every effort has been made to present information in an easy to understand way, some terms require further explanation. A full glossary of terms has been provided in [Annex 8](#).

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<sup>1</sup> Forth Estuary Flood Risk Management Strategy, SEPA (December 2015). Found at (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>)

## 1.1 How to read this Local Flood Risk Management Plan

The Plan has three chapters:

- Chapter one explains what a Local Flood Risk Management Plan is, how it has been developed and the obligations different partners have to fulfil duties under the Flood Risk Management (2009) Scotland Act
- Chapter two provides a summary of flood risk in the Forth Estuary Local Plan District and an overview of objectives and actions that apply across the Local Plan District
- Chapter three summarises the way forward following publication of the Plan.
- [Annex 1](#) provides the detail of the objectives, actions, funding arrangements, delivery periods and collaborative working set within each Potentially Vulnerable Area (see section 1.1.1) for the first flood risk management cycle 2016 – 2022 along with historical information.
- Annexes 2 to 10 provide additional supporting information. A full glossary is also provided in [Annex 8](#).

This Plan should be read alongside the Flood Risk Management Strategy<sup>2</sup> for the Forth Estuary Local Plan District. The Flood Risk Management Strategy has been developed in parallel by SEPA and provides additional background information and a national context. The strategies were approved by Scottish Ministers and published in December 2015. Both the Plan and the Flood Risk Management Strategy will be updated every six years.

### 1.1.1 Potentially Vulnerable Areas (PVAs)

A key term to understand in reading this Plan is ‘Potentially Vulnerable Areas’ or PVAs. Potentially Vulnerable Areas are catchments identified as being at risk of flooding and where the impact of flooding is sufficient to justify further assessment and appraisal. SEPA identified 243 Potentially Vulnerable Areas in the National Flood Risk Assessment and these are the focus of the first FRM planning cycle. Within the Forth Estuary Local Plan District there are 27 Potentially Vulnerable Areas (PVA) and 2 Candidate Potentially Vulnerable Areas (PVAc). Candidate Potentially Vulnerable Areas 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.

## 1.2 How we have developed the Local Flood Risk Management Plan

Many organisations and individuals have been involved in helping to improve flood risk management in Scotland and provide a fully holistic approach. It is recognised that a piecemeal or reactive approach to tackling flooding is not efficient or effective.

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<sup>2</sup> Forth Estuary Flood Risk Management Strategy, SEPA (December 2015). Found at (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>)



Working jointly to overcome administrative, institutional and geographical boundaries is essential to deliver effective flood risk management.

The Plan has been developed in close partnership between all responsible authorities, SEPA and Scottish Water. In local partnerships, here and throughout Scotland, SEPA has provided the technical analysis and the evidence to ensure that a nationally consistent approach is taken. Local authorities and Scottish Water have made sure that local knowledge and expertise has informed the decision-making process. The Forth Estuary Local Flood Risk Management Plan has been developed in partnership by:

- The City of Edinburgh Council (lead authority);
- Clackmannanshire Council, East Dunbartonshire Council, East Lothian Council, Falkirk Council, Fife Council, Midlothian Council, North Lanarkshire Council, Perth and Kinross Council, Scottish Borders Council, South Lanarkshire Council, Stirling Council and West Lothian Council;
- Forestry Commission Scotland;
- Scottish Water; and
- SEPA.

It should be noted that South Lanarkshire Council, East Dunbartonshire Council and Stirling Council areas cover only a small portion of the Forth Estuary Local Plan District and these areas do not experience significant flooding within this plan area. As such, these local authorities have had no significant input to the Forth Estuary Local Flood Risk Management Plan. The Clyde and Loch Lomond Local Flood Risk Management Plan represents flood risk management more fully for South Lanarkshire Council and East Dunbartonshire Council. The Forth Local Flood Risk Management Plan represents flood risk management for Stirling Council.

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

Local authorities were keen to hear from the people and communities that live under the threat of flooding, to ensure that local priorities are considered and that efforts to manage flooding are targeted where most can be achieved. A public consultation was held in 2015 during the development of the Flood Risk Management Strategy and the Plan. The consultation was a joint exercise between SEPA and the lead authority. The views and representations of the respondents were taken into account in developing and finalising this Plan.

In addition to input from the public consultations, advice has been sought from relevant organisations at key stages. The Flood Risk Management Strategies and Local Flood Risk Management Plans have benefitted from input from the Forth Local

Advisory Group throughout the process, providing important area-based knowledge. Advice was also taken from a National Flood Management Advisory Group consisting of over 50 member organisations, reflecting the national importance and impact of flooding on our communities, economy, environment and cultural heritage. Some of the work carried out has been complex and technical in nature for which professional advice was sought. Working together, SEPA, the Scottish Government, local authorities, Scottish Water, Forestry Commission Scotland, and other key interested organisations have assisted each other and developed industry best practice guidance for flood risk management planning.

Further detail on consultation and engagement can be found within [Annex 3](#).

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

**Individuals** are the first line of defence against flooding and have responsibilities to protect themselves from flooding. Being prepared by knowing what to do and who to contact if flooding happens can reduce the damage and disruption that flooding causes.

**SEPA** is Scotland's national flood forecasting, flood warning and strategic flood risk management authority. SEPA has a statutory duty to produce Scotland's Flood Risk Management Strategies. SEPA works 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 (NFM) techniques to be introduced.

In running Floodline, SEPA provides 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 forecast for flooding SEPA works 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 associated 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. SEPA works 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** work together for flood risk management planning purposes through a single lead authority which is responsible for producing a Local Flood Risk Management Plan. It is the responsibility of your local authority to implement its flood protection actions agreed within the Plan whether that is new engineering projects, raising awareness of flooding or clearance and repair activities on the watercourses the council manages, subject to the availability of funding. During severe flooding, local authorities will work with the emergency services and coordinate shelter for people evacuated from their homes.

**Forestry Commission Scotland** is a responsible authority for flood risk management and as the Scottish Government's forestry advisor and regulator has the potential to contribute to flood risk reduction.

**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.

Further detail on some of the key roles is outlined in [Annex 2](#).

## **1.5 Identification of objectives, appraisal and prioritisation of actions**

The identification of objectives and selection of actions was led by SEPA as part of the Flood Risk Management Strategy with significant input from local authorities and Scottish Water.

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 the 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 are 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 have been recommended in areas where they could contribute to the management of flood risk. In such instances these actions are described as part of flood protection or natural flood management studies.

To prioritise actions across Scotland, 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 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. This group was made up of representatives from SEPA, local authorities, CoSLA and Scottish Water.

The prioritised actions to meet agreed flood risk management objectives in the first six-year cycle (outlined in both Chapter 2 and [Annex 1](#) of this Plan) have been based on the assumption that the necessary funding is made available. It has been assumed that the Scottish Government will make the necessary funding available during the first planning cycle which may be supplemented by individual local authorities. However, given the timing of spending reviews and annualised financial settlements for local government, the actual ability to deliver all the actions set in the Flood Risk Management Strategies in December 2015 and detailed in this Plan will be dependent on the availability of the necessary funding in each year of the six year Plan.

## **1.6 Strategic Environmental Assessment and Habitats Regulations Appraisal**

A Strategic Environmental Assessment (SEA) and Habitats Regulations Appraisal (HRA) have been undertaken for the Flood Risk Management Strategy document that has informed this Plan. As the Plan is based on the Flood Risk Management Strategy, no further SEA assessment has been undertaken. In order to confirm this was appropriate the City of Edinburgh Council submitted an SEA screening report via SEA Gateway. Screening responses received via SEA Gateway confirmed that the Plan is consistent with the Flood Risk Management Strategy and therefore no further assessment is required at this time. Project level impact assessments will be undertaken where required by planning and environmental regulations.

The City of Edinburgh Council as lead local authority and competent authority, also undertook a Habitats Regulations Appraisal to ensure that the Plan will not adversely affect the integrity of Special Areas of Conservation and Special Protection Areas. Scottish Natural Heritage was consulted on the appraisal and their views have been taken into account. Mitigation has been applied where required to ensure that the Plan will not adversely affect the integrity of Special Areas of Conservation and Special Protection Areas. For further detail please see [Annex 9](#).

## **1.7 Links with other plans, policies, strategies and legislative requirements**

The Plan does not stand in isolation. As far as is practicable, an integrated approach to land and water management has been pursued. When developing Flood Risk



Management Strategy and the Plan, early links were made with other relevant aspects of water and land management including local development plans, river basin management plans and emergency plans. In turn, the responsible authorities will work proactively to ensure the findings from these Flood Risk Management Plans and Strategies will influence other planning initiatives in an interactive and iterative cycle. Making these links has helped identify opportunities to deliver multiple benefits from flood risk management goals, objectives and actions. Further information about other plans and policies are provided in [Annex 4](#).

### **1.7.1 River basin management planning**

Reducing flood risk in Scotland through the development of Flood Risk Management Strategies has provided an opportunity to connect with plans to improve the quality of Scotland's water environment. For example, coordination between river basin management and flood risk management can reduce flood risk, whilst improving water quality and biodiversity.

SEPA is coordinating the delivery of River Basin Management Plans and Flood Risk Management Strategies, working to ensure that there is integration and coordination between them. This coordination, particularly in regard to consultation and engagement but also in delivering environmental improvements, will be important for stakeholders many of whom have an interest in both the plans and strategies.

### **1.7.2 Scottish Water Business Plan 2015 – 2021**

Scottish Water's investment programme is set out in its business plan 2015-2021, which can be found on its website (<https://www.scottishwater.co.uk/about-us/publications/strategic-projections>).

Scottish Water's customers have told them that reducing internal property flooding from sewers is a high priority and this is reflected in Scottish Water's Business Plan commitments for the period 2015-2021. Addressing sewer flooding is of the highest importance to Scottish Water, as highlighted by its customers who have helped shape the investment plans for 2015-2021.

In recognition of this high priority, within the period 2015-2021, Scottish Water will invest c£115m to improve the hydraulic capability of the sewer network so that it can remove all customers from the high risk internal sewer flooding register (greater than 10% chance of flooding per annum) as quickly as possible, typically within four years of their problem being confirmed. However Scottish Water has made a commitment to those customers on the register on 31 March 2015 that they will no longer be on the register by 31 March 2021.

Scottish Water customers have also highlighted external flooding is important. As a result, between 2015-2021, it is investing c£40m to develop and to begin to

implement solutions to reduce the flood risk for 400 high priority external sewer flooding areas suffering from frequent repeat flooding events.

As a responsible authority under the Flood Risk Management (Scotland) Act 2009, Scottish Water is also working collaboratively with third parties such as SEPA and local authorities through the flood risk management planning process which will assess the risk of flooding into the future.

As part of that work, Scottish Water has allocated investment to undertake further modelling and assessment in sewer catchments within Potentially Vulnerable Areas to improve knowledge and understanding of flood risk from the sewers in these areas, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009. Scottish Water is also working in partnership with SEPA and local authorities, to lead on the production of Integrated Catchment Studies across key catchments. Work carried out under these Flood Risk Management (Scotland) Act 2009 duties will continue to inform future investment requirements for Scottish Water.

### **1.7.3 *Integrated Catchment Studies***

Integrated Catchment Studies (ICS) are led by Scottish Water in partnership with local authorities and SEPA. These studies will improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. with the sewer network, watercourses and (where appropriate) the sea. This will improve the understanding of contributions these drainage networks play in local surface water flood risk.

Two Integrated Catchment Studies were undertaken in the Forth Estuary Local Plan District in investment period covering 2010-2015; these were in Falkirk and Edinburgh and the Lothians. These studies are moving towards solution development in investment period 2015-2021, this will identify the actions to reduce flood risk across the catchments with outputs feeding directly into the local authority led surface water management planning process.

There are five studies being carried out in investment period 2015-2021 in the Forth Estuary Local Plan District. These are: Bathgate, Linlithgow, Dunnswood, Dunfermline and Iron Mill Bay and Levenmouth. These studies will go through a scoping and modelling phase and will culminate in defining the sources and mechanisms of flooding in the catchments along with an understanding of the impacts of that flooding. Solution Development will then be undertaken which will help inform potential actions to reduce flood risk across the catchments. The outputs will also feed in to the local authority led surface water management planning process.

Further information about Integrated Catchment Studies can be found in [Annex 4](#).

#### **1.7.4 Surface water management planning**

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. Surface water flooding is widespread in the Forth Estuary Local Plan District. Surface water management planning is therefore a key component of the flood risk assessment that has led to the development of this Plan. There are 17 priority areas to be investigated for surface water management planning in Local Plan District Number 10 (Forth Estuary).

Each local authority will consider surface water planning for their area and plans will be prepared. The exact format and detail of these plans is not known at present. Local knowledge with input from Scottish Water will help local authorities in deciding upon the format of the plans and level of detail to be presented. Careful consideration will be given to establish the extent of each Surface Water Management Plan (SWMP) dependent upon the findings once this information has been collated. In some instances a single Surface Water Management Plan covering an entire local authority may be appropriate but where issues are more complex a number of separate plans may be required. Indeed it may be necessary for more than one local authority to contribute to a Surface Water Management Plan where issues cross electoral boundaries.

North Lanarkshire Council will be starting work on a Surface Water Management Plan for Cumbernauld (East) in the first cycle (2016-2022) of the Local Flood Risk Management Plan. This will be supported by an Integrated Catchment Study led by Scottish Water working in partnership with North Lanarkshire Council that will also be undertaken in the first cycle.

Perth and Kinross Council have completed surface water investigations for Milnathort which will culminate in the implementation of a surface water flood protection scheme.

West Lothian Council's surface water management plan was prepared on behalf of the West Lothian Council by independent consultants, Mott MacDonald, in liaison with and managed by officers from the Flood Risk Management team. Works have been identified in the Surface Water Management Plan but no timescale can be set for these works until a funding process is agreed. It is likely these works will be implemented in a later planning cycle.

Further information about surface water management planning can be found in [Annex 4](#).

## **1.8 Next steps and monitoring progress**

The Plan runs from June 2016 until June 2022. Over this period the Forth Estuary local partnership will continue to meet periodically to monitor progress towards implementing the actions detailed in [Annex 1](#) of the Plan.

Between June 2018 and 2019, the lead authority will publish an interim report on the progress towards implementing the actions identified in the Plan. The mid-term report will be made publically available.

Between June 2021 and 2022, the lead authority will publish a final report on the progress towards implementing the actions contained in the Plan. The final report will be made publically available.

Throughout Scotland, the second cycle of Flood Risk Management Strategies and Local Flood Risk Management Plans will be published in December 2021 and June 2022 respectively to cover the next planning cycle from 2022-2028.

## **1.9 Licensing acknowledgements**

Full licensing acknowledgements can be found in [Annex 7](#) of this Plan.



## **Chapter 2: Managing Flood Risk in the Forth Estuary Local Plan District**

This Plan is a technical document and whilst every effort has been made to present information in an easy to understand way, some terms require further explanation. A full glossary of terms has been provided in [Annex 8](#).

Section 2.1 presents an understanding of flooding in the Forth Estuary Local Plan District.

Section 2.2 presents the objectives and actions for flood risk management to be achieved across the Local Plan District.

Section 2.3 introduces Potentially Vulnerable Area datasheets which can be seen in their entirety in [Annex 1](#). As detailed in section 1.1.1 Potentially Vulnerable Areas are catchments identified as being at risk of flooding and where the impact of flooding is sufficient to justify further assessment and appraisal. Section 2.3 provides a high level summary of actions to manage flooding in each Potentially Vulnerable Area. Furthermore, this section indicates which local authority area is within a particular Potentially Vulnerable Area, to provide a clear picture of flood risk management at a localised level. Potentially Vulnerable Area datasheets in Annex 1 summarise the risk and history of flooding in the area as well as providing fully detailed actions, to manage flooding that have been prioritised for delivery between 2016 and 2022. Implementation information for each action is also included.

Section 2.4 describes other flood risk activities undertaken by local authorities in the Forth Estuary Local Plan District so as to provide as full a picture as possible of how flood risk is managed.

### **2.1 Understanding of flooding within the Forth Estuary Local Plan District**

This chapter provides an overview of flooding and flood risk in the Forth Estuary Local Plan District. The information included has been adapted and extracted from the Forth Estuary Flood Risk Management Strategy<sup>3</sup>. This chapter summarises the characteristics and impacts of flooding from river, coastal and surface water sources on the Forth Estuary Local Plan District and how flooding from these mechanisms are to be managed. Flooding from other sources is described in more detail in the Forth Estuary Flood Risk Management Strategy. The agreed goals or objectives to be achieved Forth Estuary wide are clearly set out. Most importantly, the actions that will deliver progress against these Forth Estuary wide goals over the first six-year planning cycle from 2016 and 2022 are described, including when they will be implemented, which organisation is responsible, and how they are to be funded.

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<sup>3</sup> Forth Estuary Flood Risk Management Strategy, SEPA (December 2015). Found at (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>).

The Forth Estuary Local Plan District covers an area of 3,256km<sup>2</sup> with a population of approximately 1.4 million. It contains 13 local authorities, 27 Potentially Vulnerable Areas and 2 candidate Potentially Vulnerable Areas. The extent of the Forth Estuary Local Plan District and the location of the Potentially Vulnerable Areas are shown in Figure 2. It includes the urban areas of Edinburgh, Livingston, Cumbernauld, Falkirk, Dunfermline, Kirkcaldy and Glenrothes.

The main river catchments include the River Leven, River Carron, River Avon, River Almond, Water of Leith, River Esk, River Tyne and the Eye Water. The largest lochs / reservoirs include the Carron Valley and Loch Coulter reservoirs that are in the River Carron catchment. Other lochs/ reservoirs include Loch Leven in the River Leven catchment, Cobbinshaw Reservoir in the River Almond catchment, and Harperrig, Threipmuir and Harlaw Reservoirs in the Water of Leith catchment.

The Forth Estuary Local Plan District includes part of the central belt that is heavily urbanised. Rural areas are located to the north of the Firth of Forth, in East Lothian and along the Berwickshire coast in the Scottish Borders. Across the area the main types of land cover include heather and grassland (37%), arable and horticultural land (35%), and coniferous and broadleaved woodland (13%). Urban areas represent approximately 10% of total land cover.

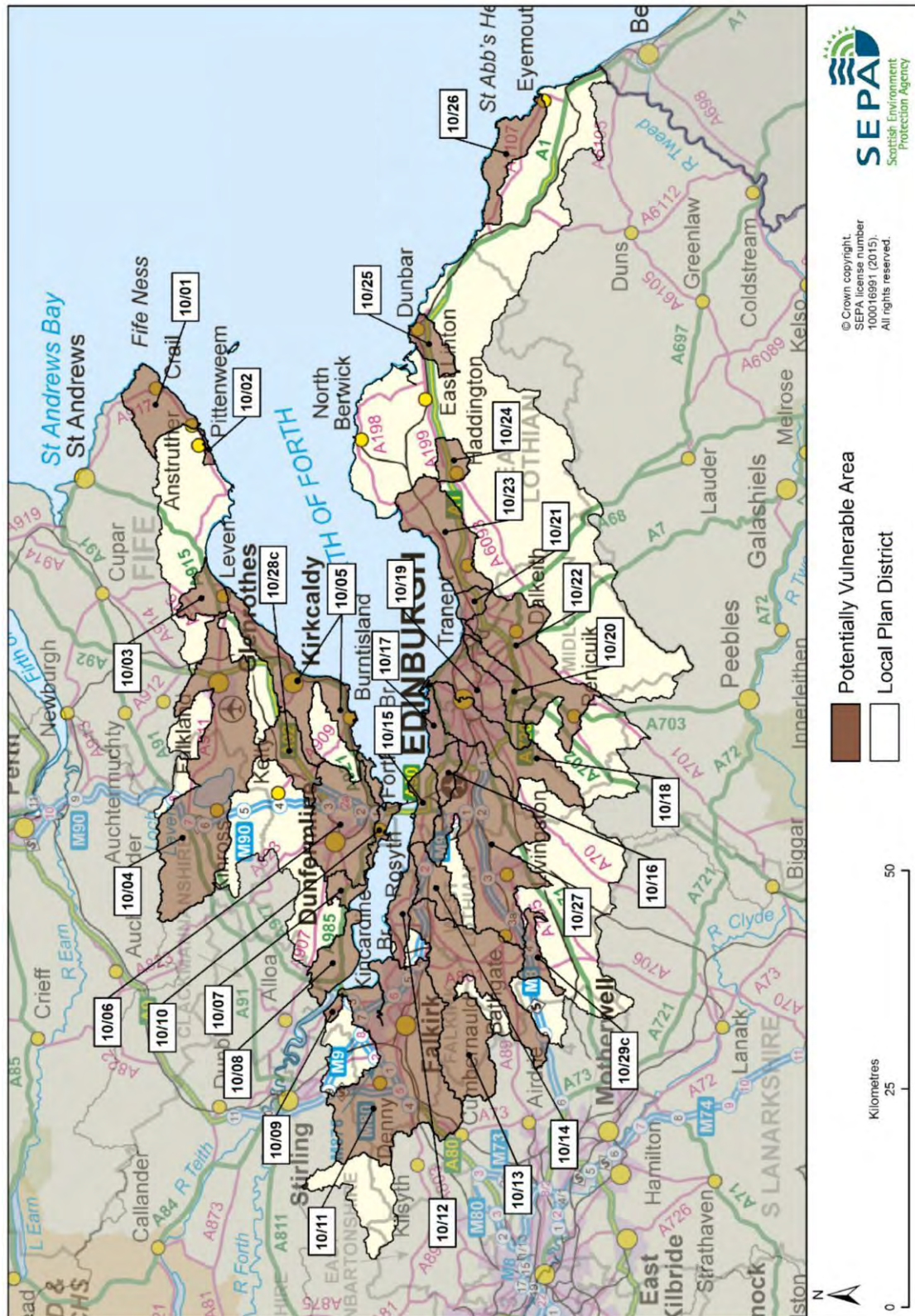
The Local Plan District has 375km of coastline that includes the Firth of Forth and the Berwickshire coast. The Firth of Forth is the largest estuary on the east coast of Scotland. It extends 95km from Stirling in the west, where the River Forth flows into the estuary, to Fife Ness in the east where it meets the North Sea.

River, coastal and surface water maps were developed by SEPA using a consistent methodology to produce outputs for the whole of Scotland. This was supplemented with more detailed, local assessments where available and suitable for use. In developing the flood maps, SEPA have:

- Used the most up to date modelling techniques;
- Used industry endorsed methods;
- Been able to show more information than ever before on the sources and impacts of flooding; and
- Developed the first national natural flood management maps showing the areas where natural techniques to help reduce flood could be most effective

In developing the maps, SEPA worked in partnership with local authorities. They also worked with the industry to define the overall approach to flood hazard mapping and undertook a series of internal checks and local authority reviews of outputs. Further information on flood hazards and risks, including mapping, can be found at <http://map.sepa.org.uk/floodmap/map.htm>

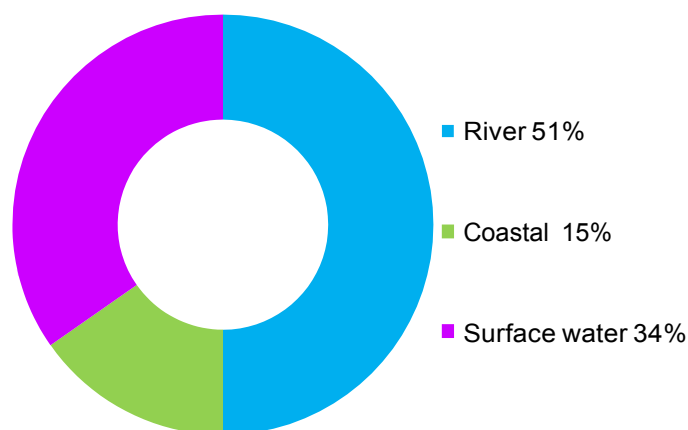
**Figure 2: The Forth Estuary Local Plan District catchment group.** *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*



### 2.1.1 Flood risk in the Forth Estuary

There are approximately 14,000 residential and 3,800 non-residential properties at risk to flooding within the Local Plan District<sup>4</sup>. This equates to approximately 16% of all properties at risk to flooding nationally. Within the Local Plan District, approximately 2% of all residential and 6% of all non-residential properties are at risk and it is estimated that 95% of these properties are located within Potentially Vulnerable Areas or candidate Potentially Vulnerable Areas. The Annual Average Damages from flooding (see glossary) are approximately £36 million.

River flooding is the main source of flood risk, followed by surface water flooding. The Annual Average Damages caused by river flooding are £18 million, those caused by surface water flooding are £12 million and those caused by coastal flooding are £5.5 million (Figure 3).



**Figure 3: Annual Average Damages by flood source.**<sup>5</sup> *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

Table 1 and Figure 4 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 were not assessed, as information on damages at this scale is not available. Further details of flood risk from distinct sources (river, coastal and surface water) can be found in Section 3 of the SEPA Forth Estuary Flood Risk Management Strategy<sup>3</sup>.

<sup>4</sup> Forth Estuary Flood Risk Management Strategy, SEPA (December 2015). Found at (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>).

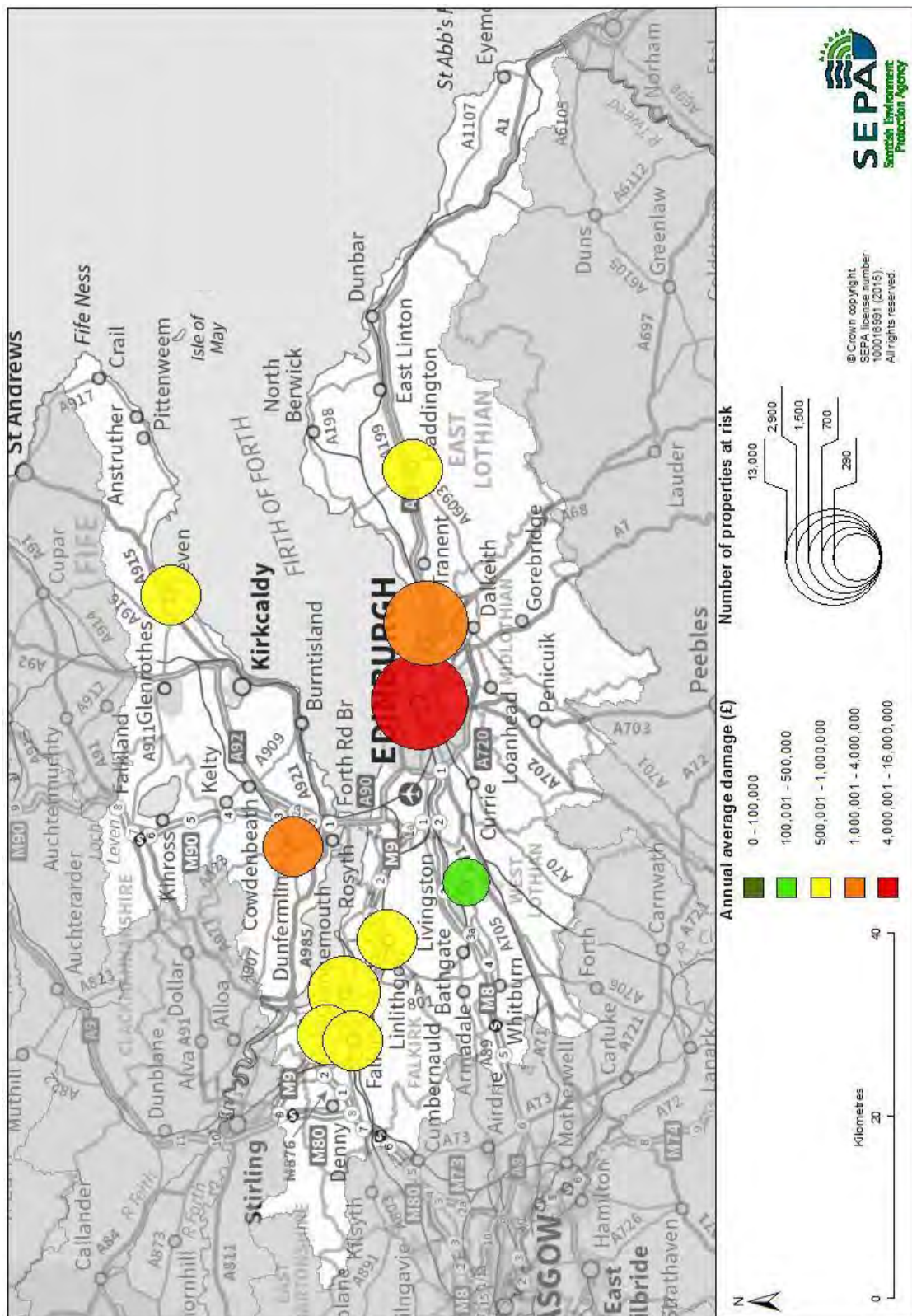
<sup>5</sup> Figure 3 illustrates the spread of annual average damages across the Forth Estuary Local Plan District.



**Table 1: Main areas at risk to flooding.** *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

<b>Location</b>	<b>Residential and non-residential properties at risk to flooding</b>	<b>Annual Average Damages</b>
<b>Edinburgh</b>	6,600	£8.5 million
<b>Musselburgh</b>	1,800	£3.8 million
<b>Grangemouth</b>	810	£940,000
<b>Carron-Carronshore-Bainsford</b>	640	£930,000
<b>Dunfermline</b>	420	£1.2 million
<b>Haddington</b>	370	£700,000
<b>Linlithgow</b>	330	£860,000
<b>Leven-Methil</b>	300	£850,000
<b>Falkirk</b>	300	£400,000
<b>Livingston</b>	290	£380,000

**Figure 4: The Forth Estuary Local Plan District showing areas with most properties at risk to flooding and associated damages. Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).**



## 2.2 Objectives and Actions in the Forth Estuary Local Plan District

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

Table 2 provides a high level summary of actions to manage flood risk over the six year plan period across the Local Plan District and within local authority boundaries within the Local Plan District. 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. Table 3 summarises these generic actions and includes further information about responsibility, timetable, funding arrangements and coordination requirements for the whole of Forth Estuary Local Plan District.

The focus of this Plan is to manage flood risk in Potentially Vulnerable Areas where specific actions apply in addition to the generic actions listed below (Table 3). As detailed in section 1.1.1 Potentially Vulnerable Areas are catchments identified as being at risk of flooding and where the impact of flooding is sufficient to justify further assessment and appraisal. Potentially Vulnerable Area datasheets for the Forth Estuary Local Plan District have been compiled in [Annex 1](#) of this report. These datasheets summarise information from the Flood Risk Management Strategy including background to the area, summary of flooding impacts, the history of flooding and objectives to manage flooding in the Potentially Vulnerable Area. The core focus of the Potentially Vulnerable Area datasheets is to provide information on the actions to manage flood risk over the six year plan period in the area. This has been provided in a number of tables which identify who will be responsible for the delivery and implementation of the actions, along with a timetable of when the actions will be undertaken and the funding arrangements. Furthermore for flood protection schemes, the ranking of the scheme at a national, local authority and Local Plan District level is identified as well as the costs and benefits of the scheme.

For completeness, each Potentially Vulnerable Area includes details on both the generic actions to manage flooding Local Plan District wide as applicable to the specific Potentially Vulnerable Area and detail on specific actions to manage flooding in the Potentially Vulnerable Area.

**Table 2: Summary of Actions to be implemented Local Plan District (LPD) wide**

Area	Actions						
	NFM <sup>6</sup> study	NFM <sup>6</sup> works	Flood Protection Study	Flood Protection scheme/ works <sup>7</sup>	SWMP <sup>8</sup>	ICS <sup>9</sup>	New flood warning <sup>10</sup>
<b>LPD10</b>	<b>3</b>	<b>0</b>	<b>26</b>	<b>10</b>	<b>17</b>	<b>7</b>	<b>3</b>
The City of Edinburgh Council	0	0	2	2	TBC <sup>11</sup>	0	0
Clackmannanshire Council*	0	0	0	0	TBC	0	0
East Dunbartonshire Council*	0	0	0	0	TBC	0	0
East Lothian Council	1 <sup>12</sup>	0	3	2	TBC	0	0
Falkirk Council*	0	0	5	1	TBC	0	0
Fife Council*	1	0	10	0	TBC	0	0
Midlothian Council	0	0	1	0	TBC	0	0
North Lanarkshire Council*	0	0	0	0	TBC	0	0
Perth & Kinross Council*	0	0	0	2	TBC	0	0
Scottish Borders Council *	0	0	1	0	TBC	0	0
South Lanarkshire Council*	0	0	0	0	TBC	0	0
Stirling Council*	0	0	0	0	TBC	0	0
West Lothian Council	1	0	4	3	TBC	0	0
Scottish Water*	0	0	0	0	0	7	0
SEPA*	0	0	0	0	0	0	3

\* Councils and responsible authorities may have other actions in other LPDs.

<sup>6</sup> Natural Flood Management

<sup>7</sup> Includes proposed flood protection schemes and surface water management works.

<sup>8</sup> SWMP denotes Surface Water Management Plan. Includes surface water management priority areas as identified in the FRM Strategy. It should be noted that surface water management works are currently not prioritised. Please note that information on the number of SWMPs that will be produced by each local authority is currently not available.

<sup>9</sup> ICS denotes Integrated Catchment Studies.

<sup>10</sup> Two flood warning schemes extend beyond the boundary of the Forth Estuary Local Plan District.

<sup>11</sup> TBC denotes To Be Confirmed

<sup>12</sup> This NFM is listed in 2 Potentially Vulnerable Areas

**Table 3: Summary of Actions to be implemented Local Plan District wide**

Selected Action	Brief Description	Delivery Lead	Delivery Period	Coordination Arrangement	Funding Arrangement
<p><b>Flood Forecasting</b> <b>100990009</b></p>	<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 (refer to Glossary in <a href="#">Annex 8</a> for definition). The flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>SEPA</p>	<p>Ongoing</p>	<p>SEPA / Met Office joint initiative. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.</p>	<p>SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.</p>
<p><b>Self Help</b> <b>100990011</b></p>	<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 the Resilient Communities Initiative, and ensuring that properties and businesses are insured against flood damage.</p>	<p>N/A</p>	<p>Ongoing</p>	<p>In the event of severe issues local authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans and providing information on property level protection.</p>	<p>This will be funded by the property owner.</p>



Selected Action	Brief Description	Delivery Lead	Delivery Period	Coordination Arrangement	Funding Arrangement
<b>Maintenance 100990007</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 risk based inspection, maintenance 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>Local authority, asset/ land managers</p>	<p>Ongoing</p>	<p>The local authorities will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The local authorities will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.</p>	<p>The relevant local authority will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its capital or operational expenditure</p>
<b>Emergency Response 100990014</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</p>	<p>Category 1 &amp; 2 Responder</p>	<p>Ongoing</p>	<p>Local authorities, the Emergency Services and SEPA initiate the relevant Emergency plan /Response as appropriate in relation to flood forecasting and flood</p>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases</p>

Selected Action	Brief Description	Delivery Lead	Delivery Period	Coordination Arrangement	Funding Arrangement
	<p>Responders. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.</p>			<p>warning information. This triggers a coordinated approach from Category 1 and Category 2 responders that may include voluntary groups.</p>	<p>Scottish Government may reimburse responders after an extreme event. Where required, local authority responsibilities for emergency response are largely funded by the relevant local authority's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its capital or operational expenditure.</p>

Selected Action	Brief Description	Delivery Lead	Delivery Period	Coordination Arrangement	Funding Arrangement
<p><b>Planning Policies 100010001</b></p>	<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 <a href="#">Annex 5</a>. SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect.</p>	<p>Planning Authority</p>	<p>Ongoing</p>	<p>The local authorities' Flooding Teams work closely with their Planning colleagues to ensure that appropriate policies and actions are put in place to reduce flood risk. SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>	<p>The responsible authorities land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its capital or operational expenditure.</p>

Selected Action	Brief Description	Delivery Lead	Delivery Period	Coordination Arrangement	Funding Arrangement
	<p>to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website at:  <a href="http://www.sepa.org.uk/environment/land/planning/">http://www.sepa.org.uk/environment/land/planning/</a>            Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred to by a local authority. More general information and flooding guidance will be available on the website at:  <a href="https://www.scottishwater.co.uk/you-and-your-home/your-home/flooding-information">https://www.scottishwater.co.uk/you-and-your-home/your-home/flooding-information</a></p>				
<p><b>Awareness Raising</b>  <b>100990013</b></p>	<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. From 2016 SEPA will undertake flood risk education and awareness raising activities. Across Scotland, SEPA will create and share communication and education</p>	<p>SEPA,            Scottish Water and            Local authority</p>	<p>Ongoing</p>	<p>Awareness raising will be coordinated through Local Plan District partnerships between responsible authorities, SEPA, Scottish Water, local authorities and community flood action groups. Local authorities</p>	<p>SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authorities.</p>

Selected Action	Brief Description	Delivery Lead	Delivery Period	Coordination Arrangement	Funding Arrangement
	<p>resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the website at: <a href="https://www.scottishwater.co.uk/you-and-your-home/your-home/flooding-information">https://www.scottishwater.co.uk/you-and-your-home/your-home/flooding-information</a></p>			<p>will raise awareness when developing discrete proposals.</p>	<p>Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its capital or operational expenditure.</p>

### 2.3 Flood risk, objectives, actions and prioritisation for the Forth Estuary Potentially Vulnerable Areas

The table below summarises the actions to manage flood risk in the 27 Potentially Vulnerable Areas and 2 candidate Potentially Vulnerable Areas of this Local Plan District. [Annex 1](#) provides further detail for each of the Potentially Vulnerable Areas listed. A hyperlink is provided for digital readers, please click on the Potentially Vulnerable Area reference e.g. 10/01 below. Table 4 summarises the actions to be carried out in the Forth Estuary Local Plan District during Planning Cycle 1 (2016-2022). It should be noted that some actions not included in this plan will be carried into Planning Cycle 2 (2022- 2028).

**Table 4: Summary of Potentially Vulnerable Actions (PVAs)**

PVA	Location	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
<a href="#">10/01</a>	Crail							✓	N/A	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/02</a>	Pittenweem							✓	N/A	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/03</a>	Leven			✓	✓		✓	✓	N/A	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/04</a>	Kinross, Milnathort, Glenrothes and Kinglassie	✓		✓	✓		✓	✓	✓	N/A	✓		✓	✓	✓	✓		✓	✓
<a href="#">10/05</a>	Kirkcaldy, East Wemyss and Methil	✓			✓		✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/06</a>	Inverkeithing, Rosyth, Dunfermline and Wellwood				✓		✓	✓	✓	N/A	✓			✓	✓	✓		✓	✓
<a href="#">10/07</a>	Cairneyhill				✓	✓	✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/08</a>	Hawkhill, Kincardine, Kennet Pans and Culross	✓			✓			✓	✓	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/09</a>	Airth			✓	✓			✓	N/A	N/A	✓			✓	✓	✓		✓	✓
<a href="#">10/10</a>	North Queensferry and Inverkeithing						✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/11</a>	Falkirk, Grangemouth, Lauriston, Denny, Redding, Dunipace, Cumbernauld, Carron and Stenhousemuir	✓		✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓
<a href="#">10/12</a>	Bo'ness						✓	✓	✓	✓	✓			✓	✓	✓		✓	✓



PVA	Location	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
<a href="#">10/13</a>	Linlithgow Bridge, Bathgate, Whiteside and Slamannan				✓	✓	✓	✓	✓	N/A	✓			✓	✓	✓		✓	✓
<a href="#">10/14</a>	Philipstoun							✓	N/A	N/A	✓			✓	✓	✓		✓	✓
<a href="#">10/15</a>	South Queensferry							✓	N/A	N/A	✓			✓	✓	✓		✓	✓
<a href="#">10/16</a>	Cramond Bridge						✓	✓	N/A	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/17</a>	Granton				✓		✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/18</a>	Water of Leith catchment	✓					✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/19</a>	Braid Burn catchment						✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
<a href="#">10/20</a>	Niddrie and Burdiehouse Burn catchment				✓		✓	✓	✓	N/A	✓			✓	✓	✓		✓	✓
<a href="#">10/21</a>	Musselburgh	✓				✓	✓	✓	N/A	✓	✓		✓	✓	✓	✓		✓	✓
<a href="#">10/22</a>	Lasswade, Penicuik, Dalkeith and Musselburgh	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓
<a href="#">10/23</a>	Cockenzie and Port Seton, Longniddry and Prestonpans				✓			✓	✓	✓	✓		✓	✓	✓	✓		✓	✓
<a href="#">10/24</a>	Haddington	✓					✓	N/A	✓	✓	✓		✓	✓	✓	✓		✓	✓
<a href="#">10/25</a>	Dunbar and West Barns				✓			✓	N/A	✓	✓		✓	✓	✓	✓		✓	✓
<a href="#">10/26</a>	Berwickshire Coast				✓			✓	N/A	✓	✓		✓	✓	✓	✓		✓	✓
<a href="#">10/27</a>	South Gyle, Broxburn and Bathgate	✓					✓	✓	✓	N/A	✓		✓	✓	✓	✓	✓	✓	✓
<a href="#">10/28c</a>	Cowdenbeath			✓	✓		✓		N/A	N/A	✓			✓	✓	✓		✓	✓
<a href="#">10/29c</a>	Whitburn				✓				N/A	N/A	✓			✓	✓	✓		✓	✓

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

## 2.4 Other flood risk activities by local authorities in the Forth Estuary Local Plan District

The Plan presents the actions to manage flood risk in the Forth Estuary Local Plan District. These actions are at a Local Plan District wide scale or are targeted at specific Potentially Vulnerable Area's. In addition to the actions in this Plan, responsible authorities are undertaking other activities to manage flood risk as

included in the Flood Risk Management (Scotland) Act 2009. These main activities, which have a significant effect on reducing flood risk should be considered in conjunction with the Plan and are summarised as follows:

#### **2.4.1 Section 18 & 59: Works of Clearance and Repair**

Based on an assessment of the condition of a body of water, local authorities must prepare a schedule of clearance and repair works that would substantially reduce the risk to flooding of land. This is commonly referred to as a Schedule 18, which is made available by each local authority within the Local Plan District for public inspection. Under s.59 of the Act, the local authority must carry out the works in the Schedule 18 if it considers that this will contribute to (but not affect) the implementation of actions in the Plan. Details of how to access Schedule 18s for each local authority in the Local Plan District are included in [Annex 4 Section 2](#) of the Plan.

#### **2.4.2 Section 56: General Power to manage flood risk**

Section 56 of Flood Risk Management (Scotland) Act 2009<sup>13</sup> states that the Local Authorities general power to manage flood risk is as follows:

1. A local authority may do anything which it considers—
  - a. will contribute to the implementation of current actions described in any relevant Local Flood Risk Management Plan,
  - b. is necessary to reduce the risk of a flood in its area which is likely to
    - i. occur imminently, and
    - ii. have serious adverse consequences for human health, the environment, cultural heritage or economic activity, or
  - c. will otherwise manage flood risk in its area without affecting the implementation of the actions in any relevant Local Flood Risk Management Plan,
2. Without contradicting the general powers outlined above a local authority may in particular—
  - a. carry out any operations as part of a flood protection scheme,
  - b. carry out any other flood protection work,
  - c. carry out any temporary works required for the purposes of a flood protection scheme or any other flood protection work,
  - d. enter into agreements or arrangements with any other person—
    - i. for the carrying out by that person or by the authority of any work which could be done by the authority under this Part, or
    - ii. relating to the management by that person of land in a way which can assist in the retention of flood water or slowing the flow of such water,

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<sup>13</sup> Flood Risk Management (Scotland) Act 2009, Scottish Government, (2009). Found at (<http://www.legislation.gov.uk/>)

- e. make contributions towards expenditure incurred by any other person doing something which could be done by the authority under this Part,
- f. make payments to any other person in compensation for income lost as a result of entering into agreements or arrangements for the management of land by that person in a way which can assist in the retention of flood water or slowing the flow of such water,
- g. receive from any other person contributions towards expenditure incurred by the authority in exercising any of its functions under this Part.

### **Chapter 3: The Way Forward**

All of the responsible authorities will work in collaboration in an attempt to achieve these goals which have been set out. The responsible authorities will continue to liaise with members of the Local Advisory Group (LAG) for the Forth Estuary. This Plan will be closely monitored and reviewed by the Lead Authority, who will publish a progress report not earlier than two years and not later than three years after this Plan is finalised. Towards the end of this six year cycle a lessons learned exercise will be undertaken to help inform the Plan which will be prepared for the next cycle. It is anticipated that many of the studies to be undertaken will help to inform future actions.

## Annexes

**[Annex 1:](#) Potentially Vulnerable Areas Datasheets**

**[Annex 2:](#) Local Plan District roles & responsibilities**

**[Annex 3:](#) Consultation and engagement**

**[Annex 4:](#) Links to other plans, policies, strategies and legislative requirements**

**[Annex 5:](#) Land use planning**

**[Annex 6:](#) Supporting Information**

**[Annex 7:](#) Acknowledgements**

**[Annex 8:](#) Glossary**

**[Annex 9:](#) Habitats Regulation Appraisal**

**[Annex 10:](#) Contact details of Forth Estuary Local Plan District Partners**

## Annex 1: Potentially Vulnerable Areas

This Plan is a technical document and whilst every effort has been made to present information in an easy to understand way, some terms require further explanation. A full glossary of terms has been provided in [Annex 8](#).

This section provides further detail for each of the 27 Potentially Vulnerable Areas and 2 candidate Potentially Vulnerable Areas listed in Table 5 below. As detailed in Section 1.1.1 of the Plan, Potentially Vulnerable Areas are catchments identified as being at risk to flooding and where the impact of flooding is sufficient to justify further assessment and appraisal. 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, described and provide a high level implementation plan for the action in terms of coordination arrangements, funding arrangements, delivery lead and delivery period. A hyperlink is provided for digital readers, please click on the location name below.

**Table 5: Summary of Potentially Vulnerable Areas (PVAs) for Forth Estuary Local Plan District**

PVA	Location	Local Authority Area	Page number
10/01	<a href="#">Crail</a>	Fife Council	33
10/02	<a href="#">Pittenweem</a>	Fife Council	44
10/03	<a href="#">Leven</a>	Fife Council	55
10/04	<a href="#">Kinross, Milnathort, Glenrothes and Kinglassie</a>	Fife Council and Perth & Kinross Council	72
10/05	<a href="#">Kirkcaldy, East Wemyss and Methil</a>	Fife Council	97
10/06	<a href="#">Inverkeithing, Rosyth, Dunfermline and Wellwood</a>	Fife Council	117
10/07	<a href="#">Cairneyhill</a>	Fife Council	136
10/08	<a href="#">Hawkhill, Kincardine, Kennet Pans and Culross</a>	Fife Council and Clackmannanshire Council	153
10/09	<a href="#">Airth</a>	Falkirk Council	172
10/10	<a href="#">North Queensferry and Inverkeithing</a>	Fife Council	187
10/11	<a href="#">Falkirk, Grangemouth, Lauriston, Denny, Redding, Dunipace, Cumbernauld, Carron and Stenhousemuir</a>	Falkirk Council, North Lanarkshire Council and Stirling Council	203
10/12	<a href="#">Bo'ness</a>	Falkirk Council and West Lothian Council	233
10/13	<a href="#">Linlithgow Bridge, Bathgate, Whiteside and Slamannan</a>	Falkirk Council, North Lanarkshire Council and West Lothian Council	249
10/14	<a href="#">Philipstoun</a>	Falkirk Council and	276



PVA	Location	Local Authority Area	Page number
		West Lothian Council	
10/15	<a href="#">South Queensferry</a>	City of Edinburgh Council and West Lothian	288
10/16	<a href="#">Cramond Bridge</a>	City of Edinburgh Council	300
10/17	<a href="#">Granton</a>	City of Edinburgh Council	314
10/18	<a href="#">Water of Leith catchment</a>	City of Edinburgh and Midlothian Council	331
10/19	<a href="#">Braid Burn catchment</a>	City of Edinburgh Council	354
10/20	<a href="#">Niddrie and Burdiehouse Burn catchment</a>	City of Edinburgh, East Lothian Council and Midlothian Council	371
10/21	<a href="#">Musselburgh</a>	City of Edinburgh Council, East Lothian Council and Midlothian Council	387
10/22	<a href="#">Lasswade, Penicuik, Dalkeith and Musselburgh</a>	City of Edinburgh, East Lothian Council and Midlothian Council	407
10/23	<a href="#">Cockenzie and Port Seton, Longniddry and Prestonpans</a>	East Lothian Council	430
10/24	<a href="#">Haddington</a>	East Lothian Council	449
10/25	<a href="#">Dunbar and West Barns</a>	East Lothian Council	463
10/26	<a href="#">Berwickshire Coast</a>	Scottish Borders Council	478
10/27	<a href="#">South Gyle, Broxburn and Bathgate</a>	City of Edinburgh and West Lothian Council	493
10/28c	<a href="#">Cowdenbeath</a>	Fife Council	520
10/29c	<a href="#">Whitburn</a>	West Lothian Council	535

## Crail (Potentially Vulnerable Area 10/01)

Local Plan District	Local authority	Main catchment
Forth Estuary	Fife Council	South Fife coastal

### Background

This Potentially Vulnerable Area is 42km<sup>2</sup> and part of the Firth of Forth catchment (shown below). It is a small coastal area including the villages of Crail and Anstruther Easter.

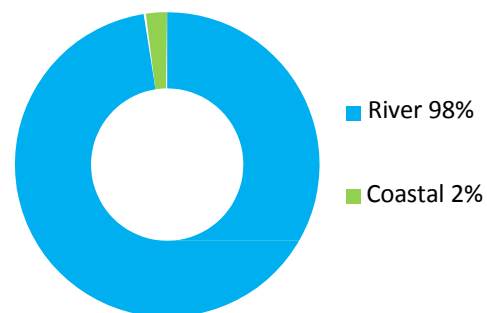
The main watercourse is the Crail Burn which flows through Crail and into the Firth of Forth.



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The area has a risk of river and coastal flooding. The majority of damages in this Potentially Vulnerable Area are caused by river flooding.

There are approximately 120 residential properties and 40 non-residential properties at risk of flooding. The Annual Average Damages are approximately £310,000.



**Figure 1:** Annual Average Damages by flood source. Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).

### Summary of flooding impacts

The greatest risk of flooding is to the village of Crail from the Crail Burn. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to non-residential properties.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Crail (Potentially Vulnerable Area 10/01).'

## History of flooding

One significant coastal flood has been recorded in this area. On 4 April 1958, flooding affected several areas along the Fife coastline including Anstruther. Homes and businesses were affected, cars washed away and civil infrastructure damaged.

## Objectives to manage flooding in Crail

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. The objectives below have been set for the Crail Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties and flood risk to community facilities in Crail caused by flooding from the Crail Burn (Objective ID: 10002);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID:10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.

## Actions to manage flooding in Crail

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. The shaded actions below have been selected as the most appropriate for the Crail 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 Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Maintain flood warning					
Awareness raising					
Emergency plans/response					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Anstruther Billowness 2017-2020. Crail 2016-2018.
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Anstruther Billowness and Crail sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Anstruther to Elie flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	SEPA will work with the local authority during verification of existing flood warning system as required
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.



<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plan/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	Fife Council will work with the public to support community resilience. This will be done by developing and reviewing emergency plans, facilitating community plans and, providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner. In the event of severe issues this is to be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 undertake flood risk education and awareness raising activities. In addition, SEPA will engage with Fife Council and community resilience groups where possible. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>Fife Council will raise awareness when developing discrete proposals. Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will share good practice, provide information on property level protection and develop and review emergency plans. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Fife Council will fund awareness raising activities from Council Revenue and Capital budgets.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and flood risk to community facilities in Crail caused by flooding from the Crail Burn (10002) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Fife Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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. Fife Council will continue to undertake culvert maintenance activities that reduce the risk of flooding to Crail from the Crail Burn.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning.
<b>Coordination Arrangement:</b>	This regular maintenance and inspection regime will be carried out by Fife Council Inspectors with clearance and repair works instructed as required. Fife Council will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Fife Council will fund maintenance and repair work from its revenue budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	<p>During severe flooding, Fife Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will maintain bodies of water as required within the council's schedule of clearance and repair. Fife Council will share good practice, provide information on property level protection and develop and review emergency plans.</p>
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Fife Council's responsibilities for emergency response are largely funded by Fife Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>Fife Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies take account of the objective to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.



## Pittenweem (Potentially Vulnerable Area 10/02)

Local Plan District	Local authority	Main catchment
Forth Estuary	Fife Council	South Fife coastal

### Background

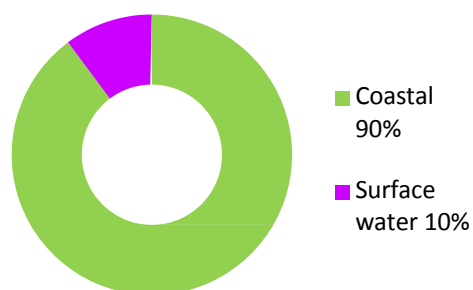
This Potentially Vulnerable Area is 3km<sup>2</sup> and part of the Forth Estuary coastal area (shown below). This is a small coastal area containing the villages of Anstruther Wester, Pittenweem and the majority of the seaside town of St Monans.



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The area has a risk of coastal and surface water flooding. The majority of damages in this Potentially Vulnerable Area are caused by coastal flooding.

There are fewer than 10 residential and non-residential properties at risk of flooding. The Annual Average Damages are approximately £17,000.



**Figure 1: Annual Average Damages by flood source.** Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).

### Summary of flooding impacts

Work carried out since the National Flood Risk Assessment in 2011 has concluded that the risk of flooding in this Potentially Vulnerable Area is now relatively low. The designation of this Potentially Vulnerable Area will be reviewed in the next flood risk management planning cycle.

For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to residential properties.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Pittenweem (Potentially Vulnerable Area 10/02)'

## History of flooding

One significant coastal flood has been recorded in this area. On 4 April 1958, flooding affected areas along the Fife coastline including Pittenweem and Shore Street in Anstruther. Homes and businesses were flooded, cars washed away and civil infrastructure damaged.

## Objectives to manage flooding in Pittenweem

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. The objectives below have been set for the Pittenweem Potentially Vulnerable Area.

- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID:10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.

## Actions to manage flooding in Pittenweem

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. The shaded actions below have been selected as the most appropriate for Pittenweem 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 Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Maintain flood warning					
Awareness raising					
Emergency plans/response					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	St Monans 2015-2018
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the St Monans sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Anstruther to Elie flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	SEPA will work with the local authority during verification of existing flood warning system as required
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.



<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	Fife Council will work with the public to support community resilience. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner. In the event of severe issues this is to be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 undertake flood risk education and awareness raising activities. In addition, SEPA will engage with Fife Council and community resilience groups where possible. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>Fife Council will raise awareness when developing discrete proposals. Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will share good practice, provide information on property level protection and develop and review emergency plans. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Fife Council will fund awareness raising activities from Council Council Revenue and Capital budgets.


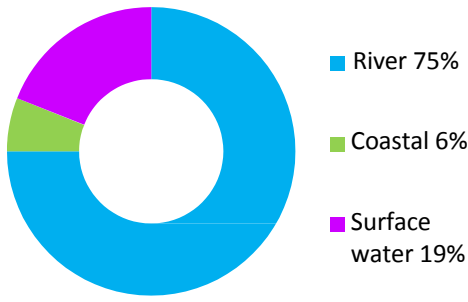
<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Fife Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Local authorities have a duty to assess watercourses and carry 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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning.
<b>Coordination Arrangement:</b>	This regular maintenance and inspection regime will be carried out by Fife Council Inspectors with clearance and repair works instructed as required. Fife Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. Fife Council will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Fife Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	<p>During severe flooding, Fife Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will maintain bodies of water as required within the council's schedule of clearance and repair. Fife Council will share good practice, provide information on property level protection and develop and review emergency plans.</p>
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Fife Council's responsibilities for emergency response are largely funded by Fife Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>Fife Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies take account of the objective to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Leven (Potentially Vulnerable Area 10/03)

Local Plan District	Local authority	Main catchment
Forth Estuary	Fife Council	River Leven (Fife)

Background									
<p>This Potentially Vulnerable Area is 22km<sup>2</sup> and part of the Firth of Forth catchment (shown below). This is a small coastal area containing the towns of Leven and Methil and villages of Kennoway and Lower Largo. The main watercourse is the River Leven. There is one other notable watercourse, the Scoonie Burn, which is situated to the north of Leven.</p>	<p>The area has a risk of river, surface water and coastal flooding. The majority of damages in this Potentially Vulnerable Area are caused by river flooding.</p> <p>There are approximately 180 residential properties and 90 non-residential properties at risk of flooding. The Annual Average Damages are approximately £820,000.</p>								
 <p style="font-size: small; margin-top: 10px;">© Crown copyright. SEPA licence number 100016991 (2015). All rights reserved. Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).</p>	 <table border="1" style="margin-top: 10px; font-size: x-small;"> <caption>Data for Figure 1: Annual Average Damages by flood source</caption> <thead> <tr> <th>Flood Source</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>River</td> <td>75%</td> </tr> <tr> <td>Surface water</td> <td>19%</td> </tr> <tr> <td>Coastal</td> <td>6%</td> </tr> </tbody> </table> <p><b>Figure 1: Annual Average Damages by flood source.</b> <i>Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).</i></p>	Flood Source	Percentage	River	75%	Surface water	19%	Coastal	6%
Flood Source	Percentage								
River	75%								
Surface water	19%								
Coastal	6%								

### Summary of flooding impacts

The highest risks of river flooding are from the River Leven and the Scoonie Burn to Methil and Leven. The highest risk of surface water flooding is in Leven.

For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to residential properties.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Leven (Potentially Vulnerable Area 10/03).'

## History of flooding

One significant flood has been recorded in this Potentially Vulnerable Area. This occurred on 6 February 2001 when widespread flooding problems were recorded across Fife after heavy snow falls over two days were followed by a thaw combined with prolonged rainfall. Problems were made worse by exceptionally high tides. High river levels on the River Leven caused drainage problems resulting in flooding in Leven including Shorehead, Riverside Road, Bridge Street and Leven Vale trading estate.

## Objectives to manage flooding in Leven Potentially Vulnerable Area

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. The objectives below have been set for the Leven Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties and risk to people in Leven caused by flooding from the River Leven and Scoonie Burn (Objective ID: 10006, 10007);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Leven and Eastern Methil where practical (Objective ID: 10004);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.



## Actions to manage flooding in Leven Potentially Vulnerable Area

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. The shaded actions below have been selected as the most appropriate for Leven Potentially Vulnerable Area.

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

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
			New flood warning		
Flood protection study					
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>NEW FLOOD WARNING (100990010)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Hydrometry developments are to begin in spring 2019. The new flood warning service is to be launched in May 2021.
<b>Status:</b>	Not started
<b>Description:</b>	The area under consideration includes properties affected by flooding in Fife and Perth and Kinross and is likely to include Leven. Further feasibility assessment will be required to assess delivery potential and the final detail of communities for which warnings can be provided will be determined during the scoping process.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Flood protection study, Self help.
<b>Coordination Arrangement:</b>	A flood protection study is proposed for Leven. SEPA will work with the local authority to ensure that new information about flood risk resulting from the proposed flood protection study is considered in developing the new flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement. In addition, Scottish Government provides grant funding to enable SEPA to implement new flood warning schemes.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100060005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Leven caused by flooding from the River Leven and Scoonie Burn (10006, 10007)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>38 of 168</b>	<b>6 of 16</b>	<b>6 of 26</b>
<b>Delivery Period:</b>	2016-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	<p>A flood protection study has been recommended for Leven to assess whether flood storage on Scoonie Burn, modification of conveyance, direct flood defences, sediment management and natural flood management could reduce flood risk.</p> <p>The study should also investigate the viability of property level protection.</p> <p>Natural flood management options that should be considered include river/ floodplain restoration and sediment management. The assessment should consider these actions in combination and the impacts on flood risk upstream and downstream of each action.</p>		
<b>Related Actions:</b>	New flood warning, Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Fife Council will arrange a study with a Consultant to establish fluvial flood risk and identify potential options to mitigate flood risk. Fife Council will discuss and seek advice from SEPA.		
<b>Funding Arrangement:</b>	This will be funded from Fife Council Revenue and Capital Flood Protection Budgets.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 26 residential properties and 52 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £8.3 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection study area. In addition the study could benefit one emergency service, five utilities and two roads located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible, opportunities to enhance and restore the environment should be sought, for example through natural flood management. Natural flood management actions can have a positive impact by restoring and enhancing natural habitats. The physical condition of a number of rivers within		

**Environmental:**

the study area is identified by SEPA to be at less than good status. These include River Leven, Kennoway Burn, Lochty Burn, Gairney Water and North Queich River (water body IDs 6301, 6303, 6312, 6315, 6320). Opportunities to improve the condition of these rivers should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. Conservation areas, gardens and designed landscapes, listed buildings, Sites of Special Scientific Interest, Ramsar sites and ancient woodlands are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100040018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Leven and Eastern Methil where practical (10004)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Not started
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	<p>Fife Council will lead on the development of surface water management plans for their area in partnership with Scottish Water, SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.</p> <p>Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.</p>
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100040019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Leven and Eastern Methil where practical (10004)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2018-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	<p>An integrated catchment study covering the Leven Valley catchment will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and (where applicable) the sea.</p> <p>This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and Fife Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions to the significant flooding issues.</p>
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water), Surface water plan/study (Fife Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Fife Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by Fife Council Revenue Budget.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Leven Valley 2018-2020
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Leven Valley sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.



<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Lower Largo and the Leven and Methil flood warning areas which are part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Flood protection study, Self help.
<b>Coordination Arrangement:</b>	SEPA will work with the local authority during verification of existing flood warning system as required
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, New flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning, New flood warning.
<b>Coordination Arrangement:</b>	Fife Council will work with the public to support community resilience. This will be done by developing and reviewing emergency plans facilitating, community plans and, providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner. In the event of severe issues this is to be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with Fife Council and community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>To support the delivery of the new SEPA flood warning scheme, SEPA will carry out a local launch event and engage directly with residents in the area. This will be supported by local and national media communications. SEPA will also support and participate in local public awareness events, in partnership with the local authority, community council or other local representative organisations, including schools.</p> <p>Fife Council will raise awareness when developing discrete proposals. Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, New flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>A new flood warning scheme is under consideration for properties in Leven. To support the delivery of the new SEPA flood warning scheme, SEPA will carry out communications and engagement activities. SEPA's awareness raising activities will be coordinated with activities of other responsible authorities as required.</p> <p>Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes</p>

	<p>detailed in the Shoreline Management Plan (2011). Fife Council will share good practice, provide information on property level protection and develop and review emergency plans. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<p><b>Funding Arrangement:</b></p>	<p>SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Fife Council will fund awareness raising activities from Council Revenue and Capital budgets.</p>

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Fife Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, New flood warning.
<b>Coordination Arrangement:</b>	This regular maintenance and inspection regime will be carried out by Fife Council Inspectors with clearance and repair works instructed as required. Fife Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. Fife Council will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Fife Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintaining flood warning, Maintenance, New flood warning.
<b>Coordination Arrangement:</b>	<p>During severe flooding, Fife Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will maintain bodies of water as required within the council's schedule of clearance and repair. Fife Council will share good practice, provide information on property level protection and develop and review emergency plans.</p>
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Fife Council's responsibilities for emergency response are largely funded by Fife Council's Revenue Budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>



<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>Fife Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies take account of the objective to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

# Kinross, Milnathort, Glenrothes and Kinglassie (Potentially Vulnerable Area 10/04)

Local Plan District	Local authority	Main catchment
Forth Estuary	Fife Council, Perth and Kinross Council	River Leven (Fife)

## Background

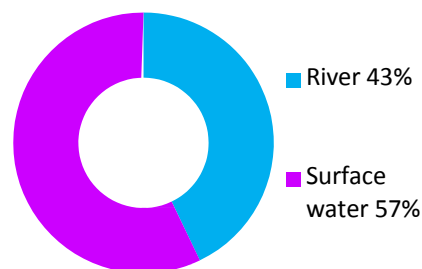
This Potentially Vulnerable Area is 201km<sup>2</sup> and includes the northern half of the River Leven catchment (shown below). It includes Glenrothes, Kinross and Milnathort. The main watercourses are the River Leven and its tributaries, the Lochty Burn, North and South Queich and the Back Burn.



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The area has a risk of river and surface water flooding. The majority of damages in this Potentially Vulnerable Area are caused by surface water flooding.

There are approximately 210 residential properties and 150 non-residential properties at risk of flooding. The Annual Average Damages are approximately £1.2 million.



**Figure 1: Annual Average Damages by flood source.** *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

## Summary of flooding impacts

The greatest risk of flooding is in Glenrothes and Milnathort from rivers and surface water.

For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to roads, notably the A91, A971 and A911.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is

available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Kinross, Milnathort, Glenrothes and Kinglassie (Potentially Vulnerable Area 10/04)'

### History of flooding

The following significant floods have been recorded in this area:

- 6 June 2009: Heavy rain caused surface water flooding in areas of Fife and Perth and Kinross, including Milnathort.
- 13 December 2006: The centre of Milnathort was flooded from Back Burn affecting a number of non-residential and residential properties. In Kinross, properties on the Industrial Estate, Queich Place, High Street and the auction mart were affected by the South Queich flooding.
- 13-14 January 1993: The centre of Milnathort was flooded from Back Burn. The South Queich also flooded, affecting houses and industrial properties in the South of Kinross.

### Objectives to manage flooding in Kinross, Milnathort, Glenrothes and Kinglassie

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. The objectives below have been set for the Kinross, Milnathort, Glenrothes and Kinglassie Potentially Vulnerable Area.

- Accept that significant flood risk in Milnathort is being managed appropriately. Maintain existing actions that reduce the risk of flooding in Milnathort from the Back Burn (Objective ID: 10010);
- Reduce economic damages to residential and number of non-residential properties in the Kinross, Milnathort, Glenrothes and Kinglassie Potentially Vulnerable Area caused by river flooding (Objective ID: 10011);
- Reduce risk to people in Glenrothes from river flooding (Objective ID: 10012);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Leven and Eastern Methil where practical (Objective ID: 10004);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Milnathort where practical (Objective ID: 10008);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Glenrothes and Markinch where practical (Objective ID: 10103);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.

### Actions to manage flooding in Kinross, Milnathort, Glenrothes and Kinglassie

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. The shaded actions below have been selected as the most appropriate for Kinross, Milnathort, Glenrothes and Kinglassie Potentially Vulnerable Area.

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

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection scheme/works					
			New flood warning		
Flood protection study					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme (existing)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100080006)</b>		
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Milnathort where practical (10008)		
<b>Delivery lead:</b>	Perth and Kinross Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>19 of 42</b>	<b>2 of 4</b>	<b>3 of 7</b>
<b>Delivery Period:</b>	2016-2019		
<b>Status:</b>	The Milnathort Surface Water Investigation study by Atkins was completed in 2011 and recommended a surface water scheme (drainage measures, storage and pumping stations). Outline design development of the scheme is expected to commence in 2016/17.		
<b>Description:</b>	A flood protection scheme has been proposed for Milnathort to address surface water flooding. The proposed scheme will provide a 1:100 year standard of protection against surface water flooding, and will include an additional allowance for climate change.		
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintenance, Maintain flood protection scheme (Milnathort), Planning Policy, Self help, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	The Milnathort Surface Water Flood Protection Scheme will be coordinated through the Forth Estuary Local Plan District Partnership and with related actions, taking cognisance of Scottish Water's recent scheme to address internal sewer flooding. This action will be coordinated with the preparation of the surface water plan/study as detailed in Action 100080018.		
<b>Funding Arrangement:</b>	The Milnathort Surface Water Flood Protection Scheme will be subject to available capital funding (up to 80% capital grant funding from the Scottish Government with the remaining funding being provided from Perth & Kinross Council's capital programme).		
<b>Potential impacts</b>			
<b>Economic:</b>	The proposed scheme may benefit 66 residential properties and 13 non-residential properties at risk for a 1 in 100 year flood. Estimated damages avoided are £4.6 million. The flood protection scheme has an estimated benefit cost ratio of 3.0.		
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. There may be negative impacts through disturbance to the local community during the construction phase.		
<b>Environmental:</b>	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100110006)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Kinross, Milnathort, Glenrothes and Kinglassie Potentially Vulnerable Area caused by river flooding (10011)		
<b>Delivery lead:</b>	Perth and Kinross Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>28 of 42</b>	<b>3 of 4</b>	<b>5 of 7</b>
<b>Delivery Period:</b>	2017-2021		
<b>Status:</b>	A Flood Protection Study carried out by consultants, Mouchel, recommended a flood scheme for the South Queich, Gelly Burn and Clash Burn. Outline design development of the scheme will commence in 2017/18.		
<b>Description:</b>	A flood protection scheme has been proposed for South Kinross to address flooding from the South Queich, Gelly Burn and Clash Burn. The scheme would consist of flood defence walls and provide a 1 in 200 year (plus climate change) standard of protection.		
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintenance, New flood warning, Self help, Strategic mapping and modelling, Planning Policy.		
<b>Coordination Arrangement:</b>	The Kinross Flood Protection Scheme will be coordinated through the Forth Estuary Local Plan District Partnership and with related actions.		
<b>Funding Arrangement:</b>	The Kinross Flood Protection Scheme will be subject to available capital funding (up to 80% capital grant funding from the Scottish Government with the remaining funding being provided from Perth & Kinross Council's capital programme).		
<b>Potential impacts</b>			
<b>Economic:</b>	The scheme has estimated damages avoided of £5.5 million and an estimated benefit cost ratio of 1.48.		
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. There may be negative impacts through disturbance to the local community during the construction phase.		
<b>Environmental:</b>	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. The proposed flood protection works are located on the South Queich River (Waterbody ID 6302). The physical condition of this river has been identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted.		



<b>Action (ID):</b>	<b>NEW FLOOD WARNING (100990010)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Hydrometry developments are to begin in spring 2019. The new flood warning service is to be launched in May 2021.
<b>Status:</b>	Not started
<b>Description:</b>	The area under consideration includes properties affected by flooding in Fife and Perth and Kinross and is likely to include Kinross. Further feasibility assessment will be required to assess delivery potential and the final detail of communities for which warnings can be provided will be determined during the scoping process.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Flood protection scheme, Flood protection study, Self help.
<b>Coordination Arrangement:</b>	A flood protection scheme is proposed for South Kinross. SEPA will work with the local authority to ensure that changes to hydrology and flood risk as a result of the proposed flood protection scheme are fully considered in the new flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement. In addition, Scottish Government provides grant funding to enable SEPA to implement new flood warning schemes.



<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100120005)</b>		
<b>Objective (ID):</b>	Reduce risk to people in Glenrothes from river flooding (10012)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>79 of 168</b>	<b>11 of 16</b>	<b>14 of 26</b>
<b>Delivery Period:</b>	2016-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	An Integrated Catchment Study looking at surface water management in Glenrothes is scheduled to start in 2017. This study may identify future study needs that would be taken forward in the second flood risk management cycle.		
<b>Related Actions:</b>	New flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Fife Council will arrange a study with a Consultant to establish fluvial flood risk and identify potential options to mitigate flood risk. Fife Council will discuss and seek advice from SEPA and Scottish Water.		
<b>Funding Arrangement:</b>	This will be funded from Fife Council Revenue and Capital Flood Protection Budgets.		
<b>Potential impacts</b>			
<b>Economic:</b>	Potential damages avoided of up to £5.1 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection study area.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. River Leven (water body ID 6301) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. 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 (100040018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Leven and Eastern Methil where practical (10004)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	<p>Fife Council will lead on the development of surface water management plans for their area in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.</p> <p>Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.</p>
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100040019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Leven and Eastern Methil where practical (10004)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2018-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	<p>An integrated catchment study covering the Leven Valley catchment will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and (where applicable) the sea.</p> <p>This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and Fife Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions to the significant flooding issues.</p>
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Fife Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by Fife Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100080018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Milnathort where practical (10008)
<b>Delivery lead:</b>	Perth and Kinross Council
<b>Delivery Period:</b>	2016-2019
<b>Status:</b>	Development of Perth and Kinross Council's surface water management plan and the outline design development of the surface water scheme will commence in 2016/17
<b>Description:</b>	Milnathort will be covered by a surface water management plan that sets objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Perth & Kinross Council had previously engaged consultants, Atkins, to produce the Milnathort Surface Water Investigation study which was completed in 2011. This study recommended a surface water flood protection scheme (involving drainage measures, underground storage and pumping stations). The proposed scheme will provide a 1:100 year standard of protection against surface water flooding, and will include an additional allowance for climate change. This action will be implemented through the Milnathort Surface Water Flood Protection Scheme Action (ID) 100080006. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Flood protection scheme/works (Milnathort), Maintenance, Maintain flood protection scheme, Self help, Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	Perth & Kinross Council will coordinate the preparation of the surface water management plan with Scottish Water and SEPA. This will include agreeing the most sustainable actions to manage surface water flooding determined from the Milnathort Surface Water Investigation, taking cognisance of Scottish Water's recent scheme to address internal sewer flooding. This action will be coordinated with the implementation of the proposed surface water scheme (the Milnathort Surface Water Flood Protection Scheme) as detailed in Action 100080006 and other related actions.  Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	The surface water management plan will be subject to funding from Perth and Kinross Council's Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101030018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Glenrothes and Markinch where practical (10103)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	<p>Fife Council will lead on the development of surface water management plans for their area in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.</p> <p>Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.</p>
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101030019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Glenrothes and Markinch where practical (10103)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2018-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	<p>An integrated catchment study covering the Leven Valley catchment will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and (where applicable) the sea.</p> <p>This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and Fife Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions to the significant flooding issues.</p>
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water), Surface water plan/study (Fife Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Fife Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by Fife Council Revenue Budget.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Kinross 2016-2017. Leven Valley 2018-2020. Milnathort 2016-2019.
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Kinross, Leven Valley and Milnathort sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.



<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100100017)</b>
<b>Objective (ID):</b>	Accept that significant flood risk in Milnathort is being managed appropriately. Maintain existing actions that reduce the risk of flooding in Milnathort from the Back Burn. (10010)
<b>Delivery lead:</b>	Perth and Kinross Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Perth and Kinross Council continue to maintain the existing flood protection schemes along the Back Burn in Milnathort. These include the Milnathort Flood Protection Schemes completed in 2006 and 2010.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting Flood protection scheme/works (Milnathort), Maintenance, Self help, Surface water plan/study.
<b>Coordination Arrangement:</b>	The existing Milnathort Flood Prevention Schemes (completed in 2006 and 2010) were implemented to manage the risk of flooding from the Back Burn. The proposed surface water flood protection scheme at Milnathort is due for completion in 2018/19 and the Kinross Flood Protection Scheme is due for completion in 2021/22. Perth & Kinross Council's Roads Maintenance Partnership will maintain any existing flood protection scheme through a programme of inspections carried out in accordance with the recommendations set out in the scheme maintenance manuals. Maintenance works will be coordinated with SEPA, SNH, landowners and other stakeholders and other related actions as required.
<b>Funding Arrangement:</b>	The maintenance of flood protection schemes will be subject to funding from Perth & Kinross Council's Revenue Budget.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, New flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (100100012)</b>
<b>Objective (ID):</b>	Accept that significant flood risk in Milnathort is being managed appropriately. Maintain existing actions that reduce the risk of flooding in Milnathort from the Back Burn. (10010)
<b>Delivery lead:</b>	Community
<b>Delivery Period:</b>	N/A
<b>Status:</b>	N/A
<b>Description:</b>	A community resilience group operated in this area and was supported by Perth and Kinross Council to develop community resilience plans. This action has been included in SEPA's Flood Risk Management Strategy, however, this community action group has now ceased its activities.
<b>Related Actions:</b>	N/A
<b>Coordination Arrangement:</b>	The group is no longer operation so coordination cannot be arranged.
<b>Funding Arrangement:</b>	N/A

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintenance, New flood warning, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>Fife Council will work with the public to support community resilience. This will be done by developing and reviewing emergency plans, facilitating community plans and, providing information on property level protection.</p> <p>Perth and Kinross Council are involved in the Resilient Communities Initiative. Perth and Kinross Council leads a multi-agency Local Resilience Partnership to support communities to develop community resilience groups and community emergency plans. Perth and Kinross Council also provide information on property level protection. Self help actions will be coordinated through the Forth Estuary Local Plan District Partnership and with other related actions.</p>
<b>Funding Arrangement:</b>	Funding for self help measures will be provided by private individuals, businesses, organisations or communities at risk of flooding. In the event of severe issues Fife Council will support Self help within their local authority area from their Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with Fife Council, Perth &amp; Kinross Council and community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>For the new flood protection schemes, SEPA will support the local authority's communications and engagement activities with media activity, local public awareness events and education engagement with schools. SEPA will also deliver joint communications with local authorities for Floodline customers in any newly protected flood warning area.</p> <p>To support the delivery of the new SEPA flood warning scheme, SEPA will carry out a local launch event and engage directly with residents in the area. This will be supported by local and national media communications. SEPA will also support and participate in local public awareness events, in partnership with the local authority, community council or other local representative organisations, including schools.</p> <p>Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities.</p> <p>Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Flood protection scheme/works, Maintenance, Maintain flood protection scheme, New flood warning, Planning policy, Self help, Strategic mapping and modelling, Surface water plan/study.

<p><b>Coordination Arrangement:</b></p>	<p>Flood protection schemes are proposed for Milnathort and South Kinross. SEPA will support the local authority's communications and engagement activities. A new flood warning scheme is under consideration for properties in Kinross. To support the delivery of the new SEPA flood warning scheme, SEPA will carry out communications and engagement activities. SEPA's awareness raising activities will be coordinated with activities of other responsible authorities as required.</p> <p>Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will share good practice, provide information on property level protection and develop and review emergency plans. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p> <p>Perth and Kinross Council 's communications activity will be coordinated through existing arrangements within LPD Partnerships. Information will be disseminated through website, social media and other community engagement activity. Perth and Kinross Council will use any studies, projects and flood schemes to engage with communities and raise awareness of flood risk.</p> <p>Self help actions will be coordinated with other related actions.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<p><b>Funding Arrangement:</b></p>	<p>SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority's Revenue Budget.</p>

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Fife Council and Perth and Kinross Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood protection scheme, Self help, Surface water plans/study.
<b>Coordination Arrangement:</b>	<p>Sections 17 and 18 of the Flood Risk Management (Scotland) Act 2009 require local authorities to prepare maps of relevant bodies of water and sustainable urban drainage systems (SUDS), assess flood risk on those bodies of water from time to time and to prepare a schedule of clearance and repair works where such works would substantially reduce flood risk. Under Section 59 of the same Act, Local authorities also have a duty to carry out clearance and repair works described on the schedule. The Local authorities' schedule of clearance and repair works is made available for public inspection on their respective websites.</p> <p>Local authorities carry out routine, scheduled inspections of watercourses on their list at a frequency which depends on flood risk. Further reactive inspections are carried out when issues are highlighted or during times of flooding. Further bodies of water will be included where it has been identified that they may give rise to a risk of flooding.</p> <p>Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk. In the first instance, clearance and repair works are therefore referred to the landowner, where they can be identified. Perth and Kinross Council usually only carries out works where there has been a failure of the landowner to act, where landownership is not clear, or where urgent intervention is required. In addition, local authorities may also be responsible for maintenance of existing flood protection schemes or works.</p> <p>Local authorities will liaise with SEPA where controlled activities may be required and with private landowners where they may require to take access on private land or to notify landowners that they require to undertake maintenance. The local authorities will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The local authorities will liaise with Scottish Water, Network Rail, Scottish Natural Heritage etc. where required.</p>



	<p>Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.</p> <p>Self help actions will be coordinated through the Forth Estuary Local Plan District Partnership and with other related actions.</p>
<p><b>Funding Arrangement:</b></p>	<p>Maintenance and repair work will be subject to funding from the relevant local authority's Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.</p>

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas. Perth and Kinross Council has developed a Generic Emergency Plan and a Flooding Emergency Response Plan.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood protection scheme, Maintenance, New flood warning, Self-help, Surface water plan/study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>During severe flooding, Fife Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will maintain bodies of water as required within the council's schedule of clearance and repair. Fife Council will share good practice, provide information on property level protection and develop and review emergency plans.</p> <p>Perth and Kinross Council has developed a Generic Emergency Plan and a Flooding Emergency Response Plan. The Plan is designed to ensure that contingency measures are in place for the coordinated and flexible response to flooding incidents to mitigate the effects of flooding emergencies. Perth and Kinross Council will monitor SEPA flood alerts and warnings and make resources ready as required. A coordinated response will follow any reports of flooding. A debrief and plan review will be carried out following any flood events. Protecting property from flooding is the responsibility of the owner, but Perth &amp; Kinross Council can sometimes provide sandbags to properties. Unfortunately the Perth &amp; Kinross Council only has the</p>

	<p>resources to supply sandbags to residents where there is an imminent risk of flooding. Emergency plans/response actions will be coordinated with other related actions</p>
<p><b>Funding Arrangement:</b></p>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, the local authorities responsibilities for emergency response are largely funded by local authorities' relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection scheme, Flood protection study, Strategic mapping and modelling Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>Fife Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies take account of the objective to reduce flood risk.</p> <p>Perth and Kinross Council is a local planning authority and will coordinate its work with the strategic development planning authority and the National Parks Authorities. Perth and Kinross Council will coordinate land use planning policies with related actions. Perth and Kinross Council's Flooding Team are consulted on planning applications and work with the Planning and Development Service to ensure that flood risk is addressed. The Local Development Plan provides the framework against which planning applications are</p>

	<p>assessed and is consistent with the Strategic Development Plan (TAYplan). Supplementary Guidance on Flood Risk and Flood Risk Assessments is also available to support the content of the Local Development Plan. Planning applications are also reviewed against SEPA's indicative flood maps, existing flood studies and records of flooding. Where flood risk is an issue, developers are required to prepare and submit a site-specific flood risk assessment and drainage impact assessment as applicable. They must also consider how a development site will be drained and how surface water runoff will be managed through the implementation of appropriate Sustainable Urban Drainage Measures.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Planning policy actions will be coordinated with other related actions.</p>
<p><b>Funding Arrangement:</b></p>	<p>The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

# Kirkcaldy, East Wemyss and Methil (Potentially Vulnerable Area 10/05)

Local Plan District	Local authority	Main catchment
Forth Estuary	Fife Council	South Fife coastal

## Background

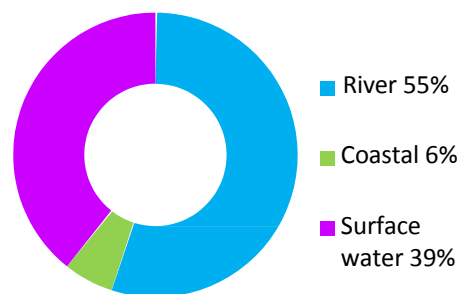
This Potentially Vulnerable Area is 71km<sup>2</sup> and part of the Firth of Forth catchment (shown below). This is a moderately sized, partially urbanised area containing the towns of Kirkcaldy, Burntisland and Methil. The main watercourses are the Tiel, East and Den Burns in Kirkcaldy and the Chemiss and Kingslaw Burns in East Wemyss.



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The area has a risk of river, surface water and coastal flooding. The majority of damages in this Potentially Vulnerable Area are caused by river flooding with surface water also posing a significant risk.

There are approximately 190 residential properties and 180 non-residential properties at risk of flooding. The Annual Average Damages are approximately £850,000.



**Figure 1: Annual Average Damages by flood source.** *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

## Summary of flooding impacts

The highest risk of river flooding is from Tiel Burn to Kirkcaldy. The highest risk of surface water flooding is also in Kirkcaldy.

For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to residential properties. A railway line is also notably impacted.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Kirkcaldy, East Wemyss and Methil (Potentially Vulnerable Area 10/05)'

## History of flooding

The following significant coastal floods have been recorded in Kirkcaldy:

- 30 March 2010: Non-residential property affected after coastal flooding to Esplanade Road.
- 18 March 1969: Two boats sunk in the harbour and Kirkcaldy esplanade flooded under two feet of water. Transport services interrupted.
- 4 April 1958: Homes and businesses flooded, cars washed away and civil infrastructure damaged. Forty families were evacuated.
- 1 October 1947: Waves up to 30 feet affected Kirkcaldy with properties and cars damaged from flood waters.

## Objectives to manage flooding in Kirkcaldy, East Wemyss and Methil

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. The objectives below have been set for the Kirkcaldy, East Wemyss and Methil Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties in the Kirkcaldy, East Wemyss and Methil Potentially Vulnerable Area caused by river and coastal flooding (Objective ID: 10015);
- Reduce risk to people in Kirkcaldy from river flooding (Objective ID: 10016);
- Reduce the physical or disruption risk related to the transport network for rail (Objective ID: 10300);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Kirkcaldy and Cluny where practical (Objective ID: 10013);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.



## Actions to manage flooding in Kirkcaldy, East Wemyss and Methil

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. The actions shaded below have been selected as the most appropriate for Kirkcaldy, East Wemyss and Methil 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
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
			Flood protection scheme/works		
Flood protection study					
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (10300021)</b>
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for rail (10300)
<b>Delivery lead:</b>	Network Rail
<b>Delivery Period:</b>	2019-2024
<b>Status:</b>	Under development
<b>Description:</b>	Network Rail will carry out civil engineering work which will reduce the risk of flooding on identified sections of the rail network within this Potentially Vulnerable Area.
<b>Related Actions:</b>	Maintain flood warning, Maintenance, Planning policy.
<b>Coordination Arrangement:</b>	Delivery of Actions during CP6 (Control Period 6) 2019 to 2024 will be coordinated with appropriate responsible authorities and project partners.
<b>Funding Arrangement:</b>	The Network Rail Initial Industry Plan (IIP) is being developed for submission to The Scottish Government September 2016. This will include a bid to carry out drainage work associated with FRM Strategy actions for the period 2019 to 2024. Delivery of FRM Strategy actions will be prioritised in accordance with allocated funding.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100150025)</b>		
<b>Objective (ID):</b>	Reduce risk to people in Kirkcaldy from river flooding (10016) Reduce economic damages to residential and non-residential properties in the Kirkcaldy, East Wemyss and Methil Potentially Vulnerable Area caused by river and coastal flooding (10015)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>25 of 168</b>	<b>2 of 16</b>	<b>4 of 26</b>
<b>Delivery Period:</b>	2016-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	<p>A flood protection study has been recommended for Linktown and Kirkcaldy to assess whether flood storage, sediment management, modification of conveyance, flood defences, and natural flood management could reduce flood risk.</p> <p>The study should also investigate property relocation. Natural flood management options that should be considered include; runoff control, river/floodplain restoration, sediment management and wave attenuation. The study should take a sustainable approach and consider the interaction between actions upstream and downstream and potential effects on coastal processes along the shoreline.</p>		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Fife Council will arrange a study with a Consultant to establish fluvial flood risk and identify potential options to mitigate flood risk. Fife Council will discuss and seek advice from SEPA.		
<b>Funding Arrangement:</b>	This will be funded from Fife Council Revenue and Capital Flood Protection Budgets.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 42 residential properties and 50 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £13 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority		

**Environmental:**

must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. Scheduled monuments, gardens and designed landscapes, listed buildings, Sites of Special Scientific Interest, Ramsar sites and ancient woodlands are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100150005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Kirkcaldy, East Wemyss and Methil Potentially Vulnerable Area caused by river and coastal flooding (10015)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>138 of 168</b>	<b>16 of 16</b>	<b>23 of 26</b>
<b>Delivery Period:</b>	2016-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	<p>A flood protection study has been recommended for East Wemyss to assess whether flood storage, sediment management, modification of conveyance, flood defences and natural flood management could reduce flood risk. The study should also consider property relocation and the viability of property level protection. Natural flood management options that should be considered include; runoff control, river/floodplain restoration, sediment management and wave attenuation.</p> <p>The study should take a sustainable approach and consider the interaction between actions upstream and downstream and potential effects on coastal processes along the shoreline.</p>		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Fife Council will arrange a study with a Consultant to establish fluvial flood risk and identify potential options to mitigate flood risk. Fife Council will discuss and seek advice from SEPA.		
<b>Funding Arrangement:</b>	This will be funded from Fife Council Revenue and Capital Flood Protection Budgets.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 23 residential properties and nine non-residential properties at risk of flooding in this location, with potential damages avoided of up to £930,000.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an		

**Environmental:** adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. Scheduled monuments, gardens and designed landscapes, Sites of Special Scientific Interest, Ramsar sites and ancient woodlands are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100130018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Kirkcaldy and Cluny where practical (10013)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Not started
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	<p>Fife Council will lead on the development of surface water management plans for their area in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.</p> <p>Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.</p>
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue Budget.



<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	SEPA led surface water mapping improvements are expected to be undertaken in 2016. Incorporation of the local authority surface water study depends on local authority timings.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,600km <sup>2</sup> of improved surface water data is currently available within this Local Plan District. The inclusion of additional surface water hazard data resulting from the completion of local authority surface water management plans and Scottish Water integrated catchment studies will be considered when these projects are completed.
<b>Related Actions:</b>	Flood protection scheme/works, Flood protection study, Planning Policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	A surface water management plan is proposed for the Kirkcaldy and Cluny area. SEPA will work with the responsible authorities to ensure that new information about flood risk resulting from the proposed surface water management plan is considered in SEPA's strategic mapping and modelling developments where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Burntisland 2016 -2019. East Wemyss 2016-2020. Kirkcaldy 2016-2019. Leven Valley 2018-2020.
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Burntisland, East Wemyss, Kirkcaldy and Leven Valley sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100150017)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Kirkcaldy, East Wemyss and Methil Potentially Vulnerable Area caused by river and coastal flooding (10015)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Fife Council will continue to maintain the existing coastal flood defences.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	A regular maintenance and inspection regime will be continued by Fife Council Inspectors with clearance and repair works instructed as necessary. Fife Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, SEPA, Scottish Natural Heritage, Landowners etc.
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Leven and Methil, Burntisland to Aberdour, Kinghorn and Kirkcaldy flood warning areas which are part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Flood protection study, Self help.
<b>Coordination Arrangement:</b>	A flood protection study is proposed for Linktown and Kirkcaldy. SEPA will work with the local authority to ensure that any new information about flood risk resulting from the proposed flood protection study is considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, New flood warning.
<b>Coordination Arrangement:</b>	Fife Council will work with the public to support community resilience. This will be done by developing and reviewing emergency plans, facilitating community plans and, providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner. In the event of severe issues this is to be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with Fife Council and community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>Fife Council will raise awareness when developing discrete proposals. Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will share good practice, provide information on property level protection and develop and review emergency plans. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>



**Funding  
Arrangement:**

SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Fife Council will fund awareness raising from Council Revenue and Capital budgets.


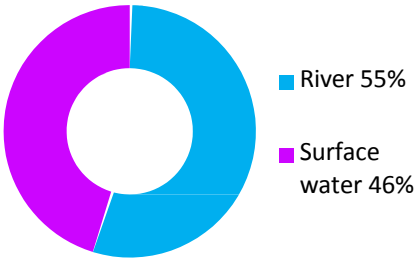
<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Fife Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Local authorities have a duty to assess watercourses and carry 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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Surface water plan/study.
<b>Coordination Arrangement:</b>	This regular maintenance and inspection regime will be carried out by Fife Council Inspectors with clearance and repair works instructed as required. Fife Council will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Fife Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood warning, Maintenance, New flood warning.
<b>Coordination Arrangement:</b>	<p>During severe flooding, Fife Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will maintain bodies of water as required within the council's schedule of clearance and repair. Fife Council will share good practice, provide information on property level protection and develop and review emergency plans.</p>
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Fife Council's responsibilities for emergency response are largely funded by Fife Council's Revenue Budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection scheme, Flood protection study, Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>Fife Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies takes account of the objective to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

# Inverkeithing, Rosyth, Dunfermline and Wellwood (Potentially Vulnerable Area 10/06)

Local Plan District	Local authority	Main catchment
Forth Estuary	Fife Council	South Fife coastal

Background	
<p>This Potentially Vulnerable Area is 82km<sup>2</sup> and part of the Firth of Forth catchment (shown below). This is a moderately sized, partially urbanised area centrally located within the catchment. It contains the towns of Dunfermline, Rosyth and the majority of Inverkeithing.</p> <div style="text-align: center;">  </div> <p style="font-size: small;">© Crown copyright. SEPA licence number 100016991 (2015). All rights reserved. <i>Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).</i></p>	<p>The main watercourse is the Lyne Burn, flowing from its source in the north east, westward through Dunfermline and into the Firth of Forth at Charleston. Other notable watercourses include the Tower Burn, Baldrige Burn, Broomhead Burn and the Keithing Burn.</p> <p>The area has a risk of river and surface water flooding. The majority of damages are caused by river flooding.</p> <p>There are approximately 410 residential properties and 230 non-residential properties at risk of flooding. The Annual Average Damages are approximately £2.0 million.</p> <div style="text-align: center;">  </div> <p><b>Figure 1:</b> Annual Average Damages by flood source. <i>Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).</i></p>

## Summary of flooding impacts

The highest risk of river flooding is from Tower Burn and the Lyne Burn to Dunfermline, Rosyth and Inverkeithing. The highest risk of surface water flooding is in Dunfermline.

- For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to residential properties.
- Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land, is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Inverkeithing, Rosyth, Dunfermline and Wellwood (Potentially Vulnerable Area 10/06)'

## History of flooding

One significant flood has been recorded in this area. On 1 April 1992, an extreme weather event resulted in 80mm of rain falling in 24 hours. This caused flooding of the Lyne Burn and its tributaries, the Tower Burn and Calais Burn and affected residential and non-residential properties in Dunfermline.

## Objectives to manage flooding in Inverkeithing, Rosyth, Dunfermline and Wellwood

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. The objectives below have been set for the Inverkeithing, Rosyth, Dunfermline and Wellwood Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties and risk to people in Dunfermline caused by flooding from the Lyne Burn and Tower Burn (Objective ID: 10019, 10022);
- Reduce economic damages to residential and non-residential properties and flood risk to community facilities in Rosyth and Inverkeithing caused by river flooding (Objective ID: 10020);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Dunfermline, Bowershall, Crossford, Wellwood, Townhill and Halbeath where practical (Objective ID: 10017);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Cairneyhill, Crombie and Muirside where practical (Objective ID: 10023);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.

## Actions to manage flooding in Inverkeithing, Rosyth, Dunfermline and Wellwood

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. The actions shaded below have been selected as the most appropriate for Inverkeithing, Rosyth, Dunfermline and Wellwood 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 Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection study					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme (existing)					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					



<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100190005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Dunfermline caused by flooding from the Lyne Burn and Tower Burn (10019, 10022)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>25 of 168</b>	<b>2 of 16</b>	<b>4 of 26</b>
<b>Delivery Period:</b>	2016-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Dunfermline to assess whether modification of conveyance, sediment management, installation/modification of fluvial control structures, flood defences and natural flood management could reduce flood risk. The study should also investigate property relocation and the viability of property level protection. Natural flood management options that should be considered include runoff control and sediment management. The assessment should consider these actions in combination and the impacts on flood risk upstream and downstream of each action.		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling.		
<b>Coordination Arrangement:</b>	Fife Council will arrange a study with a Consultant to establish fluvial flood risk and identify potential options to mitigate flood risk. Fife Council will discuss and seek advice from SEPA.		
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue and Capital Flood Protection Budgets.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 59 residential properties and 31 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £12 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. Tower Burn and Lyne Burn (water body IDs 4330 and 6907) are located within the study area and the physical condition of these rivers is identified by SEPA to be at less than good status. Opportunities to improve the condition of		

**Environmental:** the river should be considered by coordinating with river basin management planning. Conservation areas, scheduled monuments, gardens and designed landscapes, listed buildings and ancient woodlands are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100170018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Dunfermline, Bowershall, Crossford, Wellwood, Townhill and Halbeath where practical (10017)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Not started. Scoping is currently in progress with the study to commence in 2016.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	<p>Fife Council will lead on the development of surface water management plans for their area in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.</p> <p>Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.</p>
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100170019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Dunfermline, Bowershall, Crossford, Wellwood, Townhill and Halbeath where practical (10017) Reduce economic damages to residential and non-residential properties and flood risk to community facilities in Rosyth and Inverkeithing caused by river flooding (10020)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2017-2020
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study covering the Dunfermline and Iron Mill Bay catchments will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and (where applicable) the sea. This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and Fife Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions to the significant flooding issues.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water), Surface water plan/study (Fife Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Fife Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by Fife Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100230018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Cairneyhill, Crombie and Muirside where practical (10023)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Not started. Scoping is currently in progress with the study to commence in 2016.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	<p>Fife Council will lead on the development of surface water management plans for their area in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.</p> <p>Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.</p>
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100230019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Cairneyhill, Crombie and Muirside where practical (10023)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2017-2020
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study covering the Dunfermline, Iron Mill Bay and Leven Valley catchments will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and (where applicable) the sea. This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and Fife Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions to the significant flooding issues
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water), Surface water plan/study (Fife Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Fife Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by Fife Council Revenue Budget towards the Needs stage cost of the ICS.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	SEPA led surface water mapping improvements are expected to be undertaken in 2016. Incorporation of the local authority surface water study depends on local authority timings.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,600km <sup>2</sup> of improved surface water data is currently available within this Local Plan District. The inclusion of additional surface water hazard data resulting from the completion of local authority surface water management plans and Scottish Water integrated catchment studies will be considered when these projects are completed.
<b>Related Actions:</b>	Flood protection study, Surface water plan/study, Planning Policy.
<b>Coordination Arrangement:</b>	A surface water management plan and associated integrated catchment study are proposed for the Dunfermline, Bowershall, Crossford, Wellwood, Townhill and Halbeath area and the Cairneyhill, Crombie and Muirside area. SEPA will work with the responsible authorities to ensure that new information about flood risk resulting from the proposed surface water studies is considered in SEPA's strategic mapping and modelling developments where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Dunfermline 2017-2019. Iron Mill Bay 2017-2019. Leven Valley 2018-2020. Valleyfield 2016-2018.
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Dunfermline, Iron Mill Bay, Leven Valley, Valleyfield sewer catchments to improve knowledge and understanding of flood risk in this area as, required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.



<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100190017)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Dunfermline caused by flooding from the Lyne Burn and Tower Burn (10019, 10022)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Fife Council will continue to maintain the existing flood protection schemes. These include the Dunfermline Flood Protection Scheme in the south west of the town and Parkneuk Flood Protection Scheme.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	A regular maintenance and inspection regime will be continued by Fife Council Inspectors with clearance and repair works instructed as necessary. Fife Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, Network Rail, SEPA, Scottish Natural Heritage, Landowners etc.
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting.
<b>Coordination Arrangement:</b>	Fife Council will work with the public to support community resilience. This will be done by developing and reviewing emergency plans, facilitating community plans and, providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner. In the event of severe issues this is to be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 undertake flood risk education and awareness raising activities. In addition, SEPA will engage with Fife Council and community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>Fife Council will raise awareness when developing discrete proposals. Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be co-ordinated with the activities of other responsible authorities as required.</p> <p>Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will share good practice, provide information on property level protection and develop and review emergency plans. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>

**Funding  
Arrangement:**

SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Fife Council will fund awareness raising from Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Fife Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood protection scheme, Surface water management plans/study.
<b>Coordination Arrangement:</b>	This regular maintenance and inspection regime will be carried out by Fife Council Inspectors with clearance and repair works instructed as required. Fife Council will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Fife Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood protection scheme, Maintenance.
<b>Coordination Arrangement:</b>	<p>During severe flooding, Fife Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will maintain bodies of water as required within the council's schedule of clearance and repair. Fife Council will share good practice, provide information on property level protection and develop and review emergency plans.</p>
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Fife Council's responsibilities for emergency response are largely funded by Fife Council's Revenue Budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>Fife Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies takes account of the objective to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.



## Cairneyhill (Potentially Vulnerable Area 10/07)

Local Plan District	Local authority	Main catchment
Forth Estuary	Fife Council	South Fife coastal

### Background

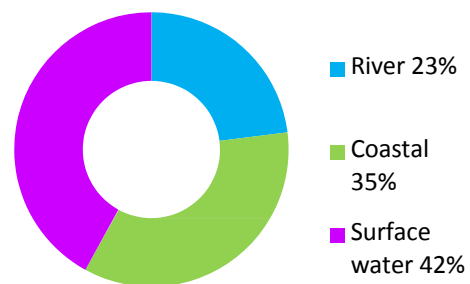
This Potentially Vulnerable Area is 11km<sup>2</sup> and part of the Firth of Forth catchment (shown below). This is a small, largely rural coastal area containing the villages of Cairneyhill and Torryburn. The main watercourse is the Torry Burn, flowing westward through Cairneyhill and into the Torry Bay on the Firth of Forth.



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

There are approximately 110 residential properties and 10 non-residential properties at risk of flooding. The Annual Average Damages are approximately £520,000.



**Figure 1: Annual Average Damages by flood source.** Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).

### Summary of flooding impacts

The highest risk of surface water flooding is in Cairneyhill and South Crombie. The highest risk of river flooding is from the Torry Burn to Cairneyhill and Torryburn, whilst the highest risk of coastal flooding is from the Firth of Forth to Newmills and Torryburn.

For this Potentially Vulnerable Area the highest damages are to non-residential and residential properties.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth

Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Cairneyhill (Potentially Vulnerable Area 10/07)'

## History of flooding

No significant floods have been recorded in this Potentially Vulnerable Area.

## Objectives to manage flooding in Cairneyhill

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. The objectives below have been set for the Cairneyhill Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties in the Cairneyhill Potentially Vulnerable Area caused by river and coastal flooding (Objective ID: 10025);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Cairneyhill, Crombie and Muirside where practical (Objective ID: 10023);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.

## Actions to manage flooding in Cairneyhill

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. The actions shaded below have been selected as the most appropriate for Cairneyhill 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 Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection study					
Natural flood management study					
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme (existing)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100250005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Cairneyhill Potentially Vulnerable Area caused by river and coastal flooding (10025)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>70 of 168</b>	<b>8 of 16</b>	<b>12 of 26</b>
<b>Delivery Period:</b>	2016-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Cairneyhill to assess whether sediment management, modification of conveyance, installation/modification of fluvial control structures, flood defences and natural flood management could reduce flood risk. The study should also investigate property relocation and the viability of property level protection. Natural flood management options that should be considered include runoff control and sediment management. The study should take a sustainable approach and consider the interaction between actions upstream and downstream and potential effects on coastal processes along the shoreline.		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Fife Council will arrange a study with a Consultant to establish fluvial flood risk and identify potential options to mitigate flood risk. Fife Council will discuss and seek advice from SEPA.		
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue and Capital Flood Protection Budgets.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 38 residential properties and six non-residential properties at risk of flooding in this location, with potential damages avoided of up to £4.6 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. In addition the study could benefit one utility, one road and one railway line located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. Middle Forth Estuary (water body ID 200436) is located within the study area and the physical condition of this estuary is identified by SEPA to be at less than good status. Opportunities to improve the condition of the estuary should be		

**Environmental:**

considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. Listed buildings, local nature reserves, Sites of Special Scientific Interest and Ramsar sites are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>NATURAL FLOOD MANAGEMENT STUDY (100250003)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Cairneyhill Potentially Vulnerable Area caused by river and coastal flooding (10025)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	2017-2019
<b>Status:</b>	Not started
<b>Description:</b>	A natural flood management study has been recommended to assess whether wave attenuation could help reduce flood risk in Torryburn.
<b>Related Actions:</b>	Awareness raising, Maintain flood warning, Strategic mapping and modelling, Planning Policy.
<b>Coordination Arrangement:</b>	A coordinated approach with SEPA, landowners and Flood Action Groups as well as general public and interested parties will be undertaken during this study.
<b>Funding Arrangement:</b>	This study will be funded by from Fife Council Revenue and Capital Flood Protection Budgets.
<b>Potential impacts</b>	
<b>Economic:</b>	The economic impact of natural flood management actions is difficult to define. However, these actions can reduce flood risk for high likelihood events. Twenty-eight residential and non-residential properties could potentially benefit from natural flood management actions in this location.
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.
<b>Environmental:</b>	Natural flood management actions can have a positive impact on the ecological quality of the environment by restoring and enhancing natural habitats. Middle Forth Estuary (water body ID 200436) is located within the study area and the physical condition of this estuary has been identified by SEPA to be at less than good status. Opportunities to improve the condition of this estuary should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100230018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Cairneyhill, Crombie and Muirside where practical (10023)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Not started. Scoping is in progress with the study to commence in 2016.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	<p>Fife Council will lead on the development of surface water management plans for their area in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.</p> <p>Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.</p>
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100230019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Cairneyhill, Crombie and Muirside where practical (10023)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2017-2020
<b>Status:</b>	Ongoing
<b>Description:</b>	<p>An integrated catchment study covering the Dunfermline and Iron Mill Bay catchments will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and (where applicable) the sea.</p> <p>This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and Fife Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions to the significant flooding issues.</p>
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water), Surface water plan/study (Fife Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Fife Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by Fife Council Revenue Budget.



<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Iron Mill Bay 2017-2019. Valleyfield 2016-2018
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Iron Mill Bay and Valleyfield sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100250017)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Cairneyhill Potentially Vulnerable Area caused by river and coastal flooding (10025)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Fife Council will continue to maintain the existing flood defences along the coast and river. This includes the Cairneyhill Flood Protection Scheme comprising of a flow diversion scheme and defences along the Torry Burn.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	A regular maintenance and inspection regime will be continued by Fife Council Inspectors with clearance and repair works instructed as necessary. Fife Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, SEPA, Scottish Natural Heritage, Landowners etc.
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Torryburn and Newmills flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Flood protection study, Natural flood management study, Self help.
<b>Coordination Arrangement:</b>	A flood protection study is proposed for Cairneyhill and a natural flood management study is proposed for Torryburn. SEPA will work with the local authority to ensure that any new information about flood risk resulting from the proposed studies is considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	Fife Council will work with the public to support community resilience. This will be done by developing and reviewing emergency plans, facilitating community plans and, providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner. In the event of severe issues this is to be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 undertake flood risk education and awareness raising activities. In addition, SEPA will engage with Fife Council and community resilience groups where possible. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>Fife Council will raise awareness when developing discrete proposals. Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will share good practice, provide information on property level protection and develop and review emergency plans. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Fife Council will fund awareness raising activities from Council Revenue and Capital budgets.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Fife Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood protection scheme, Maintain flood warning, Surface water plan/study.
<b>Coordination Arrangement:</b>	This regular maintenance and inspection regime will be carried out by Fife Council Inspectors with clearance and repair works instructed as required. Fife Council will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Fife Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood protection scheme, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	<p>During severe flooding, Fife Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will maintain bodies of water as required within the council's schedule of clearance and repair. Fife Council will share good practice, provide information on property level protection and develop and review emergency plans.</p>
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Fife Council's responsibilities for emergency response are largely funded by Fife Council's Revenue Budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>



<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Natural flood management study, Surface water plan/study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>Fife Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies takes account of the objective to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

# Hawkhill, Kincardine, Kennet Pans and Culross (Potentially Vulnerable Area 10/08)

Local Plan District	Local authority	Main catchment
Forth Estuary	Clackmannanshire Council, Fife Council	South Fife coastal

## Background

This Potentially Vulnerable Area is 31km<sup>2</sup> and part of the Firth of Forth catchment (shown below). This is a small coastal area containing the villages of Kincardine and Culross. There are numerous small burns around Kincardine which collectively cause flooding issues in the area.

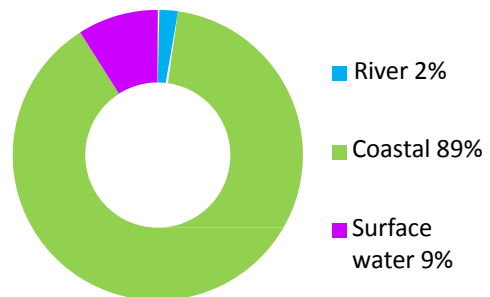


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The area has a risk of coastal, surface water and river flooding. The majority of damages in this Potentially Vulnerable Area are caused by coastal flooding.

There are approximately 240 residential properties and 30 non-residential properties at risk of flooding.

The Annual Average Damages from flooding are approximately £1.4 million.



**Figure 1: Annual Average Damages by flood source.** *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

## Summary of flooding impacts

The highest risk of coastal flooding is from the Firth of Forth to Culross and Kincardine. The highest risk of river flooding is to Kincardine.

For this Potentially Vulnerable Area the highest damages are to residential properties and roads.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Hawkhill, Kincardine, Kennet Pans and Culross (Potentially Vulnerable Area 10/08)'

## History of flooding

No significant floods have been recorded in this Potentially Vulnerable Area.

## Objectives to manage flooding in Hawkhill, Kincardine, Kennet Pans and Culross

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. The objectives below have been set for the Hawkhill, Kincardine, Kennet Pans and Culross Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties and risk to people in Culross caused by coastal flooding (Objective ID: 10026, 10028);
- Reduce economic damages to residential and non-residential properties in Kincardine caused by river flooding and coastal flooding (Objective ID: 10027);
- Accept the physical or disruption risk related to the transport network for roads (Objective ID: 10301);
- Reduce the physical or disruption risk related to the transport network for rail (Objective ID: 10302);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.

## Actions to manage flooding in Hawkhill, Kincardine, Kennet Pans and Culross

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. The actions shaded below have been selected as the most appropriate for Hawkhill, Kincardine, Kennet Pans and Culross 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
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection scheme/works					
Flood protection study					
Maintain flood warning					
Awareness raising					
Emergency plans/response					
Maintain flood protection scheme (existing)					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (10301021)</b>
<b>Objective (ID):</b>	Accept the physical or disruption risk related to the transport network for roads (10301)
<b>Delivery lead:</b>	Transport Scotland
<b>Delivery Period:</b>	No information has been provided.
<b>Status:</b>	Under development
<b>Description:</b>	Transport Scotland will carry out civil engineering work which will reduce the risk of flooding on identified sections of the trunk road.
<b>Related Actions:</b>	No information has been provided.
<b>Coordination Arrangement:</b>	No information has been provided.
<b>Funding Arrangement:</b>	No information has been provided.

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (10302021)</b>
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for rail (10302)
<b>Delivery lead:</b>	Network Rail
<b>Delivery Period:</b>	2019-2024
<b>Status:</b>	Under development
<b>Description:</b>	Network Rail will carry out civil engineering work which will reduce the risk of flooding on identified sections of the rail network within this Potentially Vulnerable Area.
<b>Related Actions:</b>	Maintain flood warning, Maintenance, Planning policy.
<b>Coordination Arrangement:</b>	The Network Rail Initial Industry Plan (IIP) is being developed for submission to The Scottish Government September 2016. This will include a bid to carry out drainage work associated with FRM Strategy actions for the period 2019 to 2024. Delivery of FRM Strategy actions will be prioritised in accordance with allocated funding.
<b>Funding Arrangement:</b>	Delivery of Actions during CP6 (Control Period 6) 2019 to 2024 will be coordinated with appropriate responsible authorities and project partners.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100270005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Kincardine caused by river flooding and coastal flooding (10027)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>21 of 168</b>	<b>1 of 16</b>	<b>3 of 26</b>
<b>Delivery Period:</b>	2016-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Kincardine to assess whether flood storage, flood defences, sediment management and natural flood management could reduce flood risk. The study should also consider the viability of property level protection. Natural flood management options that should be considered include surge attenuation. The study should take a sustainable approach and consider the interaction between actions upstream and downstream and potential effects on coastal processes along the shoreline.		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Fife Council will arrange a study with a Consultant to establish fluvial flood risk and identify potential options to mitigate flood risk. Fife Council will discuss and seek advice from SEPA.		
<b>Funding Arrangement:</b>	This will be funded from Fife Council Revenue and Capital Flood Protection Budgets.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 147 residential properties and nine non-residential properties at risk of flooding in this location, with potential damages avoided of up to £12 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. In addition the study could benefit four utilities and two roads located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The Middle Forth Estuary and Upper Forth Estuary (water body IDs 200436 and 200437) are located within the study area and the physical condition of these estuaries is identified by SEPA to be at less than good status. Opportunities to improve the condition of the estuary should be		

**Environmental:**

considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. Conservation areas, gardens and designed landscapes, listed buildings, Sites of Special Scientific Interest, Ramsar sites and ancient woodlands are also present in the study area and could be positively or negatively impacted.



<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100260005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Culross caused by coastal flooding (10026, 10028)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>90 of 168</b>	<b>13 of 16</b>	<b>16 of 26</b>
<b>Delivery Period:</b>	2016-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Culross to assess flood defences, sediment management and natural flood management. The study should also investigate the viability of property level protection. Natural flood management options that should be considered include wave and surge attenuation. The study should take a sustainable approach and consider the interaction between actions and potential effects on coastal processes along the shoreline.		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Fife Council will arrange a study with a Consultant to establish fluvial flood risk and identify potential options to mitigate flood risk. Fife Council will discuss and seek advice from SEPA.		
<b>Funding Arrangement:</b>	This will be funded from Fife Council Revenue and Capital Flood Protection Budgets.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 83 residential properties and 13 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £4.0 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The Middle Forth Estuary (water body ID 200436) is located within the study area and the physical condition of this estuary is identified by SEPA to be at less than good status. Opportunities to improve the condition of the estuary should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals		

**Environmental:** coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. Conservation areas, scheduled monuments, listed buildings, local nature reserves, Sites of Special Scientific Interest and Ramsar sites are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Wider coastal mapping and modelling improvements may take place in this area and these will be further refined in 2016 with the intention of updating the strategic coastal maps in 2016 to 2019.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.
<b>Related Actions:</b>	Flood protection study, Planning Policy.
<b>Coordination Arrangement:</b>	Flood protection studies are proposed for Culross and Kincardine. SEPA will work with the local authority to ensure that new information about flood risk resulting from the proposed flood protection studies is considered in SEPA's strategic mapping and modelling developments where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Kincardine 2016-2020. Valleyfield 2016-2018.
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Kincardine and Valleyfield sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100270017)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Kincardine caused by river flooding and coastal flooding (10027)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Fife Council will continue to maintain the Kincardine-on-Forth Flood Protection Scheme that provides protection against flooding from the Peffermill Burn. The scheme includes flow diversion from the Moor Loch Burn, culverts and channel improvements.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	A regular maintenance and inspection regime will be continued by Fife Council Inspectors with clearance and repair works instructed as necessary. Fife Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, Network Rail, SEPA, Scottish Natural Heritage, Landowners etc.
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Culross, Longannet and Kincardine flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Flood protection study, Self help.
<b>Coordination Arrangement:</b>	Flood protection studies are proposed for Culross and Kincardine. SEPA will work with the local authority to ensure that any new information about flood risk resulting from the proposed flood protection studies is considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	Fife Council will work with the public to support community resilience. This will be done by developing and reviewing emergency plans, facilitating community plans and, providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner. In the event of severe issues this is to be funded by Fife Council Revenue and Capital Budgets.



<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 and promote Floodline. This will be achieved through SEPA-led education events. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. Fife Council will raise awareness when developing discrete proposals. Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will share good practice, provide information on property level protection and develop and review emergency plans. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Fife Council will fund awareness raising activities from Council Revenue and Capital budgets.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Fife Council and Clackmannanshire Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood protection scheme, Maintain flood warning.
<b>Coordination Arrangement:</b>	This regular maintenance and inspection regime will be carried out by Fife Council Inspectors with clearance and repair works instructed as required. Fife Council will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Clackmannanshire Council, Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Fife Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood warning, Maintain flood protection scheme, Maintenance.
<b>Coordination Arrangement:</b>	<p>During severe flooding, Fife Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will maintain bodies of water as required within the council's schedule of clearance and repair. Fife Council will share good practice, provide information on property level protection and develop and review emergency plans.</p>
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Fife Council's responsibilities for emergency response are largely funded by Fife Council's Revenue Budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection scheme, Flood protection study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>Fife Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies takes account of the objective to reduce flood risk.</p> <p>SEPA's land use planning activities will be co-ordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Airth (Potentially Vulnerable Area 10/09)

Local Plan District	Local authority	Main catchment
Forth Estuary	Falkirk Council	Forth Estuary (south) coastal

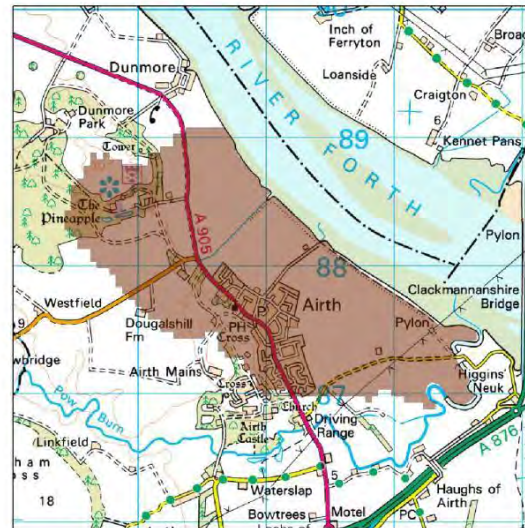
### Background

This Potentially Vulnerable Area is 4km<sup>2</sup> and part of the Firth of Forth catchment (shown right). This is a small coastal area containing the village of Airth.

All of the damages in this Potentially Vulnerable Area are caused by coastal flooding to the town of Airth.

There are approximately 110 residential properties and fewer than 10 non-residential properties at risk of flooding.

The Annual Average Damages from flooding are approximately £720,000.



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### Summary of flooding impacts

The greatest risk of flooding is to the town of Airth.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary,

(<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Airth (Potentially Vulnerable Area 10/09)'

### History of flooding

One significant coastal flood has been recorded in this area. In December 2013 a combination of surge and high tide resulted in a breach of an existing bund and led to flooding of Airth Wastewater Treatment Works and agricultural land.

## Objectives to manage flooding in Airth

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. The objectives below have been set for Airth Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties and risk to people in Airth caused by coastal flooding (Objective ID: 10029, 10030);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.

## Actions to manage flooding in Airth

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. The actions shaded below have been selected as the most appropriate for Airth 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>	<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 Policy</b>

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
<b>Year 1 (2016/17)</b>	<b>Year 2 (2017/18)</b>	<b>Year 3 (2018/19)</b>	<b>Year 4 (2019/20)</b>	<b>Year 5 (2020/21)</b>	<b>Year 6 (2021/22)</b>
New flood warning					
Flood protection study					
Awareness raising					
Emergency plans/response					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					



<b>Action (ID):</b>	<b>NEW FLOOD WARNING (100990010)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	The flood forecasting system is to be updated by May 2017.
<b>Status:</b>	Ongoing
<b>Description:</b>	Flood warning is required for properties at risk of coastal flooding in Airth. Delivery of new warnings in this area can potentially be undertaken through an extension to the existing Firth of Forth and Tay flood forecasting system and warning scheme.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Flood protection study, Self help.
<b>Coordination Arrangement:</b>	A flood protection study is proposed for Airth. SEPA will work with the local authority to ensure that new information about flood risk resulting from the proposed flood protection study is considered in developing the new flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement. In addition, Scottish Government provides grant funding to enable SEPA to implement new flood warning schemes.



<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100290005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Airth caused by coastal flooding (10029, 10030)		
<b>Delivery lead:</b>	Falkirk Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>20 of 168</b>	<b>2 of 5</b>	<b>2 of 26</b>
<b>Delivery Period:</b>	Delivery of initial outputs and high level options by 2017/18.		
<b>Status:</b>	Study has commenced in 2016.		
<b>Description:</b>	A flood protection study has been recommended for Airth to assess flood defences and natural flood management. The study should also consider the viability of property level protection. Natural flood management options that should be considered include surge attenuation. The study should take a sustainable approach and consider the interaction between actions and potential effects on coastal processes along the shoreline.		
<b>Related Actions:</b>	Maintain flood warning, New flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Falkirk Council has appointed a Consultant to assist with the delivery of this project. Falkirk Council will liaise with SEPA, responsible authorities, landowners and other agencies where required.		
<b>Funding Arrangement:</b>	This will be funded by Falkirk Council Revenue Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 108 residential properties and five non-residential properties at risk of flooding in this location, with potential damages avoided of up to £19 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection study area. In addition the study could benefit four utilities and two roads located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The Upper Forth Estuary (water body ID 200437) is located within the study area and the physical condition of this estuary is identified by SEPA to be at less than good status. Opportunities to improve the condition of the estuary should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management		

**Environmental:** Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. Conservation areas, listed buildings, Sites of Special Scientific Interest and Ramsar sites are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	SEPA led surface water mapping improvements are expected to be undertaken in 2016.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,600km <sup>2</sup> of improved surface water data is currently available within this Local Plan District.
<b>Related Actions:</b>	Flood protection study, Planning Policy.
<b>Coordination Arrangement:</b>	SEPA's strategic mapping activities will be coordinated with the activities of other responsible authorities as required.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Airth 2016-2018
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Airth sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plan/response, New flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues Falkirk Council will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. To support the delivery of the new SEPA flood warning scheme, SEPA will carry out a local launch event and engage directly with residents in the area. This will be supported by local and national media communications. SEPA will also support and participate in local public awareness events, in partnership with the local authority, community council or other local representative organisations, including schools.</p> <p>Falkirk Council will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, New flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>A new flood warning scheme is proposed for Airth. To support the delivery of the new SEPA flood warning scheme, SEPA will carry out communications and engagement activities. SEPA's awareness raising activities will be coordinated with activities of other responsible authorities as required</p> <p>Falkirk Council will work with local communities to raise awareness and assist SEPA in relation to the new flood warning system. Awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p>

	Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete awareness raising proposals will be funded by Falkirk Council Revenue budget.



<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Falkirk Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning.
<b>Coordination Arrangement:</b>	Falkirk Council will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Falkirk Council will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Falkirk Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintenance, New flood warning.
<b>Coordination Arrangement:</b>	During severe flooding, Falkirk Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Falkirk Council responsibilities may include (where appropriate) activating flood defence systems, provision of sandbags and other flood prevention controls, road traffic management closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected in addition to coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.
<b>Funding Arrangement:</b>	Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Falkirk Council's responsibilities for emergency response are largely funded by Falkirk Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>Falkirk Council Flood Officers will work directly with their planning colleagues to coordinate as appropriate the implementation of policies and measures to ensure that the council Planning Policies takes account of the objective to reduce flood risk. The relevant Planning Authority is responsible for consulting SEPA and relevant services within responsible authorities.</p> <p>SEPA's land use planning activities will be co-ordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

# North Queensferry and Inverkeithing (Potentially Vulnerable Area 10/10)

Local Plan District	Local authority	Main catchment
Forth Estuary	Fife Council	South Fife coastal

## Background

This Potentially Vulnerable Area is 15km<sup>2</sup> and is part of the Firth of Forth catchment (shown below). This is a large coastal area containing the towns of Dalgety Bay, North Queensferry, Rosyth and Inverkeithing.

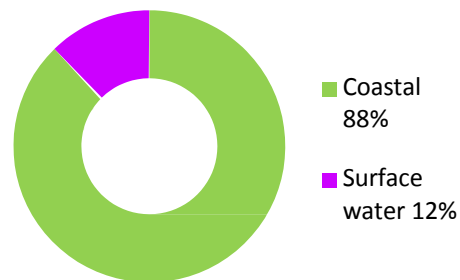


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The area has a risk of surface water and coastal flooding. The majority of damages in this Potentially Vulnerable Area are caused by coastal flooding.

There are approximately 40 residential properties and 30 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £590,000.



**Figure 1:** Annual Average Damages by flood source. *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

## Summary of flooding impacts

The highest risk of coastal flooding is from the Firth of Forth to Rosyth, Inverkeithing and North Queensferry.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'North Queensferry and Inverkeithing (Potentially Vulnerable Area 10/10)'

## History of flooding

No significant floods have been recorded in this Potentially Vulnerable Area.

## Objectives to manage flooding in North Queensferry and Inverkeithing

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. The objectives below have been set for the North Queensferry and Inverkeithing Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties and risk to people in North Queensferry and Inverkeithing Potentially Vulnerable Area caused by coastal flooding (Objective ID: 10031);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Rosyth where practical (Objective ID: 10024);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.

## Actions to manage flooding in North Queensferry and Inverkeithing

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. The actions shaded below have been selected as the most appropriate for North Queensferry and Inverkeithing 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	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100240018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Rosyth where practical (10024)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Scoping in progress. Study to commence in 2016.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	Fife Council will lead on the development of surface water management plans for their area in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue Budget.



<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100240019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Rosyth where practical (10024)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2017-2020
<b>Status:</b>	Not started
<b>Description:</b>	<p>An integrated catchment study covering the Dunfermline and Iron Mill Bay catchments will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and (where applicable) the sea.</p> <p>This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and Fife Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions to the significant flooding issues.</p>
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water), Surface water plan/study (Fife Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Fife Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by Fife Council Revenue Budget.



<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Coastal mapping improvements are expected in this area in 2016 to 2019. However, the timings of coastal mapping improvements may be dependant on local authorities' coastal studies. SEPA led surface water mapping improvements are expected to be undertaken in 2016. Incorporation of the local authority surface water study depends on local authority timings.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,600km <sup>2</sup> of improved surface water data is currently available within this Local Plan District. The inclusion of additional surface water hazard data resulting from the completion of local authority surface water management plans and Scottish Water integrated catchment studies will be considered as these projects are completed. SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.
<b>Related Actions:</b>	Planning Policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	A surface water management plan and associated integrated catchment study are proposed for the Rosyth area. SEPA will work with the responsible authorities to ensure that new information about flood risk resulting from the proposed surface water study is considered in SEPA's strategic mapping and modelling developments where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Dunfermline 2017-2019
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Dunfermline sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100310017)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the North Queensferry and Inverkeithing Potentially Vulnerable Area caused by coastal flooding (10031)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Fife Council will continue to maintain the existing coastal flood defences.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	A regular maintenance and inspection regime will be continued by Fife Council Inspectors with clearance and repair works instructed as necessary. Fife Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, Network Rail, SEPA, Scottish Natural Heritage, Landowners etc.
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Burntisland to Aberdour, North Queensferry and Inverkeithing Bay and the Rosyth, Limekilns and Charlestown flood warning areas which are part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	SEPA will work with the local authority during verification of existing flood warning system as required
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plan/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	Fife Council will work with the public to support community resilience. This will be done by developing and reviewing emergency plans, facilitating community plans and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner. In the event of severe issues this is to be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>SEPA will undertake flood risk education and awareness raising activities. In addition, the Scottish Flood Forum will undertake property level protection events. SEPA will participate in the these and engage with community resilience groups where possible. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. Fife Council will raise awareness when developing discrete proposals. Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will share good practice, provide information on property level protection and develop and review emergency plans. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Fife Council will fund awareness raising activities from Council Revenue and Capital





<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Fife Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood protection scheme, Maintain flood warning.
<b>Coordination Arrangement:</b>	This regular maintenance and inspection regime will be carried out by Fife Council Inspectors with clearance and repair works instructed as required. Fife Council will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Fife Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood protection scheme, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	<p>During severe flooding, Fife Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will maintain bodies of water as required within the council's schedule of clearance and repair. Fife Council will share good practice, provide information on property level protection and develop and review emergency plans.</p>
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Fife Council's responsibilities for emergency response are largely funded by Fife Council's Revenue Budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>Fife Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies takes account of the objective to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

# Falkirk, Grangemouth, Laurieston, Denny, Redding, Dunipace, Cumbernauld, Carron and Stenhousemuir (Potentially Vulnerable Area 10/11)

Local Plan District	Local authority	Main catchment
Forth Estuary	Falkirk Council, North Lanarkshire Council, Stirling Council	Forth Estuary (south) coastal

## Background

This large Potentially Vulnerable Area is 215km<sup>2</sup> and part of the Firth of Forth catchment (shown below). It contains the towns of Grangemouth, Falkirk, Denny and eastern Cumbernauld.

The main watercourse is the River Carron, flowing from the Carron Valley Reservoir in the west through Dunipace and Denny. Here it meets the Bonny Water and continues eastward through Larbert, Stenhousemuir and Carron before finally flowing into the Firth of Forth at Grangemouth.



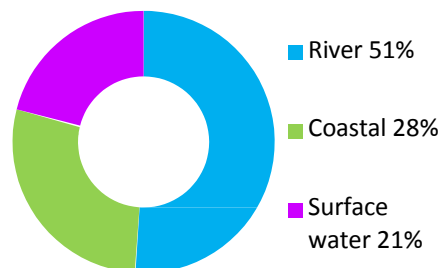
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Other notable watercourses include the Westquarter Burn, Avon Burn along with Castlerankine Burn and Bonny Water. The area has a risk of river, coastal and surface water flooding.

Interaction of coastal and river flooding occurs on the River Carron, as well as downstream of the River Avon and on the Pow Burn south of Airth. Coastal flooding affects areas of Grangemouth, Carron, Carronshore and Falkirk. However, the majority of flood damages are caused by river flooding.

There are approximately 2,000 residential properties and 330 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £3.8 million.



**Figure 1:** Annual Average Damages by flood source. *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

## Summary of flooding impacts

The highest risk of river flooding is from the River Carron in the Carron / Carronshore area; the Grange Burn in Grangemouth; the Westquarter Burn in Falkirk Westquarter; and the River Carron, Avon Burn and Castlerankine Burn in Denny and Dunipace. The highest risk of coastal flooding is from the Firth of Forth in Grangemouth, and Carron / Carronshore. The highest risk of surface water flooding is in Falkirk, Denny and Cumbernauld.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Falkirk, Grangemouth, Laurieston, Denny, Redding, Dunipace, Cumbernauld, Carron and Stenhousemuir (Potentially Vulnerable Area 10/11)'

## History of flooding

The following significant floods have been recorded in this area:

- 13 December 2006: Widespread flooding throughout the Falkirk area with businesses, residential properties and gardens affected. Large bus depot on Stirling Road was impacted and Avon Burn footbridge was washed away. Flooding resulted in the closure of the A883 at Checkbar and an electricity substation was threatened. Three residential and two non-residential properties flooded at Threepwood along the River Carron. Carronside Place in Dunipace was evacuated amid fears of flooding. Flooding of the Tor Burn affected Bogend Road.
- 2002: Flooding of the Chapel Burn affected Alloa Road in Stenhousemuir, resulting in 22 properties being flooded and up to 60 properties threatened.
- 30 September 1959: Grangemouth Docks flooded from the sea with highest tides on record at 4.47m.

## Objectives to manage flooding in Falkirk, Grangemouth, Laurieston, Denny, Redding, Dunipace, Cumbernauld, Carron and Stenhousemuir

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. The objectives below have been set for the Falkirk, Grangemouth, Laurieston, Denny, Redding, Dunipace, Cumbernauld, Carron and Stenhousemuir Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties in Carron and Carronshore caused by flooding from the River Carron and coastal flooding (Objective ID:10035);

- Reduce economic damages to residential and non-residential properties in Falkirk caused by flooding from the River Carron (Objective ID: 10036);
- Reduce economic damages to residential and non-residential properties in Falkirk Westquarter caused by flooding from the Westquarter Burn (Objective ID: 10037);
- Reduce economic damages to residential and non-residential properties in Denny and Dunipace caused by flooding from the River Carron, Avon Burn and Castlerankine Burn (Objective ID: 10038);
- Reduce economic damages to residential and non-residential properties and flood risk to community facilities in Bonnybridge and Banknock caused by flooding from the Bonny Water and its tributaries. (Objective ID: 10039)
- Reduce economic damages to residential and non-residential properties in Grangemouth caused by river flooding and coastal flooding. (Objective ID: 10040);
- Reduce risk to people in Bonnybridge, Denny, Carron and Grangemouth from river and coastal flooding. (Objective ID: 10041);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Falkirk, Stenhousemuir and Carron where practical. (Objective: 10033);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Cumbernauld (east) where practical. (Objective: 10101);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Polmont and Maddiston where practical. (Objective: 10104);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.

## Actions to manage flooding in Falkirk, Grangemouth, Laurieston, Denny, Redding, Dunipace, Cumbernauld, Carron and Stenhousemuir

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. The shaded actions below have been selected as the most appropriate for Falkirk, Grangemouth, Laurieston, Denny, Redding, Dunipace, Cumbernauld, Carron and Stenhousemuir Potentially Vulnerable Area.

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

The delivery of selected actions over the six-year plan cycle by year is summarised below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
		Flood protection scheme/works			
	New flood warning				
Community flood action groups					
Flood protection study					
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					



<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100400006)</b>		
<b>Objective (ID):</b>	<p>Reduce risk to people in Bonnybridge, Denny, Carron and Grangemouth from river and coastal flooding (10041)</p> <p>Reduce economic damages to residential and non-residential properties in Grangemouth caused by river flooding and coastal flooding (10040)</p> <p>Reduce economic damages to residential and non-residential properties in Falkirk caused by flooding from the River Carron (10036)</p> <p>Reduce economic damages to residential and non-residential properties in Carron and Carronshore caused by flooding from the River Carron and coastal flooding (10035)</p>		
<b>Delivery lead:</b>	Falkirk Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>1 of 42</b>	<b>1 of 1</b>	<b>1 of 7</b>
<b>Delivery Period:</b>	2018/19 Detailed design to commence, 2020/21 procurement of main works and advance works to commence. 2021/22 construction to commence. Completion is expected in 2027.		
<b>Status:</b>	Scheme not started. Grangemouth flood protection study is programmed to reach approved scheme status by 2018/19. Implementation of this scheme including the precursor study, is likely to span a 10 year period from 2017-2027.		
<b>Description:</b>	A flood protection scheme has been proposed for the Grangemouth area. It would include the River Carron, Grange Burn, River Avon and the Forth Estuary shoreline. The scheme would consist of flood defences, sediment management, tidal barriers/gates and natural flood management and would provide a 1 in 200 year standard of protection. Implementation of this scheme is likely to span a 10 year period from 2017-2027.		
<b>Related Actions:</b>	Awareness raising, Community action groups, Flood protection study, Maintain flood warning, New flood warning, Planning Policy, Strategic mapping and modelling.		
<b>Coordination Arrangement:</b>	The scheme is to reach approval in 2018/2019, thereafter detailed design, procurement, advance works will commence in anticipation of main construction works.		
<b>Funding Arrangement:</b>	Funding is expected from Scottish Government Capital Grant Allocation.		
<b>Potential impacts</b>			
<b>Economic:</b>	The proposed scheme may benefit 1261 residential properties and 99 non-residential properties at risk of flooding in this location, with estimated damages avoided of £6.0 billion. The flood protection scheme has an estimated benefit cost ratio of 58.		
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection scheme area. There may be negative impacts through disturbance to the local community during the construction phase.		



**Environmental:**

Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. The proposed flood protection scheme is located on a number of rivers and a part of the Forth Estuary whose physical condition has been identified by SEPA to be at less than good status. These include the Grange Burn, part of the River Carron and the Middle Forth Estuary (water body IDs 3300, 4200 and 200436). Opportunities to improve the condition of the rivers and estuary should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. World Heritage Sites, scheduled monuments, listed buildings, local nature reserves, Sites of Special Scientific Interest and ancient woodlands are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>NEW FLOOD WARNING (100990010)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Hydrometry developments are to begin in autumn 2017. The new flood warning service is to be launched in June 2020.
<b>Status:</b>	Not started
<b>Description:</b>	The area under consideration includes properties affected by flooding from the River Carron and tributaries downstream of the Carron Valley Reservoir. Full scoping, infrastructure and a flood forecasting system will be required before a flood warning service can be delivered in this area. Communities that will benefit from a warning will be identified during development of the scheme.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood protection study, Flood protection scheme, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	A flood protection study and scheme for Grangemouth and a flood protection study for Denny/Dunipace are proposed for this PVA. SEPA will work with the local authority to ensure that changes to hydrology and flood risk as a result of the proposed flood protection scheme and new information about flood risk resulting from the studies are fully considered in the new flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement. In addition, Scottish Government provides grant funding to enable SEPA to implement new flood warning schemes.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100400005)</b>		
<b>Objective (ID):</b>	<p>Reduce risk to people in Bonnybridge, Denny, Carron and Grangemouth from river and coastal flooding (10041)</p> <p>Reduce economic damages to residential and non-residential properties in Grangemouth caused by river flooding and coastal flooding (10040)</p> <p>Reduce economic damages to residential and non-residential properties in Falkirk caused by flooding from the River Carron (10036)</p> <p>Reduce economic damages to residential and non-residential properties in Carron and Carronshore caused by flooding from the River Carron and coastal flooding (10035)</p>		
<b>Delivery lead:</b>	Falkirk Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>11 of 168</b>	<b>1 of 5</b>	<b>1 of 26</b>
<b>Delivery Period:</b>	The study is expected to be completed in Summer 2018 and then to be taken to approved scheme status by 2018/19.		
<b>Status:</b>	Grangemouth flood protection study is currently going through information gathering and option appraisal with anticipated completion for submission for approved status in Summer 2018, with construction thereafter.		
<b>Description:</b>	A flood protection study is currently underway for Grangemouth to develop a flood protection scheme (FPS). The flood risk management options under consideration include flood defences, sediment management, tidal barriers/ gates and natural flood management. Natural flood management includes surge attenuation and sediment management. The study will also consider the viability of property level protection. The study is due to complete in 2018, followed by phased delivery of actions from 2018-2027.		
<b>Related Actions:</b>	Maintain flood warning, New flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Falkirk Council has appointed a Consultant to assist with the delivery of this project. Falkirk Council will liaise with SEPA, responsible authorities, landowners and other agencies where required.		
<b>Funding Arrangement:</b>	£2.4 million funding for this study has been identified within Falkirk Council's three year approved capital programme to 2017/18. An allocation of Tax Incremental Funding is included within this.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 1261 residential properties and 99 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £6.0 billion.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		

**Environmental:**

Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The physical condition of a number of rivers and a part of the Forth Estuary within the study area is identified by SEPA to be at less than good status. These include the Grange Burn, parts of the River Carron, Auchenbowie Burn and the Middle Forth Estuary (water body IDs 3300, 4200, 4210 and 200436). Opportunities to improve the condition of the rivers and estuary should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. World Heritage Sites, scheduled monuments, listed buildings, local nature reserves, Sites of Special Scientific Interest and ancient woodlands are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100380005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Denny and Dunipace caused by flooding from the River Carron, Avon Burn and Castlerankine Burn (10038)		
<b>Delivery lead:</b>	Falkirk Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>43 of 168</b>	<b>3 of 5</b>	<b>7 of 26</b>
<b>Delivery Period:</b>	Improved modelling and understanding of risk is expected by 2017/18.		
<b>Status:</b>	Commenced 2016.		
<b>Description:</b>	Initial flood risk investigations are currently underway for Denny/ Dunipace, including modelling work. These initial investigations are due to report in 2016. It is likely that a further flood protection study will be needed to assess options to manage flood risk including flood defences, sediment management and natural flood management. The study should also consider the viability of property level protection. Natural flood management options that should be considered include runoff control and sediment management. The assessment should consider these actions in combination and the impacts on flood risk upstream and downstream of each action.		
<b>Related Actions:</b>	Maintain flood warning, New flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Falkirk Council has appointed a Consultant to assist with the delivery of this project. Falkirk Council will liaise with SEPA, responsible authorities, landowners and other agencies where required.		
<b>Funding Arrangement:</b>	This will be funded by Falkirk Council Revenue Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 155 residential properties and 12 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £8.6 million. Fifty of these residential and non-residential properties are at risk from high likelihood flooding and may benefit from natural flood management actions.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The Auchenbowie Burn (water body ID 4210) is located within the study area and the physical		

**Environmental:** condition of this river is identified by SEPA to be at less than good status. 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 (100370005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Falkirk Westquarter caused by flooding from the Westquarter Burn (10037)		
<b>Delivery lead:</b>	Falkirk Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>110 of 168</b>	<b>4 of 5</b>	<b>20 of 26</b>
<b>Delivery Period:</b>	2016-2027, subject to funding being available from Falkirk Council Revenue Budget.		
<b>Status:</b>	Not started. The area is currently being managed through routine maintenance and inspection.		
<b>Description:</b>	Vegetation management and general maintenance are carried out by Falkirk Council to control erosion at Falkirk Westquarter. In future there may be a need for a flood protection study to assess whether direct flood defences and sediment management could further reduce flood risk in this area.		
<b>Related Actions:</b>	Maintain flood warning, New flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	The area is currently being managed through routine maintenance and inspection. Falkirk Council will liaise with SEPA, responsible authorities, landowners and other agencies where required.		
<b>Funding Arrangement:</b>	This will be subject to funding by Falkirk Council Revenue Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 67 residential properties and one non-residential property at risk of flooding in this location, with potential damages avoided of up to £3.3 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The Grange Burn (water body ID 3300) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. Ancient woodlands are also present in the study area and could be positively or negatively impacted.		

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100330018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Falkirk, Stenhousemuir and Carron where practical (10033)
<b>Delivery lead:</b>	Falkirk Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Not started. The first plan will be delivered in 2021/22.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	<p>The current Integrated Catchment projects within the Falkirk Council local authority area will inform the delivery of a surface water management plans in the area. Falkirk Council will lead on the development of surface water management plans in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.</p> <p>Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.</p>
<b>Funding Arrangement:</b>	This will be funded by Falkirk Council Revenue Budget.



<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100330019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Falkirk, Stenhousemuir and Carron where practical (10033)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for Falkirk was carried out in delivery period SR10 (2010-2015) to support the surface water management planning process in SWMP Priority Areas. The study has improved knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Falkirk Council.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101010018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Cumbernauld (east) where practical (10101)
<b>Delivery lead:</b>	North Lanarkshire Council
<b>Delivery Period:</b>	Plan Development will be in 2016/17 to 2018/19. Plan Implementation will be carried out in 2019/20 to 2021/22 where practical and subject to availability of capital funding.
<b>Status:</b>	Not started. Initial scoping work is underway to determine the scope of the related Scottish Water led Dunnswood Integrated Catchment Study (2017-2020).
<b>Description:</b>	The area will be covered by a surface water management plan that sets objectives for the management of surface water flood risk and identifies the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	The surface water management plan will be led by North Lanarkshire Council. The council will continue to collaborate with SEPA, Scottish Water and other relevant responsible authorities where appropriate. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by North Lanarkshire Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101010019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Cumbernauld (east) where practical (10101)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2020
<b>Status:</b>	Ongoing
<b>Description:</b>	<p>An integrated catchment study covering the Dunnswood catchment will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. the sewer network, and watercourses.</p> <p>This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and North Lanarkshire Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions to the significant flooding issues.</p>
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water), Surface water plan/study (North Lanarkshire Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with North Lanarkshire Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by North Lanarkshire Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101040018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Polmont and Maddiston where practical (10104)
<b>Delivery lead:</b>	Falkirk Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Not started. The first plan will be delivered in 2021/22.
<b>Description:</b>	The area will 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. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	The current Integrated Catchment projects within the Falkirk Council area may inform the delivery of a surface water management plan covering the area. Falkirk Council will lead on the development of surface water management plans in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by Falkirk Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101040019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Polmont and Maddiston where practical (10104)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for Falkirk was carried out in delivery period SR10 (2010-2015) to support the surface water management planning process in SWMP Priority Areas. The study has improved knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water), Surface water plan/study (Falkirk Council).
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Falkirk Council

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Coastal mapping improvements are expected in this area in 2016 to 2019. However, the timings of coastal mapping improvements may be dependant on local authorities coastal studies.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.
<b>Related Actions:</b>	Flood protection scheme, Flood protection study, Planning Policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	A flood protection study and flood protection scheme are proposed for Grangemouth. SEPA will work with the local authority to ensure that strategic mapping and modelling developments reflect the changes in flood risk resulting from new flood protection scheme and new information about flood risk resulting from the proposed flood protection study where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Bonnybridge 2016-2019. Dalderse 2016-2019. Dalmuir 2016-2020. Denny 2018-2019. Dunnswood 2017-2020. Kinneil Kerse 2016-2018.
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Bonnybridge, Dalderse, Dalmuir, Denny, Dunnswood and Kinneil Kerse sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100400017)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Grangemouth caused by river flooding and coastal flooding (10040)
<b>Delivery lead:</b>	Falkirk Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Falkirk Council will continue to maintain the existing Grangeburn Road Flood Protection Scheme on the Grange Burn. The scheme includes a flood relief channel conveying flows to the River Avon.
<b>Related Actions:</b>	Awareness raising, Community action groups, Emergency plans/response, Maintain flood warning, Maintenance, New flood warning.
<b>Coordination Arrangement:</b>	The scheme is inspected on a cyclic basis and remedial actions identified and procured accordingly.
<b>Funding Arrangement:</b>	This will be funded by Falkirk Council Revenue Budget



<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Grangemouth flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Community flood action group, Emergency plans/response, Flood forecasting, Flood protection scheme, Flood protection study, Self help.
<b>Coordination Arrangement:</b>	A flood protection study and scheme are both proposed for Grangemouth. SEPA will work with the local authority to ensure that changes to hydrology and flood risk as a result of the proposed scheme and any new information about flood risk resulting from the proposed study are fully considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, New flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (100350012)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Carron and Carronshore caused by flooding from the River Carron and coastal flooding (10035)
<b>Delivery lead:</b>	Community
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Ongoing
<b>Description:</b>	Carronvale Residents and Tenants Association operates in this area. The group raises flooding issues and promotes flood resilience.
<b>Related Actions:</b>	Awareness Raising, Emergency plans/response, Flood forecasting, Flood protection scheme, Flood protection study, Maintain flood warning, Maintain flood protection scheme, Maintenance, New flood warning, Self help, Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	Falkirk Council will engage with the community to continue to develop local resilient communities groups as required. This will be done by developing and reviewing emergency plans and facilitating resilient communities plans.
<b>Funding Arrangement:</b>	Falkirk Council engagement with the community will be funded by the Council Revenue Budget.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Community flood action groups, Emergency plans/response, Flood forecasting, Maintain flood warning, New flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues responsible authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>SEPA will engage with the community and promote Floodline. This will be achieved through business liaison and SEPA led education events.</p> <p>Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>For the new flood protection scheme, SEPA will support the local authority's communications and engagement activities with media activity, local public awareness events and education engagement with schools. SEPA will also deliver joint communications with local authorities for Floodline customers in any newly protected flood warning area. To support the delivery of the new SEPA flood warning scheme, SEPA will carry out a local launch event and engage directly with residents in the area. This will be supported by local and national media communications. SEPA will also support and participate in local public awareness events, in partnership with the local authority, community council or other local representative organisations, including schools.</p> <p>Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities.</p> <p>Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Community flood action group, Emergency plans/response, Flood forecasting, Flood Protection Scheme Maintain flood warning, New flood warning, Self help.
<b>Coordination Arrangement:</b>	A flood protection scheme is proposed for Grangemouth. SEPA will support the local authority's communications and engagement activities. A new flood warning scheme is under consideration for properties affected by flooding from the River Carron and tributaries downstream of the Carron Valley Reservoir. To support the delivery of the new SEPA flood warning scheme, SEPA will carry out

	<p>communications and engagement activities. SEPA's awareness raising activities will be coordinated with activities of other responsible authorities as required.</p> <p>Local authorities will work with local communities to raise awareness and assist SEPA in relation to the new flood warning system. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<p><b>Funding Arrangement:</b></p>	<p>SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.</p>

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Local authorities, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Community flood action group, Emergency plans/response, Maintain flood warning.
<b>Coordination Arrangement:</b>	Local authorities will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. The local authorities will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The relevant local authority will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood protection scheme, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, local authorities will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Local authority responsibilities may include (where appropriate) activating flood defence systems, provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.
<b>Funding Arrangement:</b>	Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, local authorities responsibilities for emergency response are largely funded by the relevant local authorities' relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.



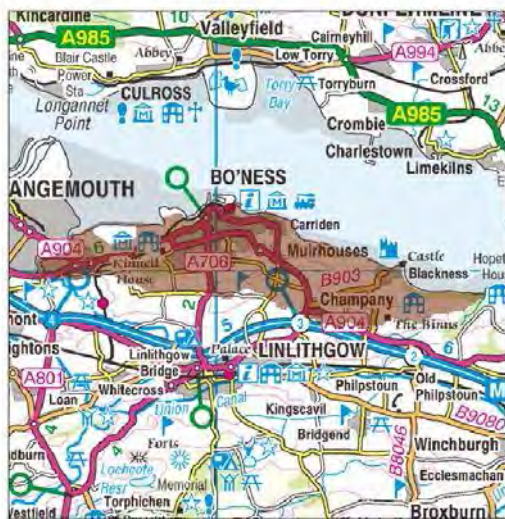
<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	<p>Scottish Planning Policy 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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection scheme, Flood protection study, Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>Local authority Flood Officers will work directly with their planning colleagues to coordinate as appropriate the implementation of policies and measures to ensure that the council Planning Policies takes account of the objective to reduce flood risk. The relevant Planning Authority is responsible for consulting SEPA and relevant services within responsible authorities.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Bo'ness (Potentially Vulnerable Area 10/12)

Local Plan District	Local authority	Main catchment
Forth Estuary	Falkirk Council, West Lothian Council	Forth Estuary (south) coastal

### Background

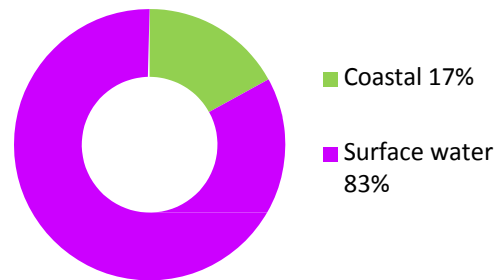
This Potentially Vulnerable Area is 23km<sup>2</sup> and part of the Firth of Forth catchment (shown below). This is a small, partially urbanised coastal area centred on the town of Bo'ness.



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The area has a risk of surface water and coastal flooding. The majority of damages in this Potentially Vulnerable Area are caused by surface water flooding.

There are approximately 200 residential properties and 70 non-residential properties at risk of flooding. The Annual Average Damages are approximately £620,000.



**Figure 1: Annual Average Damages by flood source.** *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

### Summary of flooding impacts

The highest risk of coastal flooding is to Bo'ness from the Firth of Forth. The highest risk of surface water flooding is also in Bo'ness.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Bo'ness (Potentially Vulnerable Area 10/12)'

## History of flooding

No significant floods have been recorded in this Potentially Vulnerable Area.

## Objectives to manage flooding in Bo'ness

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. The objectives below have been set for the Bo'ness Potentially Vulnerable Area.

- Accept significant flood risk in Bo'ness is managed appropriately. Maintain existing actions that reduce the risk of coastal flooding in Bo'ness. (Objective ID: 10044);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Bo'ness, Carriden and Muirhouse where practical. (Objective ID: 10042);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are detailed in the following section.

## Actions to manage flooding in Bo'ness

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. The shaded actions below have been selected as the most appropriate for Bo'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>
<i>Flood protection study</i>	<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 Policy

The delivery of selected actions over the six-year plan cycle by year is summarised below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100420018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Bo'ness, Carriden and Muirhouses where practical (10042)
<b>Delivery lead:</b>	Falkirk Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Not started. The first plan will be delivered in 2021/22.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	<p>The current Integrated Catchment projects within the Falkirk Council will inform the delivery of a surface water management plan covering the Falkirk Council area. Falkirk Council will lead on the development of surface water management plans in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.</p> <p>Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.</p>
<b>Funding Arrangement:</b>	This will be funded by Falkirk Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100420019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Bo'ness, Carriden and Muirhouses where practical (10042)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for Falkirk was carried out in delivery period SR10 (2010-2015) to support the surface water management planning process in SWMP Priority Areas. The study has improved knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Surface water plan/study (Falkirk Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Falkirk Council.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Coastal mapping improvements are expected in this area in 2016 to 2019. However, the timings of coastal mapping improvements may be dependant on local authorities coastal studies.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.
<b>Related Actions:</b>	Planning Policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	SEPA's strategic mapping activities will be coordinated with the activities of other responsible authorities as required.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Bo'ness 2016-2019. Kinneil Kerse 2016-2018.
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Bo'Ness and Kinneil Kerse sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.



<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100440017)</b>
<b>Objective (ID):</b>	Accept significant flood risk in Bo'ness is managed appropriately. Maintain existing actions that reduce the risk of coastal flooding in Bo'ness. (10044)
<b>Delivery lead:</b>	Falkirk Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Falkirk Council will continue to maintain the existing coastal flood defences.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	The defences are inspected on a cyclic basis and remedial actions identified and procured accordingly.
<b>Funding Arrangement:</b>	This will be funded by Falkirk Council Revenue Budget.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Blackness and Grangemouth flood warning areas which are part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	SEPA will work with the local authority during verification of existing flood warning system as required
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.


<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues responsible authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Falkirk Council and West Lothian Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood protection scheme, Maintain flood warning.
<b>Coordination Arrangement:</b>	Local authorities will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Local authorities will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The relevant local authority will fund maintenance and repair work from its relevant budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. West Lothian Council has and maintains a Severe Weather Plan and a Major Incident Plan which are intended for use to initiate and coordinate a response and possible actions in the event of a flooding incident. West Lothian Council provides sandbags and Aquasacs for public use in emergencies.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood warning, Maintain flood protection scheme, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, local authorities will work in partnership with the emergency responders, SEPA, Met Office, Scottish Water, voluntary organisations and other agencies to coordinate the response to the incident. Local authority responsibilities may include (where appropriate) activating flood defence systems, provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment. West Lothian Council may provide sandbags and 'Aquasacs' subject to resources being available. Sandbag supplies are also available at Scottish Fire & Rescue Stations in Linlithgow, Broxburn, Polbeth and Livingston. West Lothian Council will also arrange road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer-term recovery measures for rehabilitation of the community and restoration of the environment all in accord with its Severe Weather and Major Incident Plans.
<b>Funding Arrangement:</b>	Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, local authorities' responsibilities for



emergency response are largely funded by the relevant local authorities' relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.



<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>Local authority Flood Officers will work directly with their planning colleagues to coordinate as appropriate the implementation of policies and measures to ensure that the council Planning Policies takes account of the objective to reduce flood risk. The relevant Planning Authority is responsible for consulting SEPA and relevant services within responsible authorities.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

# Linlithgow Bridge, Bathgate, Whiteside and Slamannan (Potentially Vulnerable Area 10/13)

Local Plan District	Local authority	Main catchment
Forth Estuary	Falkirk Council, North Lanarkshire Council, West Lothian Council	River Avon

## Background

This Potentially Vulnerable Area is 165km<sup>2</sup> and part of the Firth of Forth catchment (shown below). This is a large, mainly rural area containing the towns of Linlithgow, Armadale, Slamannan and Bathgate. The main watercourse is the River Avon which flows eastward through Slamannan and Avonbridge, before flowing north past Linlithgow. Other notable watercourses include the Logie Water, Couston Water, Bathgate Water, Brunton Burn and Mains Burn.



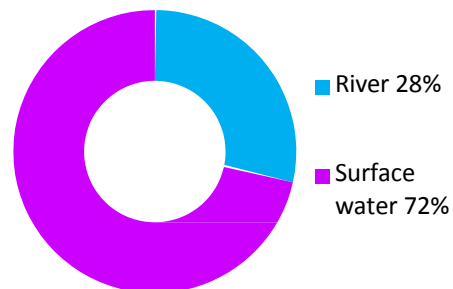
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The area has a risk of river and surface water flooding. The majority of damages in this Potentially Vulnerable Area are caused by surface water flooding.

The highest risk of river flooding is from Bathgate Water, Bell's Burn, River Avon and Culloch Burn to Linlithgow, Bathgate and Slamannan. There is also a risk of flooding from Linlithgow Loch.

There are approximately 490 residential properties and 210 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £1.6 million.



**Figure 1:** Annual Average Damages by flood source. *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

## Summary of flooding impacts

The highest risk of surface water flooding is in Linlithgow, Armadale and Bathgate.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Linlithgow Bridge, Bathgate, Whiteside and Slamannan (Potentially Vulnerable Area 10/13)'

## History of flooding

A series of flood events in Linlithgow throughout 1998 and 1999 resulted in the promotion of the Linlithgow Flood Prevention Scheme.

## Objectives to manage flooding in Linlithgow Bridge, Bathgate, Whiteside and Slamannan

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. The objectives below have been set for the Linlithgow Bridge, Bathgate, Whiteside and Slamannan Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties in Linlithgow caused by flooding from the River Avon and Bell's Burn (Objective ID: 10047);
- Reduce economic damages to residential and non-residential properties and risk to people in the Linlithgow Bridge, Bathgate, Whiteside and Slamannan Potentially Vulnerable Area caused by river flooding (Objective ID: 10048, 10049);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Bathgate where practical. (Objective ID: 10045);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Linlithgow where practical. (Objective ID: 10100);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Polmont and Maddiston where practical (Objective ID: 10104);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

### Actions to manage flooding in Linlithgow Bridge, Bathgate, Whiteside and Slamannan 10/13

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. The actions shaded have been selected as the most appropriate for Linlithgow Bridge, Bathgate, Whiteside and Slamannan 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	<i>Maintain flood warning</i>	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning Policy

The delivery of selected actions by year over the six-year plan cycle is summarised below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection study					
Natural flood management study					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100470005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Linlithgow caused by flooding from the River Avon and Bell's Burn (10047)		
<b>Delivery lead:</b>	West Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>90 of 168</b>	<b>2 of 4</b>	<b>16 of 26</b>
<b>Delivery Period:</b>	2017-2018		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Linlithgow to assess whether modification of conveyance, flood defences and sediment management could reduce flood risk. The study should also consider the viability of property level protection. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Discussions will be undertaken with SEPA and Scottish Water to progress this study.		
<b>Funding Arrangement:</b>	This will be funded by the relevant West Lothian Council Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 56 residential properties and 13 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £4.1 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. Conservation areas, listed buildings and ancient woodlands are also present in the study area and could be positively or negatively impacted.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100490005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in the Linlithgow Bridge, Bathgate, Whiteside and Slamannan Potentially Vulnerable Area caused by river flooding (10048, 10049)		
<b>Delivery lead:</b>	Falkirk Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>121 of 168</b>	<b>5 of 5</b>	<b>22 of 26</b>
<b>Delivery Period:</b>	2016-2021. Integrated catchment study ongoing.		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Slamannan to assess whether sediment management, direct flood defences and natural flood management could reduce flood risk. The study should also consider the viability of property level protection. Natural flood management options that should be considered include runoff control and sediment management. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream. The study should be informed by the ongoing surface water investigations and an Integrated Catchment Study.		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	A future study within Slamannan will be informed and coordinated with the outputs of the integrated catchment study. Falkirk Council will liaise with SEPA, responsible authorities, landowners and other agencies where required.		
<b>Funding Arrangement:</b>	This will be funded by Falkirk Council Revenue Budget		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 18 residential properties and one non-residential property at risk of flooding in this location, with potential damages avoided of up to £2.1 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. Parts of the River Avon (water body IDs 3101 and 3102) are located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river		

**Environmental:** should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted.



<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100490025)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in the Linlithgow Bridge, Bathgate, Whiteside and Slamannan Potentially Vulnerable Area caused by river flooding (10048, 10049)		
<b>Delivery lead:</b>	West Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>138 of 168</b>	<b>3 of 4</b>	<b>23 of 26</b>
<b>Delivery Period:</b>	2018-2019		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Bathgate to assess whether sediment management, flood defences and natural flood management could reduce flood risk. The study should also consider property relocation and the viability of property level protection. Natural flood management options that should be considered include runoff control and sediment management. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream. There is an opportunity for partnership working with the Almond/Avon reconnection project and Bathgate restoration project.		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Discussions to be undertaken with SEPA and Scottish Water to progress this study.		
<b>Funding Arrangement:</b>	This will be funded by the relevant West Lothian Council Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 11 residential properties and one non-residential property at risk of flooding in this location, with potential damages avoided of up to £1.0 million. Sixteen of these residential and non-residential properties are at risk from high likelihood flooding and may benefit from natural flood management actions.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The Couston Water (water body		



**Environmental:** ID 3107) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100490027)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in the Linlithgow Bridge, Bathgate, Whiteside and Slamannan Potentially Vulnerable Area caused by river flooding (10048, 10049)		
<b>Delivery lead:</b>	West Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>156 of 168</b>	<b>4 of 4</b>	<b>26 of 26</b>
<b>Delivery Period:</b>	2019-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Blackridge to assess whether sediment management and modification of conveyance (with a focus on existing culverts) could reduce flood risk. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Discussions will be undertaken with Falkirk Council, SEPA and Scottish Water to progress this study.		
<b>Funding Arrangement:</b>	This will be funded by the relevant West Lothian Council Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit five residential properties and three non-residential properties at risk of flooding in this location, with potential damages avoided of up to £55,000.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted.		

<b>Action (ID):</b>	<b>NATURAL FLOOD MANAGEMENT STUDY (100490003)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in the Linlithgow Bridge, Bathgate, Whiteside and Slamannan Potentially Vulnerable Area caused by river flooding (10048, 10049)
<b>Delivery lead:</b>	West Lothian Council in partnership with Falkirk Council
<b>Delivery Period:</b>	2016-2021. This delivery period is indicative and subject to funding.
<b>Status:</b>	Not started
<b>Description:</b>	A natural flood management study has been recommended for Bathgate, Blackridge, Linlithgow and Slamannan to assess whether runoff control and sediment management could help reduce flood risk. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream. The study should be carried out in conjunction with the flood protection studies and in collaboration with Falkirk Council.
<b>Related Actions:</b>	Awareness raising, Flood protection study, Planning Policy, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	West Lothian Council and Falkirk Council will liaise SEPA and Scottish Natural Heritage during progression of this study.
<b>Funding Arrangement:</b>	This will be funded in partnership by the Relevant West Lothian Council Budget and Falkirk Council Relevant Budget.
<b>Potential impacts</b>	
<b>Economic:</b>	The economic impact of natural flood management actions is difficult to define. However, these actions can reduce flood risk for high likelihood events. Sixteen residential and non-residential properties could potentially benefit from natural flood management actions in this location.
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.
<b>Environmental:</b>	Natural flood management actions can have a positive impact on the ecological quality of the environment by restoring and enhancing natural habitats. The physical condition of a number of rivers within the study area is identified by SEPA to be at less than good status. These include parts of the River Avon, Mains Burn and Boghead Burn (water body IDs 3101, 3103 and 3107). Opportunities to improve the condition of this estuary should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura

**Environmental:** site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100450018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Bathgate where practical (10045)
<b>Delivery lead:</b>	West Lothian Council
<b>Delivery Period:</b>	SWMP is complete.
<b>Status:</b>	Complete
<b>Description:</b>	The area has been covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water provided local knowledge and understanding of the sewer network. This included Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	This surface water management plan has been completed.  Scottish Water worked with and supported surface water management planning by ensuring that best available knowledge and data was used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This was funded by the relevant West Lothian Council Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100450019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Bathgate where practical (10045)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2017-2020
<b>Status:</b>	Ongoing
<b>Description:</b>	<p>An integrated catchment study covering the Bathgate catchment will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network i.e. the sewer network, and watercourses.</p> <p>This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and West Lothian Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions the significant flooding issues.</p>
<b>Related Actions:</b>	Surface water plan/study (West Lothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with West Lothain Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by West Lothain Council.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101000018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Linlithgow where practical (10100)
<b>Delivery lead:</b>	West Lothian Council
<b>Delivery Period:</b>	SWMP is complete.
<b>Status:</b>	Study is complete.
<b>Description:</b>	The area has been covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will undertake further investigation and modelling in the Armadale, Bathgate, Blackburn. Kinneil Kerse sewer catchments to improve knowledge and understanding of flood risk in this area as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	This surface water management plan has been completed.  Scottish Water worked with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	The surface water management plan was funded by the relevant West Lothian Council budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101000019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Linlithgow where practical (10100)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2019
<b>Status:</b>	Ongoing
<b>Description:</b>	<p>An integrated catchment study covering the Linlithgow catchment will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. the sewer network, and watercourses.</p> <p>This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and West Lothian Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions the significant flooding issues.</p>
<b>Related Actions:</b>	Surface water plan/study (West Lothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with West Lothian Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by West Lothian Council.



<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101040018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Polmont and Maddiston where practical (10104)
<b>Delivery lead:</b>	Falkirk Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Not started. The first plan will be delivered in 2021/22.
<b>Description:</b>	The area will 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. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	<p>The current Integrated Catchment projects within the Falkirk Council area will inform the delivery of a surface water management plan covering the area. Falkirk Council will lead on the development of surface water management plans in partnership with Scottish Water, SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.</p> <p>Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.</p>
<b>Funding Arrangement:</b>	This will be funded by Falkirk Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101040019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Polmont and Maddiston where practical (10104)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for Falkirk was carried out in delivery period SR10 (2010-2015) to support the surface water management planning process in SWMP Priority Areas. The study has improved knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Surface water plan/study (Falkirk Council and West Lothain Council).
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Falkirk Council.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	SEPA led surface water mapping improvements are expected to be undertaken in 2016. Incorporation of the local authority surface water study depends on local authority timings.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,600km <sup>2</sup> of improved surface water data is currently available within this Local Plan District. The inclusion of additional surface water hazard data resulting from the completion of local authority surface water management plans and Scottish Water integrated catchment studies will be considered as these projects are completed.
<b>Related Actions:</b>	Flood protection study, Natural flood management study, Planning Policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	A surface water management plan and associated integrated catchment study are proposed for the Linlithgow area, Polmont and Maddiston area and Bathgate area. SEPA will work with the responsible authorities to ensure that new information about flood risk resulting from the proposed surface water studies is considered in SEPA's strategic mapping and modelling developments where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Armadale 2016-2018. Bathgate 2018-2020. Blackburn 2018-2020. Kinneil Kerse 2016-2018. Linlithgow 2016-2019.
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Armadale, Bathgate, Blackburn, Kinneil Kerse and Linlithgow sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100470017)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Linlithgow caused by flooding from the River Avon and Bell's Burn (10047)  Reduce economic damages to residential and non-residential properties and risk to people in the Linlithgow Bridge, Bathgate, Whiteside and Slamannan Potentially Vulnerable Area caused by river flooding (10048, 10049)
<b>Delivery lead:</b>	West Lothian Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	West Lothian Council will continue to maintain the existing Linlithgow Flood Protection Scheme along the Mains Burn. The scheme provides protection to part of the town and includes reservoirs storage, a diversion channel and channel improvements.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	West Lothian Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that the infrastructure is maintained.
<b>Funding Arrangement:</b>	This will be funded from the relevant West Lothian Council budget.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.


<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting.
<b>Coordination Arrangement:</b>	In the event of severe issues responsible authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.



<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Local authorities, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood protection scheme.
<b>Coordination Arrangement:</b>	Local authorities will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Local authorities will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The relevant local authority will fund maintenance and repair work from its relevant budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. West Lothian Council has and maintains a Severe Weather Plan and a Major Incident Plan which are intended for use to initiate and coordinate a response and possible actions in the event of a flooding incident. West Lothian Council provides sandbags and Aquasacs for public use in emergencies.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood protection scheme, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, local authorities will work in partnership with the emergency responders, SEPA, Met Office, Scottish Water, voluntary organisations and other agencies to coordinate the response to the incident. Local authority responsibilities may include (where appropriate) activating flood defence systems, provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment. West Lothian Council may provide sandbags and 'Aquasacs' subject to resources being available. Sandbag supplies are also available at Scottish Fire & Rescue Stations in Linlithgow, Broxburn, Polbeth and Livingston. West Lothian Council will also arrange road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer-term recovery measures for rehabilitation of the community and restoration of the environment all in accord with its Severe Weather and Major Incident Plans.
<b>Funding Arrangement:</b>	Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, local authorities' responsibilities for



emergency response are largely funded by the local authorities' relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Natural flood management study, Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>Local authority Flood Officers will work directly with their planning colleagues to coordinate as appropriate the implementation of policies and measures to ensure that the council Planning Policies takes account of the objective to reduce flood risk. The relevant Planning Authority is responsible for consulting SEPA and relevant services within responsible authorities.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' relevant budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Philipstoun (Potentially Vulnerable Area 10/14)

Local Plan District	Local authority	Main catchment
Forth Estuary	Falkirk Council, West Lothian Council	Forth Estuary (south) coastal

### Background

This Potentially Vulnerable Area is 27km<sup>2</sup> and part of the Firth of Forth catchment (shown below). This is a small, rural area containing the rural village of Philipstoun.

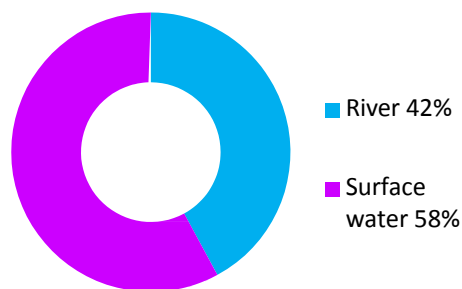


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There is a low risk of flooding in this area, with the majority of the damages caused by surface water flooding.

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

The Annual Average Damages are approximately £23,000.



**Figure 1:** Annual Average Damages by flood source. *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

### Summary of flooding impacts

Work carried out since the National Flood Risk Assessment in 2011 has concluded that the risk of flooding in this Potentially Vulnerable Area is now relatively low. The designation of this Potentially Vulnerable Area will be reviewed in the next flood risk management planning cycle.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Philipstoun (Potentially Vulnerable Area 10/14)'

## History of flooding

No significant floods have been recorded in this Potentially Vulnerable Area.

## Objectives to manage flooding in Philipstoun

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. The objectives below have been set for the Philipstoun Potentially Vulnerable Area.

- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in Philipstoun

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. The actions shaded have been selected as the most appropriate for Philipstoun 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>	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 Policy

The delivery of selected actions by year over the six-year plan cycle is summarised below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Awareness raising					
Emergency plans/response					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	SEPA led surface water mapping improvements are expected to be undertaken in 2016. Incorporation of the local authority surface water study depends on local authority timings.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,600km <sup>2</sup> of improved surface water data is currently available within this Local Plan District.
<b>Related Actions:</b>	Planning Policy.
<b>Coordination Arrangement:</b>	SEPA's strategic mapping activities will be coordinated with the activities of other responsible authorities as required.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.



<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Linlithgow 2016-2019
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Linlithgow sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009. The Linlithgow sewer catchment shares a small area with the Philipstoun PVA. The Section 16 assessment carried out for Linlithgow will therefore cover a small of the Philipstoun PVA
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.


<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plan/response, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting.
<b>Coordination Arrangement:</b>	In the event of severe issues responsible authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Falkirk Council and West Lothian Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response.
<b>Coordination Arrangement:</b>	Local authorities will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Local authorities will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The relevant local authority will fund maintenance and repair work from its relevant budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. West Lothian Council has and maintains a Severe Weather Plan and a Major Incident Plan which are intended for use to initiate and coordinate a response and possible actions in the event of a flooding incident. West Lothian Council provides sandbags and Aquasacs for public use in emergencies.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, local authorities will work in partnership with the emergency responders, SEPA, Met Office, Scottish Water, voluntary organisations and other agencies to coordinate the response to the incident. Local authority responsibilities may include (where appropriate) activating flood defence systems, provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment. West Lothian Council may provide sandbags and 'Aquasacs' subject to resources being available. Sandbag supplies are also available at Scottish Fire & Rescue Stations in Linlithgow, Broxburn, Polbeth and Livingston. West Lothian Council will also arrange road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer-term recovery measures for rehabilitation of the community and restoration of the environment all in accord with its Severe Weather and Major Incident Plans.
<b>Funding Arrangement:</b>	Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, local authorities responsibilities for



emergency response are largely funded by the relevant local authorities' relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>Local authority Flood Officers will work directly with their planning colleagues to coordinate as appropriate the implementation of policies and measures to ensure that the council Planning Policies takes account of the objective to reduce flood risk. The relevant Planning Authority is responsible for consulting SEPA and relevant services within responsible authorities.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' relevant budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.



## South Queensferry (Potentially Vulnerable Area 10/15)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council, West Lothian Council	Forth Estuary (south) coastal

### Background

This Potentially Vulnerable Area is 23km<sup>2</sup> and is part of the Firth of Forth catchment (shown below). This is a small, coastal area centred around the town of Queensferry on the southern bank of the Firth of Forth.

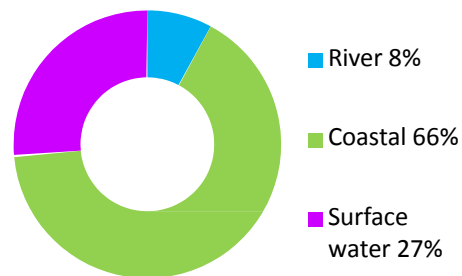


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There is low risk of flooding in this area and the majority of flood damages are caused by coastal flooding.

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

The Annual Average Damages are approximately £31,000.



**Figure 1: Annual Average Damages by flood source.** *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

### Summary of flooding impacts

Work carried out since the National Flood Risk Assessment in 2011 has concluded that the risk of flooding in this Potentially Vulnerable Area is now relatively low. The designation of this Potentially Vulnerable Area will be reviewed in the next flood risk management planning cycle.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'South Queensferry (Potentially Vulnerable Area 10/15)'

## History of flooding

No significant floods have been recorded in this Potentially Vulnerable Area.

## Objectives to manage flooding in South Queensferry

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. The objectives below have been set for the South Queensferry Potentially Vulnerable Area.

- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in South Queensferry

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. The actions shaded below have been selected as the most appropriate for South Queensferry 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 Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Awareness raising					
Emergency plans/response					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	SEPA led surface water mapping improvements are expected to be undertaken in 2016. Incorporation of the local authority surface water study depends on local authority timings.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,600km <sup>2</sup> of improved surface water data is currently available within this Local Plan District.
<b>Related Actions:</b>	Planning Policy.
<b>Coordination Arrangement:</b>	SEPA's strategic mapping activities will be coordinated with the activities of other responsible authorities as required.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	South Queensferry 2016-2019
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the South Queensferry sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting.
<b>Coordination Arrangement:</b>	In the event of severe issues local authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Awareness raising will be coordinated through the Local Plan District (LPD) between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.



<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Local authorities, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response.
<b>Coordination Arrangement:</b>	Local authorities will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. Local authorities will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The relevant local authority will fund maintenance and repair work from its relevant budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	<p>Existing. The City of Edinburgh Council maintains a Flooding Emergency Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the Edinburgh area may cause flooding. The City of Edinburgh Council's Flood Prevention service in Transport Maintenance regularly assess river levels and flows and liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting Edinburgh being passed by SEPA to Police Scotland (Edinburgh Division), an assessment of the need to convene a multi-agency Edinburgh Flood Group will be made by the Senior Police Officer. Council representatives on the Edinburgh Flood Group will establish liaison with the Corporate Incident Management Team (if convened) at the Council Incident Coordination Centre, City Chambers and with the Flood Response Group based at Bankhead Depot, Sighthill.</p> <p>West Lothian Council has and will maintain a Severe Weather Plan and a Major Incident Plan which are intended for use to initiate and coordinate a response and possible actions in the event of a flooding incident.</p>
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. The City of Edinburgh Council operates Emergency Action Packs to determine where people should be deployed during flood events. The City of Edinburgh Council also owns temporary flood barriers and sandbags that can be used to protect properties from river flooding. West Lothian Council provides sandbags and Aquasacs for public use in emergencies.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintenance.
<b>Coordination Arrangement:</b>	<p>During severe flooding, local authorities will work in partnership with the emergency responders, SEPA, Met Office, Scottish Water, voluntary organisations and other agencies to coordinate the response to the incident. The City of Edinburgh Council's responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions,</p>

	<p>assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.</p> <p>West Lothian Council may provide sandbags and 'Aquasacs' subject to resources being available. Sandbag supplies are also available at Scottish Fire &amp; Rescue Stations in Linlithgow, Broxburn, Polbeth and Livingston. West Lothian Council will also arrange road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer-term recovery measures for rehabilitation of the community and restoration of the environment all in accord with its Severe Weather and Major Incident Plans.</p>
<p><b>Funding Arrangement:</b></p>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, local authorities responsibilities for emergency response are largely funded by the relevant local authorities' relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

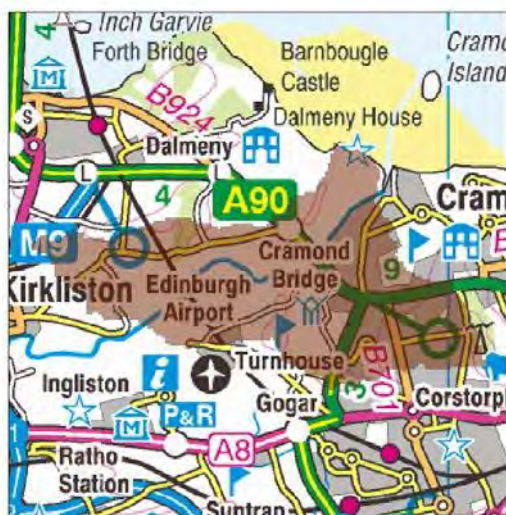
<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	<p>Scottish Planning Policy 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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>The local authorities' Flood Prevention Teams work closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' relevant budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Cramond Bridge (Potentially Vulnerable Area 10/16)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council	Edinburgh coastal

### Background

This Potentially Vulnerable Area is 15km<sup>2</sup> and is part of the Almond and Edinburgh Group catchment (shown below). This is a small area on the eastern outskirts of Edinburgh containing the suburbs of Clermiston and Cramond.

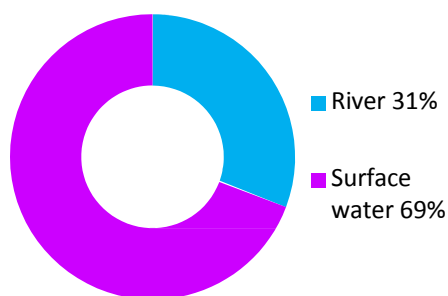


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The area has a risk of river and surface water flooding. The majority of damages in this Potentially Vulnerable Area are caused by surface water flooding.

There are approximately 60 residential properties and 20 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £110,000.



**Figure 1:** Annual Average Damages by flood source. *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

### Summary of flooding impacts

The highest risk of flooding is to Clermiston from surface water flooding.

Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Cramond Bridge (Potentially Vulnerable Area 10/16)'

### History of flooding

No significant floods have been recorded in this Potentially Vulnerable Area.

## Objectives to manage flooding in Cramond Bridge

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. The objectives below have been set for the Cramond Bridge Potentially Vulnerable Area.

- Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical. (Objective ID: 10052);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in Cramond Bridge

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. The actions shaded have been selected as the most appropriate for Cramond Bridge 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	Surface water plan/study	Emergency plans/response
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning Policy

The delivery of selected actions by year over the six-year plan cycle is summarised below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					



<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	<b>The City of Edinburgh Council</b> , Midlothian Council, East Lothian Council
<b>Delivery Period:</b>	2016-2021.
<b>Status:</b>	The SWMPs will be prepared in the period 2016-2021. Scottish Water is leading on an Integrated Catchment Study (ICS) which is progressing well (action 1000520019). The initial phase of the ICS is complete and the local authorities have concluded that to date the results presented by Scottish Water accurately reflect flooding. This ICS when complete will complement the Surface Water Management Plan (SWMP) to be prepared by the local authorities.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will lead on the development of surface water management plans for their area in partnership with other relevant authorities where required, Scottish Water and SEPA. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.



<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for parts of Edinburgh, East Lothian and Midlothian was carried out in between 2010-2015 to improve knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Surface water plan/study (The City of Edinburgh Council, East Lothian Council, Midlothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in Partnership with City of Edinburgh Council, East Lothian Council and Midlothian Council.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	AVSE PFI Edinburgh 2016-2019
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Almond Valley, Seafield and Esk Water Private Finance Initiative (AVSE PFI), Edinburgh sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Cramond flood warning area which is part of the Almond (West Lothian) river flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	SEPA will work with the local authority during verification of existing flood warning system as required
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues The City of Edinburgh Council will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. The City of Edinburgh Council will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Awareness raising will be coordinated through the Local Plan District (LPD) between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by The City of Edinburgh Council.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	The City of Edinburgh Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The City of Edinburgh Council will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The City of Edinburgh Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. The City of Edinburgh Council maintains a Flooding Emergency Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the Edinburgh area may cause flooding. The City of Edinburgh Council's Flood Prevention service in Transport Maintenance regularly assess river levels and flows and liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting Edinburgh being passed by SEPA to Police Scotland (Edinburgh Division), an assessment of the need to convene a multi-agency Edinburgh Flood Group will be made by the Senior Police Officer. Council representatives on the Edinburgh Flood Group will establish liaison with the Corporate Incident Management Team (if convened) at the Council Incident Coordination Centre, City Chambers and with the Flood Response Group based at Bankhead Depot, Sighthill.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. The City of Edinburgh Council operates Emergency Action Packs to determine where people should be deployed during flood events. The City of Edinburgh Council also owns temporary flood barriers and sandbags that can be used to protect properties from river flooding.
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, The City of Edinburgh Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. The City of Edinburgh Council's responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the



	environment.
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, The City of Edinburgh Council's responsibilities for emergency response are largely funded by The City of Edinburgh Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>The City of Edinburgh Council's Flood Prevention Team works closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' relevant budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Granton (Potentially Vulnerable Area 10/17)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council	Edinburgh coastal

### Background

This Potentially Vulnerable Area is 13km<sup>2</sup> and is part of the Almond and Edinburgh catchment group (shown below). This is a small, urbanised coastal area in the north of Edinburgh containing the suburbs of Silverknowes, Muirhouse, Granton, eastern Cramond and the Port of Leith.

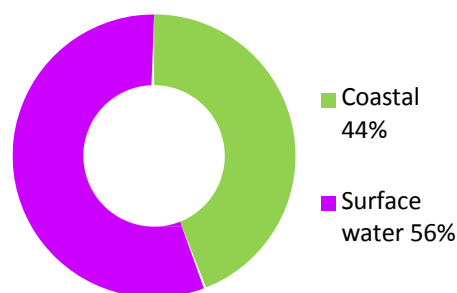


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The area has a risk of coastal and surface water flooding. The majority of damages in this Potentially Vulnerable Area are caused by surface water flooding.

There are approximately 290 residential properties and 60 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £280,000.



**Figure 1: Annual Average Damages by flood source.** *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

## Summary of flooding impacts

The highest risk of surface water flooding is to Granton and Muirhouse.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Granton (Potentially Vulnerable Area 10/17)'

## History of flooding

The following significant floods have been recorded in this area:

- 30 March 2010: A tidal surge coinciding with the highest mean tides of the year caused extensive flooding along the east coast of Scotland, with the Firth of Forth being one of the worst affected areas. Many locations were affected included Leith, Musselburgh, Prestonpans, Port Seton, Dunbar and North Berwick. Impacts included flooding of properties, damage to harbours, seawalls and roads. The City of Edinburgh Council estimated the costs of repair to be in the region of £650,000.
- 17 October 1898: Newhaven Pier in Edinburgh washed away as a result of coastal flooding.

## Objectives to manage flooding in Granton

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. The objectives below have been set for the Granton Potentially Vulnerable Area.

- Accept coastal flooding in Cramond, Silverknowes and Granton is managed appropriately. Maintain existing actions that protect residential and non-residential properties from coastal flooding. (Objective ID: 10095);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical. (Objective ID: 10052);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in Granton

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. The shaded actions below have been selected as the most appropriate for Granton 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 Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection study					
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme (existing)					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100950005)</b>		
<b>Objective (ID):</b>	Accept coastal flooding in Cramond, Silverknowes and Granton is managed appropriately. Maintain existing actions that protect residential and non-residential properties from coastal flooding. (10095)		
<b>Delivery lead:</b>	The City of Edinburgh Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>104 of 168</b>	<b>2 of 3</b>	<b>18 of 26</b>
<b>Delivery Period:</b>	2016-2017		
<b>Status:</b>	Tenders are currently being sought to carry out this study. Reference will be made to previous hydraulic modelling work undertaken for the Water of Leith in this study.		
<b>Description:</b>	A study should be undertaken of siltation in the Water of Leith basin in conjunction with the operation of the docks. The study covers the stretch of river known as the Basins. This is the part of the river affected by the impoundment of the river at the Port of Leith.		
<b>Related Actions:</b>	Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	The study will establish flood risk in this area of the Water of Leith and make recommendations regarding dredging. The study will also identify various environmental constraints and regulatory approvals which will inform future coordination arrangements. The City of Edinburgh Council will seek advice from SEPA on the data collection/hydraulic modelling elements of the study. Discussions are ongoing with the Friends of the Water of Leith Basin and Scottish Water regarding this study.		
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council's Revenue Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The economic impacts have not been defined at this stage.		
<b>Social:</b>	The social impacts will depend on the outcome of the study and recommended actions.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The Water of Leith (water body ID 3700) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted.		

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	<b>The City of Edinburgh Council</b> , Midlothian Council, East Lothian Council
<b>Delivery Period:</b>	2016-2021.
<b>Status:</b>	The SWMPs will be prepared in the period 2016-2021. Scottish Water is leading on an Integrated Catchment Study (ICS) which is progressing well (action 1000520019). The initial phase of the ICS is complete and the local authorities have concluded that to date the results presented by Scottish Water accurately reflect flooding. This ICS when complete will complement the Surface Water Management Plan (SWMP) to be prepared by the local authorities.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will lead on the development of surface water management plans for their area in partnership with other relevant authorities where required, Scottish Water and SEPA. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for parts of Edinburgh, East Lothian and Midlothian was carried out in between 2010-2015 to improve knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Surface water plan/study (The City of Edinburgh Council, East Lothian Council, Midlothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with The City of Edinburgh Council, East Lothian Council and Midlothian Council.



<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Wider coastal mapping and modelling improvements may take place in this area and these will be further refined in 2016 with the intention of updating the strategic coastal maps in 2016 to 2019. However, local authority led coastal studies may affect the timings of these improvements.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.
<b>Related Actions:</b>	Flood protection study, Planning policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	SEPA's strategic mapping activities will be coordinated with the activities of other responsible authorities as required.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	AVSE PFI Edinburgh 2016-2019
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling for Almond Valley, Seafield and Esk Water Private Finance Initiative (AVSE PFI), Edinburgh sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100950017)</b>
<b>Objective (ID):</b>	Accept coastal flooding in Cramond, Silverknowes and Granton is managed appropriately. Maintain existing actions that protect residential and non-residential properties from coastal flooding. (10095)
<b>Delivery lead:</b>	The City of Edinburgh Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	The City of Edinburgh Council will continue to maintain the existing rock armour, concrete and masonry walls and revetments along the coast in Cramond, Silverknowes and Granton where it has this responsibility.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance, Surface water plans/study.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that the infrastructure is maintained. The City of Edinburgh Council will liaise with Scottish Water, SEPA, Scottish Natural Heritage, Landowners etc.
<b>Funding Arrangement:</b>	Inspection of coastal assets will be funded from The City of Edinburgh Council Revenue Budget. Individual asset owners (including the public) will fund works associated with maintenance and repair.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Granton and Leith flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood protection study, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	SEPA will work with the local authority during verification of existing flood warning system as required
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues The City of Edinburgh Council will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 and promote Floodline. This will be achieved through increased media awareness and partnership project working. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>The City of Edinburgh Council will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities.</p> <p>Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Awareness raising will be coordinated through the Local Plan District (LPD) between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by The City of Edinburgh Council.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	The City of Edinburgh Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintain flood protection scheme.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The City of Edinburgh Council will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The City of Edinburgh Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.



<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	<p>Existing. The City of Edinburgh Council maintains a Flooding Emergency Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the Edinburgh area may cause flooding. The City of Edinburgh Council 's Flood Prevention service in Transport Maintenance regularly assess river levels and flows and liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting Edinburgh being passed by SEPA to Police Scotland (Edinburgh Division), an assessment of the need to convene a multi-agency Edinburgh Flood Group will be made by the Senior Police Officer. Council representatives on the Edinburgh Flood Group will establish liaison with the Corporate Incident Management Team (if convened) at the Council Incident Coordination Centre, City Chambers and with the Flood Response Group based at Bankhead Depot, Sighthill.</p> <p>Following a serious flooding incident, once the emergency phase is deemed over and it is considered that there is no further threat to life, the chair of the Edinburgh Flood Group will pass progressively from Police Scotland to The City of Edinburgh Council. The Edinburgh Flood Group, chaired by the Council, will continue to meet in recovery mode to assess levels of damage caused by the event, coordinate the restoration of essential services, the clean up of affected areas and the provision of information and assistance to the public.</p>
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. The City of Edinburgh Council operates Emergency Action Packs to determine where people should be deployed during flood events.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood warning, Maintain flood protection scheme, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, The City of Edinburgh Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. The City of Edinburgh Council's responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood

	<p>prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.</p>
<p><b>Funding Arrangement:</b></p>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, The City of Edinburgh Council's responsibilities for emergency response are largely funded by The City of Edinburgh Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Strategic mapping and modelling, Surface water management plan/study.
<b>Coordination Arrangement:</b>	<p>The City of Edinburgh Council's Flood Prevention Team works closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

# Water of Leith Catchment (Potentially Vulnerable Area 10/18)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council, Midlothian Council	Water of Leith

## Background

This Potentially Vulnerable Area is 73km<sup>2</sup> and includes the lower reaches of the Water of Leith catchment (shown below). It includes central Edinburgh and suburban areas to the south west including Balerno, Currie and the foothills of the Pentland Hills. The main watercourses are the Water of Leith and its tributary, the Murray Burn. The Union Canal also flows through this Potentially Vulnerable Area.

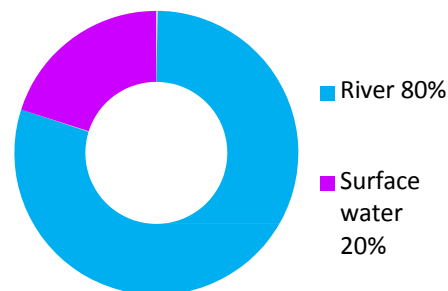


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The area has a risk of river and surface water flooding. The majority of damages are caused by river flooding.

There are approximately 3,300 residential properties and 480 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £5.8 million.



**Figure 1:** Annual Average Damages by flood source. Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).

## Summary of flooding impacts

The highest risk of river flooding is from the Water of Leith and Murray Burn to Murrayfield, Roseburn and Sighthill. The risk of surface water flooding is spread across the greater Edinburgh urban area.

In the Water of Leith catchment, the local authority has undertaken more detailed studies for the design and build of the Water of Leith Flood Protection Scheme. The information in this report uses SEPA data which may be different from the more detailed information held by the local authority arising from differences in modelling approach.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Water of Leith Catchment(Potentially Vulnerable Area 10/18)'

## History of flooding

Edinburgh has a long history of flooding from the Water of Leith. The following significant floods have been recorded in this area:

- 26 April 2000: Flooding on the Water of Leith caused boundary walls at Saughton, Balgreen, Stockbridge, Warriston and Bonnington to collapse resulting in the inundation of over 500 properties. Murrayfield Stadium, Murrayfield Ice Rink and two residential care homes also flooded.
- 6 October 1990: The Water of Leith flooded in multiple locations with Roseburn badly affected.
- 3 November 1984: Flooding on the Water of Leith resulted in the inundation of two sheltered housing schemes. The Saughton and Roseburn areas were worst affected.
- 15 October 1907: Water of Leith water levels in Currie were 1.5m above normal levels resulting in the flooding of Woodhall Paper Mill at Juniper Green. Flooding was contained at Cannonmills due to retaining walls however it overtopped at Warriston Green causing road closures.
- 17 August 1907: Serious flooding within the Roseburn Park area of Edinburgh after the Water of Leith burst its banks.

## Objectives to manage flooding in Water of Leith Catchment

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. The objectives below have been set for the Water of Leith Catchment Potentially Vulnerable Area.

- Accept flood risk in Edinburgh is managed appropriately. Maintain existing flood protection scheme (reservoir) that reduces economic damages to residential and non-residential properties in Edinburgh caused by flooding from the Water of Leith. (Objective ID: 10059);
- Accept flood risk in Edinburgh (between Bonnington and Veitch's Square) is managed appropriately. Maintain the Water of Leith Flood Protection Scheme that reduces the risk of flooding. (Objective ID: 10060);

- Reduce risk to community facilities and economic damages to residential and non-residential properties in Edinburgh at Murrayfield and Roseburn caused by flooding from the Water of Leith (Objective ID: 10061);
- Reduce risk to community facilities and economic damages to residential and non-residential properties in Edinburgh (Coltbridge, Gorgie and Saughton) from the Water of Leith. (Objective ID: 10062);
- Reduce risk to people from river flooding in Edinburgh (Murrayfield, Gorgie, Saughton, Stenhouse and Longstone) caused by flooding from the Water of Leith. (Objective ID: 10063);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical. (Objective ID: 10052);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in Water of Leith Catchment

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. The actions shaded have been selected as the most appropriate for Water of Leith Catchment 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>
<i>Flood protection study</i>	<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 Policy

The delivery of selected actions by year over the six-year plan cycle is summarised below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection scheme/works					
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					



<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100610006)</b>
<b>Objective (ID):</b>	Reduce risk to community facilities and economic damages to residential and non-residential properties in Edinburgh at Murrayfield and Roseburn caused by flooding from the Water of Leith (10061)
<b>Delivery lead:</b>	The City of Edinburgh Council
<b>Delivery Period:</b>	2016-2018
<b>Status:</b>	Advance works at the reservoirs in the headwaters of the river are complete and Phase 1 is also complete. Works at Murrayfield/Roseburn have commenced. Elements of the confirmed operations at Murrayfield/Roseburn have been decoupled and these will be progressed in the future subject to funding. The works at Damside, Belford Bridge and Edinburgh Sports Club have been removed. At present the Stank Burn Pumping Station and a stretch of wall along Corstorphine Road have been omitted.
<b>Description:</b>	The Water of Leith (Phase 2) Flood Protection Scheme is currently under construction, scheduled to be completed by 2018. The scheme will protect Murrayfield and Roseburn from flooding from the Water of Leith.
<b>Related Actions:</b>	Awareness raising, Flood protection scheme/works (Action ID 100620006), Planning Policy, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council undertook a major consultation exercise in promoting the Water of Leith Flood Prevention Scheme. A local public inquiry was held and the reporters findings were accepted. The City of Edinburgh Council will liaise with SEPA in the development of the works.
<b>Funding Arrangement:</b>	This will be fully funded by The City of Edinburgh Council's Capital Programme.
<b>Potential impacts</b>	
<b>Economic:</b>	The flood protection scheme has an estimated benefit cost ratio of 4.9.
<b>Social:</b>	A reduction in flood risk will have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection scheme area. There may be negative impacts through disturbance to the local community during the construction phase and changes in visual amenity and land use as a result of these works.
<b>Environmental:</b>	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. As part of the planning process, an environmental impact assessment was carried out and an action plan prepared for each phase of the scheme.



<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100620006)</b>		
<b>Objective (ID):</b>	Reduce risk to people from river flooding in Edinburgh (Murrayfield, Gorgie, Saughton, Stenhouse and Longstone) caused by flooding from the Water of Leith (10063) Reduce risk to community facilities and economic damages to residential and non-residential properties in Edinburgh (Coltbridge, Gorgie and Saughton) from the Water of Leith (10062)		
<b>Delivery lead:</b>	The City of Edinburgh Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>22 of 42</b>	<b>1 of 1</b>	<b>4 of 7</b>
<b>Delivery Period:</b>	At present as there is uncertainty over funding a delivery period is yet to be confirmed. This will be reviewed once funding is secured.		
<b>Status:</b>	An updated economic appraisal has been undertaken on this watercourse and it is now proposed to undertake further flood prevention works at Coltbridge, Gorgie, and Saughton. The works at Balgreen, Longstone and Murrayburn have been removed.		
<b>Description:</b>	Flood protection works have been proposed for Edinburgh to further reduce flooding from Water of Leith. The proposed works will likely include Coltbridge, Gorgie, and Saughton, subject to the availability of funding.		
<b>Related Actions:</b>	Awareness raising, Flood protection scheme/works (Action ID 100610006), Planning Policy, Strategic mapping and modelling.		
<b>Coordination Arrangement:</b>	The City of Edinburgh Council undertook a major consultation exercise in promoting the Water of Leith Flood Prevention Scheme. A local public inquiry was held and the reporters findings were accepted. The proposals are now to be revisited and accordingly a further consultation and engagement exercise will be undertaken with all the relevant stakeholders. Areas previously identified as part of the Water of Leith Flood Prevention Scheme (Coltbridge, Gorgie, and Saughton) will not be undertaken as part of this scheme and it will now be necessary to revisit these areas to establish the detailed nature of the work. It will be necessary to apply for modifications to the planning consent currently in place. The City of Edinburgh Council did liaise with SEPA in the development of the scheme.		
<b>Funding Arrangement:</b>	The City of Edinburgh Council has yet to identify funding for this scheme.		
<b>Potential impacts</b>			
<b>Economic:</b>	The proposed works may benefit 75 residential properties at risk of flooding in this location, with estimated damages avoided of £22.9 million. The flood protection works have an estimated benefit cost ratio of 2.53 (Coltbridge); 0.98 (Gorgie); 2.45 (Saughton).		
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the area. In addition there is one educational building which has been identified as potentially benefitting from this action. There may be negative impacts through disturbance to the local community during the construction phase.		

**Environmental:**

Flood protection works can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. The proposed flood protection works are located on parts of the Water of Leith (water body ID 3700). The physical condition of this river has been identified by SEPA to be at less than good status. 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 (100520018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	<b>The City of Edinburgh Council</b> , Midlothian Council, East Lothian Council
<b>Delivery Period:</b>	2016-2021.
<b>Status:</b>	The SWMPs will be prepared in the period 2016-2021. Scottish Water is leading on an Integrated Catchment Study (ICS) which is progressing well (action 1000520019). The initial phase of the ICS is complete and the local authorities have concluded that to date the results presented by Scottish Water accurately reflect flooding. This ICS when complete will complement the Surface Water Management Plan (SWMP) to be prepared by the local authorities.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will lead on the development of surface water management plans for their area in partnership with other relevant authorities where required, Scottish Water and SEPA. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for parts of Edinburgh, East Lothian and Midlothian was carried out in between 2010-2015 to improve knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Surface water plan/study (The City of Edinburgh Council, East Lothian Council, Midlothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with The City of Edinburgh Council, East Lothian Council and Midlothian Council.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Surface water mapping improvements in this area are dependant on the outputs from a local authority surface water study. Timescales are indicative only and SEPA will seek to better understanding these during 2016 in order to further refine timescales. SEPA led surface water mapping improvements are expected to be undertaken in 2016.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,600km <sup>2</sup> of improved surface water data is currently available within this Local Plan District. The inclusion of additional surface water hazard data resulting from the completion of local authority surface water management plans and Scottish Water integrated catchment studies will be considered as these projects are completed.
<b>Related Actions:</b>	Flood protection scheme, Planning policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	A surface water management plan and associated integrated catchment study are proposed for the Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith area. SEPA will work with the responsible authorities to ensure that new information about flood risk resulting from the proposed surface water study is considered in SEPA's strategic mapping and modelling developments where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	AVSE PFI Edinburgh 2016-2019
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in for Almond Valley, Seafield and Esk Water Private Finance Initiative (AVSE PFI), Edinburgh sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100590017)</b>
<b>Objective (ID):</b>	Accept flood risk in Edinburgh is managed appropriately. Maintain existing flood protection scheme (reservoir) that reduces economic damages to residential and non-residential properties in Edinburgh caused by flooding from the Water of Leith. (10059)
<b>Delivery lead:</b>	The City of Edinburgh Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	The City of Edinburgh Council will continue to maintain the reservoirs in the upper catchment of the Water of Leith to reduce peak flows and lower river levels downstream. The reservoir forms part of Water of Leith Flood Protection Scheme.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The City of Edinburgh Council will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc.
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100600017)</b>
<b>Objective (ID):</b>	Accept flood risk in Edinburgh (between Bonnington and Veitch's Square) is managed appropriately. Maintain the Water of Leith Flood Protection Scheme that reduces the risk of flooding. (10060)
<b>Delivery lead:</b>	The City of Edinburgh Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	The City of Edinburgh Council will continue to maintain the existing Water of Leith Flood Protection Scheme at Bonnington, St Marks, Warriston, Stockbridge Colonies and Veitch's Square.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The City of Edinburgh Council will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.



<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100610017)</b>
<b>Objective (ID):</b>	Reduce risk to community facilities and economic damages to residential and non-residential properties in Edinburgh at Murrayfield and Roseburn caused by flooding from the Water of Leith (10061)
<b>Delivery lead:</b>	The City of Edinburgh Council
<b>Delivery Period:</b>	Maintenance will commence in 2018 at completion of the scheme and become an ongoing action.
<b>Status:</b>	This maintenance is yet to commence.
<b>Description:</b>	The City of Edinburgh Council will maintain the Water of Leith Flood Protection Scheme and works in Murrayfield and Roseburn when completed in 2018.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood protection scheme, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The City of Edinburgh Council will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc.
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Dean Village, Warriston and Bonnington, Stockbridge, Longstone/Stenhouse and Roseburn flood warning areas which are part of the Water of Leith river flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood protection scheme, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	The Water of Leith (Phase 2) Flood Protection Scheme is currently under construction and a further phase of the flood protection scheme is proposed. SEPA will work with the local authority to ensure that changes to hydrology and flood risk as a result of the flood protection schemes are fully considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues local authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>For the new flood protection scheme, SEPA will support the local authority's communications and engagement activities with media activity, local public awareness events and education engagement with schools. SEPA will also deliver joint communications with local authorities for Floodline customers in any newly protected flood warning area.</p> <p>The City of Edinburgh Council will raise awareness when developing discrete proposals. The City of Edinburgh Council undertook a major consultation exercise in developing the Water of Leith Flood Prevention Scheme. A re-engagement exercise was undertaken when refining Phase 2.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Flood protection scheme, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>The Water of Leith (Phase 2) Flood Protection Scheme is currently under construction and a further phase of the flood protection scheme is proposed. SEPA will support the local authority's communications and engagement activities. SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Awareness raising will be coordinated through the Local Plan District (LPD) between SEPA, responsible authorities and community flood</p>

	<p>action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<p><b>Funding Arrangement:</b></p>	<p>SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by The City of Edinburgh Council.</p>

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Local authorities, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintain flood protection scheme.
<b>Coordination Arrangement:</b>	The local authorities will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The local authorities will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The relevant local authority will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. The City of Edinburgh Council maintains a Flooding Emergency Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the Edinburgh area may cause flooding. The City of Edinburgh Council's Flood Prevention service in Transport Maintenance regularly assess river levels and flows and liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting Edinburgh being passed by SEPA to Police Scotland (Edinburgh Division), an assessment of the need to convene a multi-agency Edinburgh Flood Group will be made by the Senior Police Officer. Council representatives on the Edinburgh Flood Group will establish liaison with the Corporate Incident Management Team (if convened) at the Council Incident Coordination Centre, City Chambers and with the Flood Response Group based at Bankhead Depot, Sighthill.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. The City of Edinburgh Council operates Emergency Action Packs to determine where people should be deployed during flood events. The City of Edinburgh Council owns temporary flood barriers and sandbags that can be used to protect properties from river flooding.
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood warning, Maintain flood protection scheme, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, The City of Edinburgh Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. The City of Edinburgh Council's responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.



**Funding  
Arrangement:**

Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, The City of Edinburgh Council's responsibilities for emergency response are largely funded by The City of Edinburgh Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.

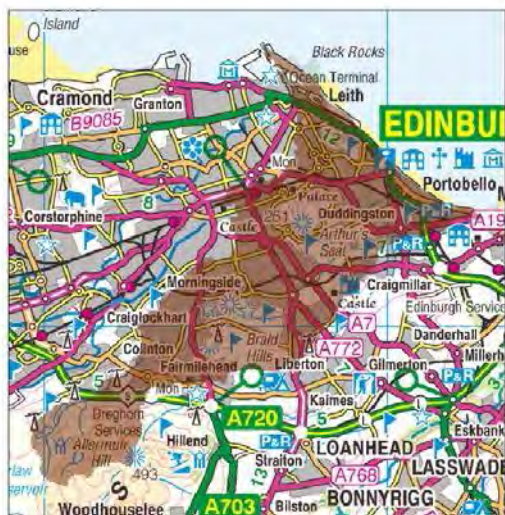
<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	<p>Scottish Planning Policy 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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection scheme, Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>The local authorities' Flood Prevention Teams work closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Braid Burn Catchment (Potentially Vulnerable Area 10/19)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council	Braid Burn

### Background

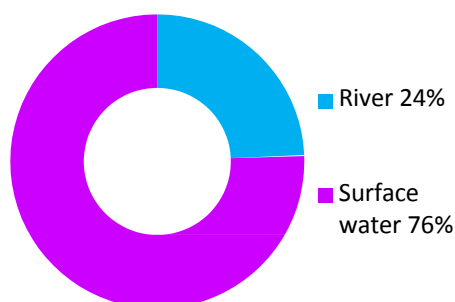
This Potentially Vulnerable Area is 43km<sup>2</sup> and includes the whole of the Braid Burn catchment (shown below). It covers central Edinburgh and its suburbs to the south including Oxbgangs, Prestonfield and Craigmillar.



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The main watercourse is the Braid Burn flowing through Colinton Mains, Oxbgangs, Duddingston and Durham before discharging into the Firth of Forth at Portobello. However, the main source of flooding is from surface water.

There are approximately 750 residential properties and 210 non-residential properties at risk of flooding. The Annual Average Damages are approximately £1.2 million.



**Figure 1:** Annual Average Damages by flood source. *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

### Summary of flooding impacts

The risk of surface water flooding is spread out across the greater Edinburgh urban area. The risk of flooding from the Braid Burn is reduced by the Braid Burn Flood Protection Scheme.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary,

(<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Braid Burn Catchment (Potentially Vulnerable Area 10/19)'

## History of flooding

This area has a long history of flooding from Braid Burn, the sea and surface water. The following significant floods have been recorded in this area:

- 8 July 2011: Surface water flooding of homes and businesses in Edinburgh. Balcarres Street in Morningside was identified as the worst affected area with around 20 residential properties and 3 commercial properties flooded.
- 30 March 2010: A tidal surge coinciding with the highest mean tides of the year caused extensive coastal flooding along the east coast of Scotland, with the Firth of Forth being one of the worst affected areas. Locations within this coastal area affected included Leith, Musselburgh, Prestonpans, Port Seton, Dunbar and North Berwick. Impacts included flooding of properties, damage to harbours, seawalls and roads with Edinburgh City Council estimating the costs to repair damages in the region of £650,000.
- 26 April 2000: Flooding from the Braid Burn. Areas from Colinton to Portobello flooded to an estimated depth of greater than 2m in some areas.
- 4 April 1958: Portobello Promenade and nearby houses were flooded during a coastal flood event.
- 1877: Sea wall washed away between Portobello and Joppa due to flooding from the sea.

## Objectives to manage flooding in the Braid Burn Catchment

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. The objectives below have been set for the Braid Burn Catchment Potentially Vulnerable Area.

- Accept that flood risk in Edinburgh is managed appropriately. Maintain existing flood protection scheme that reduces risk to residential and non-residential properties and community facilities in Edinburgh caused by flooding from the Braid Burn. (Objective ID: 10067);
- Accept coastal flooding in Leith and Portobello is managed appropriately. Maintain existing actions that protect residential and non-residential properties from coastal flooding. (Objective ID: 10068);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (Objective ID: 10052);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

### Actions to manage flooding in the Braid Burn Catchment

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. The actions shaded below have been selected as the most appropriate for Braid Burn Catchment 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	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	<b>The City of Edinburgh Council</b> , Midlothian Council, East Lothian Council
<b>Delivery Period:</b>	2016-2021.
<b>Status:</b>	The SWMPs will be prepared in the period 2016-2021. Scottish Water is leading on an Integrated Catchment Study (ICS) which is progressing well (action 1000520019). The initial phase of the ICS is complete and the local authorities have concluded that to date the results presented by Scottish Water accurately reflect flooding. This ICS when complete will complement the Surface Water Management Plan (SWMP) to be prepared by the local authorities.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will lead on the development of surface water management plans for their area in partnership with other relevant authorities where required, Scottish Water and SEPA. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for parts of Edinburgh, East Lothian and Midlothian was carried out in between 2010-2015 to improve knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Surface water plan/study (The City of Edinburgh Council, East Lothian Council, Midlothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with The City of Edinburgh Council, East Lothian Council and Midlothian Council.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Wider coastal mapping and modelling improvements may take place in this area and these will be further refined in 2016 with the intention of updating the strategic coastal maps in 2016 to 2019. However, local authority led coastal studies may affect the timings of these improvements.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.
<b>Related Actions:</b>	Planning policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	SEPA's strategic mapping activities will be coordinated with the activities of other responsible authorities as required.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.



<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	AVSE PFI Edinburgh 2016-2019
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Almond Valley, Seafield and Esk Water Private Finance Initiative (AVSE PFI), Edinburgh sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100670017)</b>
<b>Objective (ID):</b>	Accept that flood risk in Edinburgh is managed appropriately. Maintain existing flood protection scheme that reduces risk to residential and non-residential properties and community facilities in Edinburgh caused by flooding from the Braid Burn. (10067)
<b>Delivery lead:</b>	The City of Edinburgh Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	The City of Edinburgh Council will continue to maintain the existing Braid Burn Flood Protection Scheme in Edinburgh. The scheme reduces the risk of flooding to homes and businesses along the Braid Burn between Redford Road and Portobello.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that the infrastructure is maintained. The City of Edinburgh Council will liaise with Scottish Water, Network Rail, SEPA, Scottish Natural Heritage and Landowners etc.
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100680017)</b>
<b>Objective (ID):</b>	Accept coastal flooding in Leith and Portobello is managed appropriately. Maintain existing actions that protect residential and non-residential properties from coastal flooding. (10068)
<b>Delivery lead:</b>	The City of Edinburgh Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	The City of Edinburgh Council will continue to maintain the existing flood defences along the coast.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that the infrastructure is maintained. The City of Edinburgh Council will liaise with Scottish Water, Network Rail, Marine Scotland, SEPA, Scottish Natural Heritage etc.
<b>Funding Arrangement:</b>	Inspection of coastal assets will be funded from The City of Edinburgh Council Revenue Budget. Individual asset owners (including the public) will fund works associated with maintenance and repair.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Colinton Mains, Mid Liberton and Cameron Toll, Inch Park and Peffermill and the Portobello flood warning areas which are part of the Braid Burn river flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	SEPA will work with the local authority during verification of existing flood warning system as required
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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> <p>The City of Edinburgh Council has issued properties on Balcarres Street with door and vent flood guards.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues The City of Edinburgh Council will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. The City of Edinburgh Council will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Awareness raising will be coordinated through the Local Plan District (LPD) between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by The City of Edinburgh Council.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	The City of Edinburgh Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintain flood protection scheme.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The City of Edinburgh Council will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The City of Edinburgh Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.



<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. The City of Edinburgh Council maintains a Flooding Emergency Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the Edinburgh area may cause flooding. The City of Edinburgh Council's Flood Prevention service in Transport Maintenance regularly assess river levels and flows and liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting Edinburgh being passed by SEPA to Police Scotland (Edinburgh Division), an assessment of the need to convene a multi-agency Edinburgh Flood Group will be made by the Senior Police Officer. Council representatives on the Edinburgh Flood Group will establish liaison with the Corporate Incident Management Team (if convened) at the Council Incident Coordination Centre, City Chambers and with the Flood Response Group based at Bankhead Depot, Sighthill.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. The City of Edinburgh Council operates Emergency Action Packs to determine where people should be deployed during flood events. The City of Edinburgh Council also owns temporary flood barriers and sandbags that can be used to protect properties from river flooding.
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood warning, Maintain flood protection scheme, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, The City of Edinburgh Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. The City of Edinburgh Council's responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the

	environment.
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, The City of Edinburgh Council's responsibilities for emergency response are largely funded by The City of Edinburgh Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>The City of Edinburgh Council's Flood Prevention Team works closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Niddrie and Burdiehouse Burn Catchment (Potentially Vulnerable Area 10/20)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council, East Lothian Council, Midlothian Council	Niddrie and Burdiehouse Burn catchment

### Background

This Potentially Vulnerable Area is 26km<sup>2</sup> and includes the whole of the Niddrie and Burdiehouse Burn catchment (shown below). It covers the south and east areas of Edinburgh including Brunstane, Niddrie, Burdiehouse and Fairmilehead.



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The main watercourse is the Burdiehouse Burn which changes name to the Niddrie Burn and Brunstane Burn in the lower reaches where it flows into the Firth of Forth.

There are approximately 390 residential properties and 40 non-residential properties at risk of flooding. The Annual Average Damages are approximately £780,000.

The area has a risk of surface water and river flooding.

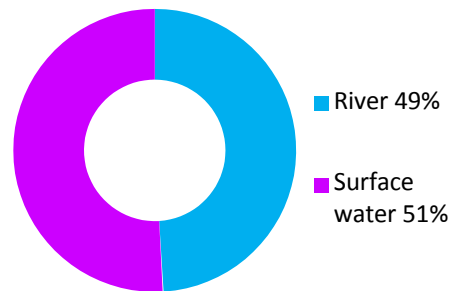


Figure 1: Annual Average Damages by flood source. *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

### Summary of flooding impacts

The greatest risk of river flooding is in the Eastfield, Niddrie, Moredun and Burdiehouse areas from the Niddrie and Burdiehouse Burn. The greatest risk of surface water flooding is in the Fairmilehead, Burdiehouse and Niddrie areas.

In this Potentially Vulnerable Area there is lower confidence in the SEPA flood maps. SEPA and The City of Edinburgh Council are working together to improve the understanding of flooding issues in this area.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Niddrie Burn / Burdiehouse Burn catchment(Potentially Vulnerable Area 10/20)'

## **History of flooding**

No significant floods have been recorded in this Potentially Vulnerable Area.

## **Objectives to manage flooding in Niddrie Burn / Burdiehouse Burn catchment**

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. The objectives below have been set for the Niddrie Burn / Burdiehouse Burn catchment Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties and risk to people in Edinburgh / Burdiehouse caused by flooding from the Niddrie Burn (Objective ID: 10071, 10072);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (Objective ID: 10052);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in Niddrie Burn / Burdiehouse Burn catchment

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. The actions shaded below have been selected as the most appropriate for Niddrie Burn / Burdiehouse Burn catchment 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 Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection study					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100710005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Edinburgh / Burdiehouse caused by flooding from the Niddrie Burn (10071, 10072)		
<b>Delivery lead:</b>	The City of Edinburgh Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>57 of 168</b>	<b>1 of 3</b>	<b>8 of 26</b>
<b>Delivery Period:</b>	2016-2021		
<b>Status:</b>	A programme has been developed to appoint a Consultant to assess the need/location and design of a gauging station in 2016/17. Construction of gauging station is expected in 2017/18. The flood study is then planned for 2021/22.		
<b>Description:</b>	A flood protection study has been recommended for Niddrie Burn in Edinburgh to assess whether flood storage, modification of conveyance, installation/modification of fluvial control structures, flood defences and sediment management could reduce flood risk. The study should also consider the viability of property level protection. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream. This study should also aim to improve gauging on the Niddrie/Burdiehouse Burn catchment in partnership between SEPA and the City of Edinburgh Council.		
<b>Related Actions:</b>	Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Where possible opportunities to enhance and restore the environment will be sought, for example through natural flood management. Conservation areas, gardens and designed landscapes and ancient woodlands are also present in the study area and could be positively or negatively impacted. The City of Edinburgh Council will seek advice from SEPA on the gauging/data collection/hydraulic modelling elements of the study. Discussions will be undertaken with the National Health Service (NHS) and Scottish Water.		
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 178 residential properties and 19 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £6.8 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area. In addition there is one healthcare facility which has been identified as potentially benefitting from any proposed actions.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the		



**Environmental:**

environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The Burdiehouse Burn (water body ID 3600) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. Gardens and designed landscapes, listed buildings, local nature reserves, Sites of Special Scientific Interest, Ramsar sites and ancient woodlands are also present in the study area and could be positively or negatively impacted.



<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	<b>The City of Edinburgh Council</b> , Midlothian Council, East Lothian Council
<b>Delivery Period:</b>	2016-2021.
<b>Status:</b>	The SWMPs will be prepared in the period 2016-2021. Scottish Water is leading on an Integrated Catchment Study (ICS) which is progressing well (action 1000520019). The initial phase of the ICS is complete and the local authorities have concluded that to date the results presented by Scottish Water accurately reflect flooding. This ICS when complete will complement the Surface Water Management Plan (SWMP) to be prepared by the local authorities.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will lead on the development of surface water management plans for their area in partnership with other relevant authorities where required, Scottish Water and SEPA. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for parts of Edinburgh, East Lothian and Midlothian was carried out in between 2010-2015 to improve knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Surface water plan/study (The City of Edinburgh Council, Midlothian Council, East Lothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with The City of Edinburgh Council, East Lothian Council and Midlothian Council.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	AVSE PFI Edinburgh 2016-2019
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Almond Valley, Seafield and Esk Water Private Finance Initiative (AVSE PFI), Edinburgh sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100710017)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Edinburgh / Burdiehouse caused by flooding from the Niddrie Burn (10071, 10072)
<b>Delivery lead:</b>	The City of Edinburgh Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	The City of Edinburgh Council will continue to maintain the flood control structure and flood storage area at Greendykes and flood defences at Nether Craigour once completed. The works are due to be completed in 2016/17.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintenance.
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The City of Edinburgh Council will liaise with NHS, Scottish Water, SEPA and Scottish Natural Heritage etc.
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Flood forecasting.
<b>Coordination Arrangement:</b>	In the event of severe issues The City of Edinburgh Council will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans facilitating, community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. The City of Edinburgh Council will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Awareness raising will be coordinated through the Local Plan District (LPD) between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by The City of Edinburgh Council.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Local authorities, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood protection scheme.
<b>Coordination Arrangement:</b>	Local authorities will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. The local authorities will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The relevant local authority will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.



<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. The City of Edinburgh Council maintains a Flooding Emergency Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the Edinburgh area may cause flooding. The City of Edinburgh Council's Flood Prevention service in Transport Maintenance regularly assess river levels and flows and liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting Edinburgh being passed by SEPA to Police Scotland (Edinburgh Division), an assessment of the need to convene a multi-agency Edinburgh Flood Group will be made by the Senior Police Officer. Council representatives on the Edinburgh Flood Group will establish liaison with the Corporate Incident Management Team (if convened) at the Council Incident Coordination Centre, City Chambers and with the Flood Response Group based at Bankhead Depot, Sighthill.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. The City of Edinburgh Council operates Emergency Action Packs to determine where people should be deployed during flood events. The City of Edinburgh Council owns temporary flood barriers and sandbags that can be used to protect properties from river flooding.
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintain flood protection scheme, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, The City of Edinburgh Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. The City of Edinburgh Council responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.

**Funding  
Arrangement:**

Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, The City of Edinburgh Council's responsibilities for emergency response are largely funded by The City of Edinburgh Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	<p>The local authorities' Flooding Teams work closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Musselburgh (Potentially Vulnerable Area 10/21)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council, East Lothian Council, Midlothian Council	Edinburgh coastal

### Background

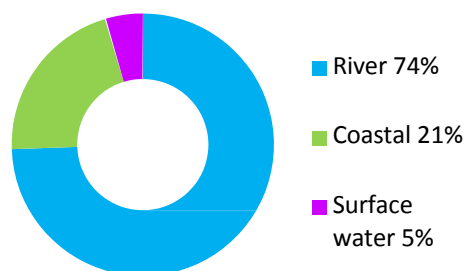
This Potentially Vulnerable Area is 12km<sup>2</sup> and is part of the Almond and Edinburgh Group catchment. This is a small, partially urbanised area covering the town of Musselburgh. The main watercourse is the River Esk which passes through the centre of Musselburgh before discharging into the Firth of Forth at Fisherrow Sands.



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There are approximately 1,300 residential properties and 280 non-residential properties at risk of flooding. The Annual Average Damages from flooding are approximately £3.3 million.

The majority of damages are caused by river flooding.



**Figure 1:** Annual Average Damages by flood source. *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

### Summary of flooding impacts

The highest risk of river flooding is from the River Esk to Musselburgh. The highest risk of surface water flooding is in Wallyford and Pinkie Brae in Musselburgh and the highest risk of coastal flooding is from the Firth of Forth to Musselburgh and Inveresk.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Musselburgh (Potentially Vulnerable Area 10/21)'

## History of flooding

The following significant floods have been recorded in this area:

- 30 March 2010: A tidal surge coinciding with the highest mean tides of the year caused extensive flooding along the east coast of Scotland, with the Firth of Forth being one of the worst affected areas. Locations within this coastal area affected included Leith, Musselburgh, Prestonpans, Port Seton, Dunbar and North Berwick. Impacts included flooding of properties, damage to harbours, seawalls and roads.
- 13 August 1948: Evacuation required in Musselburgh after flooding from the River Esk occurred in Eskside West, Eskside East, Shorthope Street, Millhill and areas of the High Street.

There is also a history of groundwater flooding in Musselburgh, particularly around the Pinkie area.

## Objectives to manage flooding in Musselburgh

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. The objectives below have been set for the Musselburgh Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties and risk to people in Musselburgh caused by flooding from the River Esk and coastal flooding (Objective ID: 10075, 10076);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (Objective ID: 10052);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in Musselburgh

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. The actions shaded below have been selected as the most appropriate for Musselburgh 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>
<i>Flood protection study</i>	Natural flood management study	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 Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection scheme/works					
Community flood action groups					
					Natural flood management study
Maintain flood warning					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100750006)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Musselburgh caused by flooding from the River Esk and coastal flooding (10075, 10076)		
<b>Delivery lead:</b>	East Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>11 of 42</b>	<b>1 of 2</b>	<b>2 of 7</b>
<b>Delivery Period:</b>	2016/18 Outline Design & Approvals, 2018/19 Detailed Design, 2019/21 Construction. The above dates are subject to confirmation of funding.		
<b>Status:</b>	The scheme is under development with the Option Appraisal Report received at this stage.		
<b>Description:</b>	A flood protection scheme has been proposed for Musselburgh to reduce flood risk from the River Esk. The scheme would consist of flood defences and earth embankments and would provide a 1 in 200 year standard of protection. Part of this proposed scheme is located in Potentially Vulnerable Area 10/22. The benefits and impacts have been assessed for the whole scheme.		
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Flood protection scheme (PVA 10/22), Planning Policy, Strategic mapping and modelling.		
<b>Coordination Arrangement:</b>	East Lothian Council will undertake consultation and engagement exercises with the public and local groups during scheme development. East Lothian Council will liaise with SEPA in the development of the scheme.		
<b>Funding Arrangement:</b>	Musselburgh Flood Protection Scheme will receive 80% of its funding from the Scottish Government General Capital Grant and the remaining funding will be allocated from East Lothian Council's Capital Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The proposed scheme may benefit 1489 residential properties and 407 non-residential properties at risk of flooding in this location, with estimated damages avoided of £30 million. The Option Appraisal Report estimates the benefit cost ratio as 3.6 – 4.4.		
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. In addition there are three educational buildings which have been identified as potentially benefitting from this action. There may be negative impacts through disturbance to the local community during the construction phase.		
<b>Environmental:</b>	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. These include conservation areas, scheduled monuments, gardens and designed landscapes, battlefields, listed buildings, Sites of Special Scientific Interest,		

**Environmental:** Ramsar sites and ancient woodlands.

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<b>Action (ID):</b>	<b>NATURAL FLOOD MANAGEMENT STUDY (100750003)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Musselburgh caused by flooding from the River Esk and coastal flooding (10075, 10076)
<b>Delivery lead:</b>	East Lothian Council
<b>Delivery Period:</b>	2021-2022
<b>Status:</b>	Not started
<b>Description:</b>	A natural flood management study has been recommended for Musselburgh to assess whether wave attenuation could help reduce flood risk. The study should link with the proposed flood protection scheme in Musselburgh. Part of this proposed study is located in Potentially Vulnerable Area 10/22. The benefits and impacts have been assessed for the whole study.
<b>Related Actions:</b>	Awareness raising, Community action groups, Flood protection study (PVA 10/23 and 25), Natural flood management study (PVA 10/22), Planning Policy, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	The East Lothian Council Flooding Team will liaise with SEPA, Scottish Water, Scottish Natural Heritage and other council departments during the progression of this study.
<b>Funding Arrangement:</b>	The study will be funded from the Scottish Government General Capital Grant which has a 20% allocation for Flood Risk Management projects.
<b>Potential impacts</b>	
<b>Economic:</b>	The economic impact of natural flood management actions is difficult to define. However, these actions can reduce flood risk for high likelihood events.
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.
<b>Environmental:</b>	Natural flood management actions can have a positive impact on the ecological quality of the environment by restoring and enhancing natural habitats. The Leith Docks to Port Seton coastline (water body ID 200034) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	The City of Edinburgh Council, Midlothian Council, <b>East Lothian Council</b>
<b>Delivery Period:</b>	2016-2021.
<b>Status:</b>	The SWMPs will be prepared in the period 2016-2021. Scottish Water is leading on an Integrated Catchment Study (ICS) which is progressing well (action 1000520019). The initial phase of the ICS is complete and the local authorities have concluded that to date the results presented by Scottish Water accurately reflect flooding. This ICS when complete will complement the Surface Water Management Plan (SWMP) to be prepared by the local authorities.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process. The ICS also covers a large part of PVA 10/23. If issues are identified, these will be addressed in the SWMP.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	East Lothian Council will lead on the development of surface water management plans for their area in partnership with other relevant authorities where required, Scottish Water and SEPA. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by East Lothian Council Revenue Budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for parts of Edinburgh, East Lothian and Midlothian was carried out in between 2010-2015 to improve knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Surface water plan/study (The City of Edinburgh Council, Midlothian Council, East Lothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with The City of Edinburgh Council, East Lothian Council and Midlothian Council.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Strategic mapping improvements for the Lower Esk area and Pinkie Burn are dependant on the outputs from a local authority study and the implementation of a flood protection scheme. However, SEPA proposes to undertake river mapping improvements in 2017 to 2018. Due to the large number of third party studies and works in this area there is considerable uncertainty over delivery timescales for this catchment. SEPA will seek to better understand these during 2016 in order to further refine timescales. Wider coastal mapping and modelling improvements may take place in this area and these will be further refined in 2016 with the intention of updating the strategic coastal maps in 2016 to 2019.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to develop flood mapping in the Lower Esk area and Pinkie Burn areas to improve understanding of flood risk. SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.
<b>Related Actions:</b>	Flood protection scheme, Natural flood management study, Planning Policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	A flood protection scheme and a coastal natural flood management study are proposed for Musselburgh. SEPA will work with the local authority to ensure that strategic mapping and modelling developments reflect the changes in flood risk resulting from the new flood protection scheme and new information about flood risk resulting from the proposed study where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	AVSE PFI Edinburgh 2016-2019
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Almond Valley, Seafield and Esk Water Private Finance Initiative (AVSE PFI), Edinburgh sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Musselburgh flood warning area which is part of the Esk (East Lothian) river flood warning scheme. SEPA will continue to maintain the Musselburgh Coastal flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Community flood action group, Emergency plans/response, Flood Forecasting, Flood protection scheme, Natural flood management study, Self help.
<b>Coordination Arrangement:</b>	A flood protection scheme and natural flood management study are proposed for Musselburgh. SEPA will work with the local authority to ensure that changes to hydrology and flood risk as a result of the proposed scheme and any new information about flood risk resulting from the proposed study are fully considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (100750012)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties and risk to people in Musselburgh caused by flooding from the River Esk and coastal flooding (10075, 10076)
<b>Delivery lead:</b>	Community
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	East Lothian Tenants and Residents Panel, Musselburgh and Inveresk Community Council and Musselburgh Waterfront Group operate in this area. The groups aim to involve the community in area-specific issues and could help increase community resilience to flooding.
<b>Related Actions:</b>	Awareness Raising, Emergency plans/response, Flood forecasting, Flood protection scheme, Natural flood management study, Maintain flood warning, Maintenance, Self help, Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	East Lothian Council will engage with East Lothian Tenants and Residents Panel, Musselburgh and Inveresk Community Council and Musselburgh Waterfront Groups as well as the wider community to continue to increase community resilience to flooding. This will be done by developing and reviewing emergency plans and facilitating resilient communities' plans. There is also interaction between East Lothian Council Emergency Planning Officer and chair of Community Councils focusing on risks including flooding.
<b>Funding Arrangement:</b>	East Lothian Council engagement with the community will be funded by the East Lothian Council Revenue Budget.



<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues the local authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships.</p> <p>For the new flood protection scheme, SEPA will support the local authority's communications and engagement activities with media activity, local public awareness events and education engagement with schools. SEPA will also deliver joint communications with local authorities for Floodline customers in any newly protected flood warning area. As part of SEPA's education programme and to contribute to community resilience SEPA is sponsoring a play by Rightlines Productions called 'Rapid Departure'. This interactive play about flooding will tour locations in Scotland throughout 2016, including this Potentially Vulnerable Area. The performances aim to lead people to consider how flooding could impact their community and how they can take steps to prepare for it.</p> <p>Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities.</p> <p>Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Community flood action groups, Emergency plans/response, Flood protection scheme, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>A flood protection scheme is proposed for Musselburgh. SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Awareness raising will be coordinated through the Local Plan District</p>

	<p>(LPD) between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<p><b>Funding Arrangement:</b></p>	<p>SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.</p>

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Local authorities, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning.
<b>Coordination Arrangement:</b>	Local authorities will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. The local authorities will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The relevant local authority will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	<p>Existing. The City of Edinburgh Council maintains a Flooding Emergency Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the Edinburgh area may cause flooding. The City of Edinburgh Council's Flood Prevention service in Transport Maintenance regularly assess river levels and flows and liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting Edinburgh being passed by SEPA to Police Scotland (Edinburgh Division), an assessment of the need to convene a multi-agency Edinburgh Flood Group will be made by the Senior Police Officer. Council representatives on the Edinburgh Flood Group will establish liaison with the Corporate Incident Management Team (if convened) at the Council Incident Coordination Centre, City Chambers and with the Flood Response Group based at Bankhead Depot, Sighthill.</p> <p>East Lothian Council maintains a Severe Weather Response Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the East Lothian area may cause flooding. River levels and flows are monitored and East Lothian Council liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting East Lothian being passed by SEPA to Police Scotland (J Division), an assessment of the need to convene the multi-agency East Lothian Flood Group will be made by the Senior Police Officer.</p>
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. The City of Edinburgh Council operates Emergency Action Packs to determine where people should be deployed during flood events. The City of Edinburgh Council owns temporary flood barriers and sandbags that can be used to protect properties from river flooding. East Lothian Council strategically deploys temporary flood barriers and sandbags when properties are threatened by flooding.</p>
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning, Maintenance.

<b>Coordination Arrangement:</b>	<p>During severe flooding, local authorities will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Local authorities responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.</p>
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, local authorities responsibilities for emergency response are largely funded by the relevant local authorities' relevant Revenue Budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection scheme, Natural flood management study, Surface water plan/study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>The local authorities' Flooding Teams work closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.



# Lasswade, Penicuik, Dalkeith and Musselburgh (Potentially Vulnerable Area 10/22)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council, East Lothian Council, Midlothian Council	River Esk (Lothian)

## Background

This Potentially Vulnerable Area is 97km<sup>2</sup> and is part of the Almond and Edinburgh catchment (shown below). This is a large, mainly rural area covering southern Musselburgh, Dalkeith, Lasswade, Bonnyrigg and Penicuik.

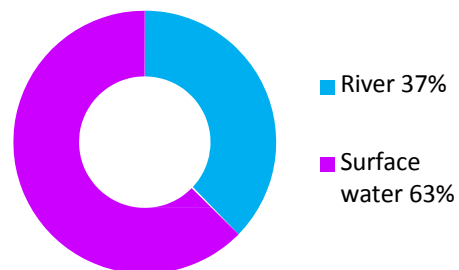


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The main watercourse is the River Esk, forming after the confluence of the River North Esk and River South Esk on the outskirts of Dalkeith. Other notable watercourses include the Park Burn and the Bilston Burn. The majority of damages are caused by surface water flooding.

There are approximately 320 residential properties and 320 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £1.8 million.



**Figure 1:** Annual Average Damages by flood source. *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

## Summary of flooding impacts

The highest risk of surface water flooding is in Dalkeith, Lasswade and Bonnyrigg. The highest risk of river flooding is from the River Esk, the River South Esk, the River North Esk and the Loan Burn to Musselburgh, Dalkeith and Newbattle,



Lasswade and Bonnyrigg and Penicuik. Musselburgh is also at risk from coastal flooding from the Firth of Forth.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Lasswade, Penicuik, Dalkeith and Musselburgh (Potentially Vulnerable Area 10/22)'

## History of flooding

Two significant floods have been recorded in this area. On 6 October 1990 Musselburgh was affected by flooding from the River Esk. On 13 August 1948 evacuation was required in Musselburgh after flooding occurred in Eskside West, Eskside East, Shorthope Street, Millhill and areas of the High Street.

## Objectives to manage flooding in Lasswade, Penicuik, Dalkeith and Musselburgh

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. The objectives below have been set for the Lasswade, Penicuik, Dalkeith and Musselburgh Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties and risk to people in Musselburgh caused by flooding from the River Esk and coastal flooding (Objective ID: 10075, 10076);
- Reduce economic damages to residential and non-residential properties in the Lasswade, Penicuik, Dalkeith and Musselburgh Potentially Vulnerable Area caused by river flooding (Objective ID: 10077);
- Reduce economic damages to residential and non-residential properties in Musselburgh caused by flooding from the River Esk (Objective ID: 10078);
- Reduce risk to people in Bilston, Dalkeith and Musselburgh from river flooding (Objective ID: 10079);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical. (Objective ID: 10052);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

### Actions to manage flooding in Lasswade, Penicuik, Dalkeith and Musselburgh

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. The actions shaded below have been selected as the most appropriate for Lasswade, Penicuik, Dalkeith and Musselburgh 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 Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection scheme/works					
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 (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100750006)</b>		
<b>Objective (ID):</b>	<p>Reduce risk to people in Bilston, Dalkeith and Musselburgh from river flooding (10079)</p> <p>Reduce economic damages to residential and non-residential properties in Musselburgh caused by flooding from the River Esk (10078)</p> <p>Reduce economic damages to residential and non-residential properties in the Lasswade, Penicuik, Dalkeith and Musselburgh Potentially Vulnerable Area caused by river flooding (10077)</p> <p>Reduce economic damages to residential and non-residential properties and risk to people in Musselburgh caused by flooding from the River Esk and coastal flooding (10075, 10076)</p>		
<b>Delivery lead:</b>	East Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>11 of 42</b>	<b>1 of 2</b>	<b>2 of 7</b>
<b>Delivery Period:</b>	2016/18 Outline Design & Approvals, 2018/19 Detailed Design, 2019/21 Construction. The above dates are subject to confirmation of funding.		
<b>Status:</b>	The scheme is under development with the Option Appraisal Report received at this stage.		
<b>Description:</b>	A flood protection scheme has been proposed for Musselburgh to reduce flood risk from the River Esk. The scheme would consist of flood defences and earth embankments and would provide a 1 in 200 year standard of protection. Part of this proposed scheme is located in Potentially Vulnerable Area 10/21. The benefits and impacts have been assessed for the whole scheme.		
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Flood protection scheme (PVA 10/21), Planning Policy, Strategic mapping and modelling.		
<b>Coordination Arrangement:</b>	East Lothian Council will undertake consultation and engagement exercises with the public and local groups during scheme development. East Lothian Council will liaise with SEPA in the development of the scheme.		
<b>Funding Arrangement:</b>	Musselburgh Flood Protection Scheme will receive 80% of its funding from the Scottish Government General Capital Grant and the remaining funding will be allocated from East Lothian Council's Capital Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The proposed scheme may benefit 1489 residential properties and 407 non-residential properties at risk of flooding in this location, with estimated damages avoided of £30 million. The Option Appraisal Report estimates the benefit cost ratio as 3.6 – 4.4.		
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. In addition there are three educational buildings which have been identified as potentially benefitting from this action. There may be negative impacts through disturbance to the local community during the construction phase.		
<b>Environmental:</b>	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on		

**Environmental:**

how they are designed. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. In addition, a number of nationally and locally designated sites are also present in the study area and could be positively or negatively impacted. These include conservation areas, scheduled monuments, gardens and designed landscapes, battlefields, listed buildings, Sites of Special Scientific Interest, Ramsar sites and ancient woodlands.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100770005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Lasswade, Penicuik, Dalkeith and Musselburgh Potentially Vulnerable Area caused by river flooding (10077)		
<b>Delivery lead:</b>	Midlothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>142 of 168</b>	<b>1 of 1</b>	<b>25 of 26</b>
<b>Delivery Period:</b>	2016-2022		
<b>Status:</b>	A programme will be developed for Midlothian Council to appoint a Consultant to assess the potential protection requirements during 2016/2017, with a view to commencing any construction as soon as possible thereafter.		
<b>Description:</b>	A flood protection study has been recommended for Dalkeith and Lasswade to assess whether flood defences and sediment management could reduce flood risk. The study should also consider the viability of property level protection. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
<b>Related Actions:</b>	Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Where possible opportunities to enhance and restore the environment will be sought, for example through natural flood management. Conservation areas, gardens and designed landscapes and ancient woodlands are also present in the study area and could be positively or negatively impacted. Midlothian Council will seek advice from SEPA on the data collection/hydraulic modelling elements of the study, and will discuss key elements of the study with Scottish Water.		
<b>Funding Arrangement:</b>	This will funded from the Midlothian Council Revenue Budget and Scottish Government funding as available.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 11 residential properties and three non-residential properties at risk of flooding in this location, with potential damages avoided of up to £650,000.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. Conservation areas, gardens and designed landscapes and ancient woodlands are also present in the study area and could be positively or negatively impacted.		

<b>Action (ID):</b>	<b>NATURAL FLOOD MANAGEMENT STUDY (100750003)</b>
<b>Objective (ID):</b>	<p>Reduce risk to people in Bilston, Dalkeith and Musselburgh from river flooding (10079)</p> <p>Reduce economic damages to residential and non-residential properties in Musselburgh caused by flooding from the River Esk (10078)</p> <p>Reduce economic damages to residential and non-residential properties in the Lasswade, Penicuik, Dalkeith and Musselburgh Potentially Vulnerable Area caused by river flooding (10077)</p> <p>Reduce economic damages to residential and non-residential properties and risk to people in Musselburgh caused by flooding from the River Esk and coastal flooding (10075, 10076)</p>
<b>Delivery lead:</b>	East Lothian Council
<b>Delivery Period:</b>	2021-2022
<b>Status:</b>	Not started
<b>Description:</b>	A natural flood management study has been recommended for Musselburgh to assess whether wave attenuation could help reduce flood risk. The study should link with the proposed flood protection scheme in Musselburgh. Part of this proposed study is located in Potentially Vulnerable Area 10/21. The benefits and impacts have been assessed for the whole study.
<b>Related Actions:</b>	Awareness raising, Community action groups, Flood protection study (PVA 10/21 and 22), Natural flood management study (PVA 10/21), Planning Policy, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	The East Lothian Council Flooding Team will liaise with SEPA, Scottish Water, Scottish Natural Heritage and other council departments during progression of this study.
<b>Funding Arrangement:</b>	The study will be funded from the Scottish Government General Capital Grant which has a 20% allocation for Flood Risk Management projects.
<b>Potential impacts</b>	
<b>Economic:</b>	The economic impact of natural flood management actions is difficult to define. However, these actions can reduce flood risk for high likelihood events.
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.
<b>Environmental:</b>	Natural flood management actions can have a positive impact on the ecological quality of the environment by restoring and enhancing natural habitats. The Leith Docks to Port Seton coastline (water body ID 200034) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning.

**Environmental:** To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	The City of Edinburgh Council, <b>Midlothian Council</b> , East Lothian Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	The SWMPs will be prepared in the period 2016-2021. Scottish Water is leading on an Integrated Catchment Study (ICS) which is progressing well (action 1000520019). The initial phase of the ICS is complete and the local authorities have concluded that to date the results presented by Scottish Water accurately reflect flooding. This ICS when complete will complement the Surface Water Management Plan (SWMP) to be prepared by the local authorities.
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process. The ICS also covers a large part of PVA 10/23. If issues are identified, these will be addressed in the SWMP.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	Midlothian Council will lead on the development of surface water management plans for their area in partnership with other relevant authorities where required, Scottish Water and SEPA. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by Midlothian Council Revenue Budget.



<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for parts of Edinburgh, East Lothian and Midlothian was carried out in between 2010-2015 to improve knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with The City of Edinburgh Council, East Lothian Council and Midlothian Council.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Strategic mapping improvements for the Lower Esk area are dependant on the outputs from a local authority study and the implementation of a flood protection scheme. However, SEPA proposes to undertake river mapping improvements in 2017 to 2018. Due to the large number of third party studies and works in this area there is considerable uncertainty over delivery timescales for this catchment. SEPA will seek to better understand these during 2016 in order to further refine timescales.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to develop flood mapping in the Lower Esk area to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.
<b>Related Actions:</b>	Flood protection study, Flood protection scheme, Natural flood management study, Planning Policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	A flood protection scheme is proposed for Musselburgh and a flood protection study is proposed for Dalkeith and Lasswade. SEPA will work with the local authority to ensure that strategic mapping and modelling developments reflect the changes in flood risk resulting from the new flood protection scheme and new information about flood risk resulting from the proposed study where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	AVSE PFI Edinburgh 2016-2019. Penicuik 2017-2020. Rosewell 2016-2019. Roslin 2016-2019.
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Almond Valley, Seafield and Esk Water the Private Finance Initiative (AVSE PFI), Edinburgh, Penicuik, Rosewell and Roslin sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100770017)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Lasswade, Penicuik, Dalkeith and Musselburgh Potentially Vulnerable Area caused by river flooding (10077)
<b>Delivery lead:</b>	Midlothian Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Midlothian Council will continue to maintain the existing flood protection schemes and defences. These include defences along the Bilston Burn, the Rullion Road Penicuik Flood Protection Scheme and the Polton Road Bridge Relief Culvert Flood Protection Scheme.
<b>Related Actions:</b>	Awareness raising, Community action groups, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	Midlothian Council will ensure that any works are coordinated with interested parties, undertaken with minimal disruption, and will liaise with Scottish Water, SEPA and Scottish Natural Heritage, as appropriate.
<b>Funding Arrangement:</b>	This will be funded by the Midlothian Council Revenue Budget.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Musselburgh flood warning area which is part of the Esk (East Lothian) river flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Emergency plans/response, Flood forecasting, Flood protection scheme, Flood protection study, Natural flood management study, Self help.
<b>Coordination Arrangement:</b>	A flood protection scheme is proposed for Musselburgh and a flood protection study is proposed for Dalkeith and Lasswade. SEPA will work with the local authority to ensure that changes to hydrology and flood risk as a result of the proposed scheme and any new information about flood risk resulting from the proposed study are fully considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (100770012)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Lasswade, Penicuik, Dalkeith and Musselburgh Potentially Vulnerable Area caused by river flooding (10077)
<b>Delivery lead:</b>	Community
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	East Lothian Tenants and Residents Panel operate in this area. The group aims to involve the community in area-specific issues and could help increase community resilience to flooding.
<b>Related Actions:</b>	Awareness Raising, Emergency plans/response, Flood forecasting, Flood protection scheme, Flood protection study, Natural flood management study, Maintain flood warning, Maintenance, Maintain flood protection scheme, Self help, Strategic mapping and modelling, Surface water plan/study.
<b>Coordination Arrangement:</b>	East Lothian Council will engage with East Lothian Tenants and Residents Panel as well as the wider community to continue to increase community resilience to flooding. This will be done by developing and reviewing emergency plans, and facilitating resilient communities' plans. There is also interaction between East Lothian Council Emergency Planning Officer and chair of Community Councils focusing on risks including flooding.
<b>Funding Arrangement:</b>	East Lothian Council engagement with the community will be funded by the East Lothian Council Revenue Budget.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues the local authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.



<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. For the new flood protection scheme, SEPA will support the local authority's communications and engagement activities with media activity, local public awareness events and education engagement with schools. SEPA will also deliver joint communications with local authorities for Floodline customers in any newly protected flood warning area. As part of SEPA's education programme and to contribute to community resilience SEPA is sponsoring a play by Rightlines Productions called 'Rapid Departure'. This interactive play about flooding will tour locations in Scotland throughout 2016, including this Potentially Vulnerable Area. The performances aim to lead people to consider how flooding could impact their community and how they can take steps to prepare for it. Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Community flood action groups, Emergency plans/response, Flood protection scheme, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>A flood protection scheme is proposed for Musselburgh. SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Awareness raising will be coordinated through the Local Plan District</p>

	<p>(LPD) between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<p><b>Funding Arrangement:</b></p>	<p>SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.</p>

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Local authorities, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintain flood protection scheme.
<b>Coordination Arrangement:</b>	Local authorities will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. The local authorities will liaise with Scottish Water, Network Rail, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The relevant local authority will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	<p>Existing. The City of Edinburgh Council maintains a Flooding Emergency Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the Edinburgh area may cause flooding. The City of Edinburgh Council's Flood Prevention service in Transport Maintenance regularly assess river levels and flows and liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting Edinburgh being passed by SEPA to Police Scotland (Edinburgh Division), an assessment of the need to convene a multi-agency Edinburgh Flood Group will be made by the Senior Police Officer. Council representatives on the Edinburgh Flood Group will establish liaison with the Corporate Incident Management Team (if convened) at the Council Incident Coordination Centre, City Chambers and with the Flood Response Group based at Bankhead Depot, Sighthill.</p> <p>East Lothian Council maintains a Severe Weather Response Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the East Lothian area may cause flooding. River levels and flows are monitored and East Lothian Council liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting East Lothian being passed by SEPA to Police Scotland (J Division), an assessment of the need to convene the multi-agency East Lothian Flood Group will be made by the Senior Police Officer. East Lothian Council strategically deploys temporary flood barriers and sandbags when properties are threatened by flooding.</p> <p>Midlothian Council maintains and makes available stocks of sand bags and pallet (flood) barriers for use as required and can draft in pumps as required or retain on standby.</p>
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.</p>
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning, Maintain flood protection scheme, Maintenance.

<p><b>Coordination Arrangement:</b></p>	<p>During severe flooding, local authorities will work in partnership with the Emergency responders, SEPA, Met Office, Scottish Water, voluntary organisations and other agencies to coordinate the response to the incident.</p> <p>The City of Edinburgh Council and East Lothian Council responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.</p> <p>Midlothian Council responsibilities may include; provision of sandbags on request, erection of temporary pallet (flood) barriers, provision of standby pumps, traffic management and road closures, alerting and warning residents and making available the use of public buildings as temporary rest centres for the care and welfare of persons affected.</p>
<p><b>Funding Arrangement:</b></p>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, local authorities responsibilities for emergency response are largely funded by the relevant local authorities' relevant Revenue Budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection scheme, Flood protection study, Natural flood management study, Surface water plan/study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>The local authorities' Flooding Teams work closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

# Cockenzie, Port Seton, Longniddry and Prestonpans (Potentially Vulnerable Area 10/23)

Local Plan District	Local authority	Main catchment
Forth Estuary	East Lothian Council	East Lothian coastal

## Background

This Potentially Vulnerable Area is 65km<sup>2</sup> and part of the East Lothian and Berwickshire catchment (shown below). This is a moderately sized coastal area covering Cockenzie and Port Seton, Tranent, Prestonpans and Longniddry. The main watercourses are the Redhouse Burn and the Seton Dean.

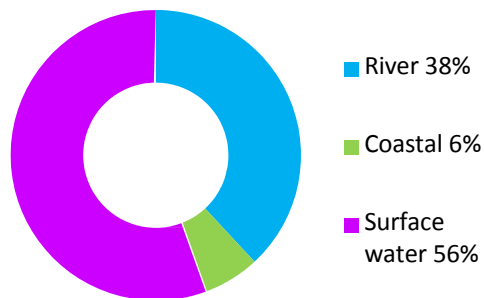


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The area has a risk of river, surface water and coastal flooding. The majority of damages are caused by surface water flooding.

There are approximately 120 residential properties and 60 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £730,000.



**Figure 1: Annual Average Damages by flood source.** Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).

## Summary of flooding impacts

The highest risk of surface water flooding is in Tranent.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Cockenzie, Port Seton, Longniddry and Prestonpans (Potentially Vulnerable Area 10/23)'



## History of flooding

One significant coastal flood has been recorded in this area. On 30 March 2010, a tidal surge coincided with the highest mean tides of the year and caused extensive flooding along the east coast of Scotland. The Firth of Forth, notably Leith, Musselburgh, Prestonpans, Port Seton, Dunbar and North Berwick were badly affected. Impacts included flooding of properties, damage to harbours, seawalls and roads.

## Objectives to manage flooding in Cockenzie, Port Seton, Longniddry and Prestonpans

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. The objectives below have been set for the Cockenzie, Port Seton, Longniddry and Prestonpans Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties in the Cockenzie, Port Seton, Longniddry and Prestonpans Potentially Vulnerable Area caused by river and coastal flooding (Objective ID: 10080);
- Reduce risk to people in Tranent from river flooding (Objective ID: 10081);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.



## Actions to manage flooding in Cockenzie, Port Seton, Longniddry and Prestonpans

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. The actions shaded below have been selected as the most appropriate for Cockenzie, Port Seton, Longniddry and Prestonpans Potentially Vulnerable Area.

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

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Community flood action groups					
			Flood protection study		
Maintain flood warning					
Awareness raising					
Emergency plans/response					
Maintain flood protection scheme					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100800005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Cockenzie, Port Seton, Longniddry and Prestonpans Potentially Vulnerable Area caused by river and coastal flooding (10080)		
<b>Delivery lead:</b>	East Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>61 of 168</b>	<b>1 of 3</b>	<b>9 of 26</b>
<b>Delivery Period:</b>	2019-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Cockenzie, Port Seton and Prestonpans to assess whether modification of conveyance, installation/modification of fluvial control structures, flood defences, sediment management and natural flood management could reduce flood risk. The study should also consider the viability of property level protection. Natural flood management options that should be considered include wave attenuation. The study should take a sustainable approach and consider the interaction between actions upstream and downstream and potential effects on coastal processes along the shoreline.		
<b>Related Actions:</b>	Flood protection study (PVA 10/23 and 10/25), Natural flood management study (PVA 10/21), Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	The East Lothian Council Flooding Team will liaise with SEPA, Scottish Water, Scottish Natural Heritage and other council departments during the progression of this study.		
<b>Funding Arrangement:</b>	The study will be funded from the Scottish Government General Capital Grant which has a 20% allocation for Flood Risk Management projects.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 63 residential properties and 14 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £6.2 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an		

**Environmental:** adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. Conservation areas, scheduled monuments, gardens and designed landscapes and battlefields are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100810005)</b>		
<b>Objective (ID):</b>	Reduce risk to people in Tranent from river flooding (10081)		
<b>Delivery lead:</b>	East Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>79 of 168</b>	<b>2 of 3</b>	<b>14 of 26</b>
<b>Delivery Period:</b>	2019-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Tranent to assess whether modification of conveyance, installation/modification of fluvial control structures, direct flood defences and sediment management could reduce flood risk. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
<b>Related Actions:</b>	Flood protection study (PVA 10/23), Maintain flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	The East Lothian Council Flooding Team will liaise with SEPA, Scottish Water, Scottish Natural Heritage and other council departments during the progression of this study.		
<b>Funding Arrangement:</b>	The study will be funded from the Scottish Government General Capital Grant which has a 20% allocation for Flood Risk Management projects.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 29 residential properties and 46 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £4.6 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. Conservation areas and battlefields are also present in the study area and could be positively or negatively impacted.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	SEPA will await local study for this location with a view to incorporating it subject to a positive assessment. Timescales are indicative only; therefore SEPA will seek to better understanding these during 2016 in order to refine timescales and inform resource planning. Incorporation of additional surface water mapping SEPA-led. Surface water mapping improvements expected to be undertaken 2016.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,600km <sup>2</sup> of improved surface water data is currently available within this Local Plan District. The inclusion of additional surface water hazard data resulting from the completion of local authority surface water management plans and Scottish Water integrated catchment studies will be considered when these projects are completed.
<b>Related Actions:</b>	Flood protection study, Planning Policy.
<b>Coordination Arrangement:</b>	SEPA's strategic mapping activities will be coordinated with the activities of other responsible authorities as required.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	AVSE PFI Edinburgh 2016-2019. Gullane 2016-2020
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Almond Valley, Seafield and Esk Water Private Finance Initiative (AVSE PFI), Edinburgh and Gullane sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100800017)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Cockenzie, Port Seton, Longniddry and Prestonpans Potentially Vulnerable Area caused by river and coastal flooding (10080)
<b>Delivery lead:</b>	East Lothian Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	East Lothian Council will continue to maintain the existing flood defences along the coast.
<b>Related Actions:</b>	Awareness raising, Community action groups, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	East Lothian Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that the infrastructure is maintained. East Lothian Council will liaise with Scottish Water, Scottish Natural Heritage, Marine Scotland, SEPA etc.
<b>Funding Arrangement:</b>	This will be funded by the East Lothian Council Revenue Budget.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Prestonpans and Port Seton flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Emergency plans/response, Flood forecasting, Flood protection study, Self help.
<b>Coordination Arrangement:</b>	A flood protection study is proposed for Cockenzie, Port Seton and Prestonpans. SEPA will work with the local authority to ensure that any new information about flood risk resulting from the proposed flood protection study is considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.



<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (100800012)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Cockenzie, Port Seton, Longniddry and Prestonpans Potentially Vulnerable Area caused by river and coastal flooding (10080)
<b>Delivery lead:</b>	Community
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	East Lothian Tenants and Residents Panel and Port Seton and Cockenzie Coastal Regeneration Group operate in this area. The groups could help increase community resilience to flooding.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning, Maintenance, Maintain flood protection scheme, Self help.
<b>Coordination Arrangement:</b>	East Lothian Council will engage with East Lothian Tenants and Residents Panel and Port Seton and Cockenzie Coastal Regeneration Group as well as the wider community to continue to increase community resilience to flooding. This will be done by developing and reviewing emergency plans and facilitating resilient communities' plans. There is also interaction between East Lothian Council Emergency Planning Officer and chair of Community Councils focusing on risks including flooding.
<b>Funding Arrangement:</b>	East Lothian Council engagement with the community will be funded by the East Lothian Council Revenue Budget.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues East Lothian Council will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. As part of SEPA's education programme and to contribute to community resilience SEPA is sponsoring a play by Rightlines Productions called 'Rapid Departure'. This interactive play about flooding will tour locations in Scotland throughout 2016, including this Potentially Vulnerable Area. The performances aim to lead people to consider how flooding could impact their community and how they can take steps to prepare for it. Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Community flood action groups, Emergency plans/response, Flood forecasting, Flood Protection Scheme, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>

**Funding  
Arrangement:**

SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	East Lothian Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintain flood protection scheme.
<b>Coordination Arrangement:</b>	East Lothian Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. East Lothian Council will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	East Lothian Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. East Lothian Council maintains a Severe Weather Response Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the East Lothian area may cause flooding. River levels and flows are monitored and East Lothian Council liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting East Lothian being passed by SEPA to Police Scotland (J Division), an assessment of the need to convene the multi-agency East Lothian Flood Group will be made by the Senior Police Officer.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. East Lothian Council strategically deploys temporary flood barriers and sandbags when properties are threatened by flooding.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning, Maintain flood protection scheme, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, East Lothian Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. East Lothian Council's responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.
<b>Funding Arrangement:</b>	Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, East Lothian Council's responsibilities for emergency response are largely funded by East Lothian Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid




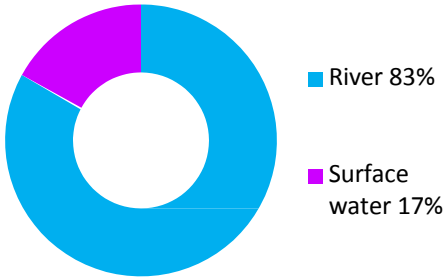
settlement.



<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>The East Lothian Council Flooding Team works closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Haddington (Potentially Vulnerable Area 10/24)

Local Plan District	Local authority	Main catchment
Forth Estuary	East Lothian Council	River Tyne

Background	
<p>This Potentially Vulnerable Area is 16km<sup>2</sup> and part of the East Lothian and Berwickshire catchment group (shown below). This is a small, rural area covering Haddington and its surroundings. The main watercourse is the River Tyne which flows through the south of Haddington before continuing through the town centre and out to the east.</p>  <p>© Crown copyright. SEPA licence number 100016991 (2015). All rights reserved. <i>Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).</i></p>	<p>The area has a risk of river and surface water flooding. The majority of damages in this Potentially Vulnerable Area are caused by river flooding.</p> <p>There are approximately 230 residential properties and 140 non-residential properties at risk of flooding.</p> <p>The Annual Average Damages are approximately £700,000.</p>  <p><b>Figure 1:</b> Annual Average Damages by flood source. <i>Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).</i></p>

### Summary of flooding impacts

The highest risk of river flooding is from the River Tyne to Haddington and the highest risk of surface water flooding is also in Haddington.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Haddington (Potentially Vulnerable Area 10/24)'

## History of flooding

The following significant river floods have been recorded in this area:

- 7 July and 25 Sept 2012: High river levels in Haddington caused drains and watercourses to back up and unable to discharge into the River Tyne. This resulted in property flooding.
- 12 August 1948: The waters of the River Tyne rose 2 inches above the levels reached during the large flood of 1775. The High Street flooded to a depth of 57 inches. The flood event is known to have affected a large area with railway lines and road bridges damaged or destroyed and multiple buildings flooded.
- 1926 and 1932: Photographic evidence of large flood events in Haddington.
- October 1775: A large flood event in Haddington inundated most of the town.

## Objectives to manage flooding in Haddington

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. The objectives below have been set for the Haddington Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties in Haddington caused by flooding from the River Tyne (Objective ID: 10082);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in Haddington

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. The actions shaded below have been selected as the most appropriate for Haddington 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>
<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 Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
	Flood protection scheme/works				
Community flood action groups					
Maintain flood warning					
Awareness raising					
Emergency plans/response					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100820006)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Haddington caused by flooding from the River Tyne (10082)		
<b>Delivery lead:</b>	East Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>37 of 42</b>	<b>2 of 2</b>	<b>7 of 7</b>
<b>Delivery Period:</b>	2017/19 Outline Design & Approvals, 2019/20 Detailed Design, 2020/22 Construction. The above dates are subject to confirmation of funding.		
<b>Status:</b>	The scheme is under development with the Option Appraisal Report currently ongoing.		
<b>Description:</b>	A flood protection scheme has been proposed for Haddington to reduce flood risk from the River Tyne. The scheme would consist of flood defences, possibly in combination with natural flood management.		
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Planning Policy, Strategic mapping and modelling.		
<b>Coordination Arrangement:</b>	East Lothian will undertake consultation and engagement exercises with the public and local groups during scheme development. East Lothian Council will liaise with SEPA in the development of the scheme.		
<b>Funding Arrangement:</b>	Haddington Flood Protection Scheme will receive 80% of it's funding from the Scottish Government General Capital Grant and the remaining funding will be allocated from East Lothian Council's Capital Budget.		
<b>Potential impacts</b>			
<b>Economic:</b>	The proposed scheme may benefit 231 residential and non-residential properties at risk of flooding in this location, with estimated damages avoided of £8.8 million. The flood protection scheme has an estimated benefit cost ratio of 1.2.		
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. There may be negative impacts through disturbance to the local community during the construction phase.		
<b>Environmental:</b>	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. A number of nationally and locally designated sites are present in the study area and could be positively or negatively impacted. These include conservation areas, scheduled monuments, gardens and designed landscapes and listed buildings.		

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Haddington 2016-2019
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Haddington sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the three flood warning areas in Haddington which are part of the Tyne river flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Emergency plans/response, Flood forecasting, Flood protection scheme, Self help.
<b>Coordination Arrangement:</b>	A flood protection scheme is proposed for Haddington. SEPA will work with the local authority to ensure that changes to hydrology and flood risk as a result of the proposed flood protection scheme are fully considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.



<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (100820012)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Haddington caused by flooding from the River Tyne (10082)
<b>Delivery lead:</b>	Community
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	East Lothian Tenants and Residents Panel and Friends of the River Tyne operate in this area. The groups could help increase community resilience to flooding.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning, Maintenance, Self help.
<b>Coordination Arrangement:</b>	East Lothian Council will engage with East Lothian Tenants and Residents Panel and Friends of the River Tyne as well as the wider community to continue to increase community resilience to flooding. This will be done by developing and reviewing emergency plans and facilitating resilient communities' plans. There is also interaction between East Lothian Council Emergency Planning Officer and chair of Community Councils focusing on risks including flooding.
<b>Funding Arrangement:</b>	East Lothian Council engagement with the community will be funded by the East Lothian Council Revenue Budget.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues East Lothian Council will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 and promote Floodline. This will be achieved through SEPA-led education events. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. For the new flood protection scheme, SEPA will support the local authority's communications and engagement activities with media activity, local public awareness events and education engagement with schools. SEPA will also deliver joint communications with local authorities for Floodline customers in any newly protected flood warning area.</p> <p>Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Community flood action groups, Emergency plans/response, Flood forecasting, Flood protection scheme, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>A flood protection scheme is proposed for Haddington. SEPA will support the local authority's communications and engagement activities. SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete

proposals will be funded by the relevant local authority.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	East Lothian Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain Flood Warning.
<b>Coordination Arrangement:</b>	East Lothian Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. East Lothian Council will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	East Lothian Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. East Lothian Council maintains a Severe Weather Response Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the East Lothian area may cause flooding. River levels and flows are monitored and East Lothian Council liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting East Lothian being passed by SEPA to Police Scotland (J Division), an assessment of the need to convene the multi-agency East Lothian Flood Group will be made by the Senior Police Officer.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. East Lothian Council strategically deploys temporary flood barriers and sandbags when properties are threatened by flooding.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, East Lothian Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. East Lothian Council's responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.
<b>Funding Arrangement:</b>	Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, East Lothian Council's responsibilities for emergency response are largely funded by East Lothian Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection scheme, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>The East Lothian Council Flooding Team works closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

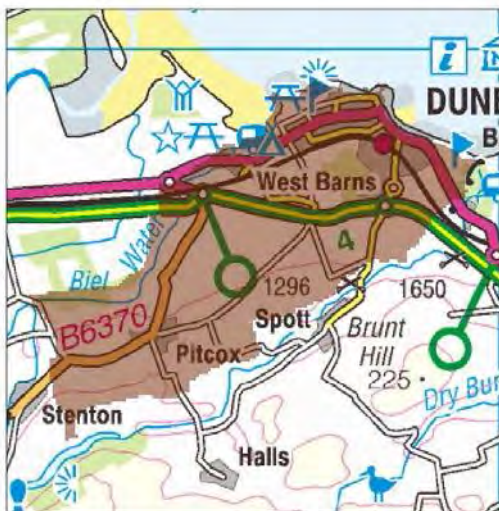
## Dunbar and West Barns (Potentially Vulnerable Area 10/25)

Local Plan District	Local authority	Main catchment
Forth Estuary	East Lothian Council	East Lothian coastal

### Background

This Potentially Vulnerable Area is 19km<sup>2</sup> and part of the East Lothian and Berwickshire catchment group (shown below). This is a small, coastal area covering Dunbar and West Barns and its immediate surroundings.

The main watercourse is the Biel Water which flows through the west of the area towards the north east, passing around the West Barns and discharging into the North Sea at Belhaven Bay.

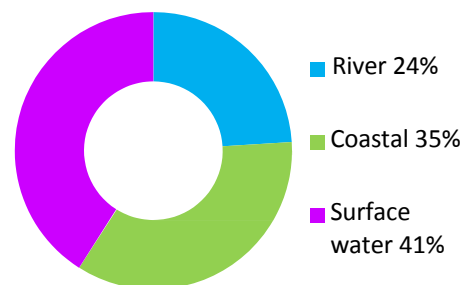


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The area has a risk of river, coastal and surface water flooding. The majority of damages in this Potentially Vulnerable Area are caused by surface water flooding.

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

The Annual Average Damages are approximately £220,000.



**Figure 1: Annual Average Damages by flood source.** *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

### Summary of flooding impacts

The greatest risk of river flooding is from the Biel Water and the Hedderwick Burn to Dunbar and West Barns. The greatest risk of coastal flooding is from the North Sea to Dunbar and West Barns.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Dunbar and West Barns (Potentially Vulnerable Area 10/25)'



## History of flooding

The following flood events have been identified as significant in this Potentially Vulnerable Area:

- 5 December 2012: A combination of wind and high tides caused large waves and coastal flooding along the east coast of Scotland. There was significant damage to North Berwick harbour and damage to the communal slipway at Dunbar harbour.
- 30 March 2010: A tidal surge coinciding with the highest mean tides of the year caused extensive flooding along the east coast of Scotland. Locations within this coastal area affected included Leith, Musselburgh, Prestonpans, Port Seton, Dunbar and North Berwick. The flood caused damage to properties, harbours, seawalls and roads.
- 22 October 2002: Belhaven hospital flooded from the river. Patients had to be evacuated after the generator room was shut down and wards closed.
- August 1949: Storm surge resulted in flooding to Dunbar.

## Objectives to manage flooding in Dunbar and West Barns

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. The objectives below have been set for the Dunbar and West Barns Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties in the Dunbar and West Barns Potentially Vulnerable Area caused by river and coastal flooding (Objective ID: 10083);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in Dunbar and West Barns

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. The actions shaded below have been selected as the most appropriate for Dunbar and West Barns Potentially Vulnerable Area.

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

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Community flood action groups					
	Flood protection study				
Maintain flood warning					
Awareness raising					
Emergency plans/response					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Emergency plans/response					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100830005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Dunbar and West Barns Potentially Vulnerable Area caused by river and coastal flooding (10083)		
<b>Delivery lead:</b>	East Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>110 of 168</b>	<b>3 of 3</b>	<b>20 of 26</b>
<b>Delivery Period:</b>	2017-2018		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Dunbar/West Barns to assess whether modification of conveyance, flood defences, sediment management and natural flood management could reduce flood risk. The study should also consider the viability of property level protection. Natural flood management options that should be considered include wave attenuation. The study should take a sustainable approach and consider the interaction between actions upstream and downstream and potential effects on coastal processes along the shoreline. The study should also assess the risk and mitigation of wave overtopping at North Berwick.		
<b>Related Actions:</b>	Flood protection study (PVA 10/23), Natural flood management study (PVA 10/21), Maintain flood warning, Planning Policy, Strategic mapping and modelling.		
<b>Coordination Arrangement:</b>	The East Lothian Council Flooding Team will liaise with SEPA, Scottish Water, Scottish Natural Heritage and other council departments during the progression of this study.		
<b>Funding Arrangement:</b>	The study will be funded from the Scottish Government General Capital Grant which has a 20% allocation for Flood Risk Management projects.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 49 residential properties and 15 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £3.4 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or		

**Environmental:** permissions are granted. Conservation areas, battlefields and listed buildings are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Strategic mapping improvements in this area are dependant on a local authority study. Wider coastal mapping and modelling improvements may take place in this area and these will be further refined in 2016 with the intention of updating the strategic coastal maps in 2016 to 2019.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.
<b>Related Actions:</b>	Flood protection study, Planning Policy.
<b>Coordination Arrangement:</b>	A flood protection study is proposed for Dunbar/West Barns. SEPA will work with the local authority to ensure that new information about flood risk resulting from the proposed flood protection study is considered in SEPA's strategic mapping and modelling developments where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Dunbar 2016-2017
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Dunbar sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Dunbar flood warning area including West Barns which is part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Emergency plans/response, Flood forecasting, Flood protection study, Self help.
<b>Coordination Arrangement:</b>	A flood protection study is proposed for Dunbar and West Barns. SEPA will work with the local authority to ensure that any new information about flood risk resulting from the proposed flood protection study is considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.



<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (100830012)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in the Dunbar and West Barns Potentially Vulnerable Area caused by river and coastal flooding (10083)
<b>Delivery lead:</b>	Community
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	Dunbar Shore and Harbour Neighbourhood Group, East Lothian Tenants and Residents Panel and North Berwick Environment Group operate in this area. The groups could help increase community resilience to flooding.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning, Maintenance, Self help.
<b>Coordination Arrangement:</b>	East Lothian Council will engage with Dunbar Shore and Harbour Neighbourhood Group, East Lothian Tenants and Residents Panel and North Berwick Environment Group as well as the wider community to continue to increase community resilience to flooding. This will be done by developing and reviewing emergency plans and facilitating resilient communities' plans. There is good interaction between East Lothian Council Emergency Planning Officer and chair of Community Councils focussing on risks including flooding.
<b>Funding Arrangement:</b>	East Lothian Council engagement with the community will be funded by East Lothian Council Revenue Budget.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues East Lothian Council will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Community flood action groups, Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	East Lothian Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning.
<b>Coordination Arrangement:</b>	East Lothian Council will work with private landowners to ensure that works are coordinated and that the infrastructure is maintained. East Lothian Council will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	East Lothian Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. East Lothian Council maintains a Severe Weather Response Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the East Lothian area may cause flooding. River levels and flows are monitored and East Lothian Council liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting East Lothian being passed by SEPA to Police Scotland (J Division), an assessment of the need to convene the multi-agency East Lothian Flood Group will be made by the Senior Police Officer.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. East Lothian Council strategically deploys temporary flood barriers and sandbags when properties are threatened by flooding.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, East Lothian Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. East Lothian Council's responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.
<b>Funding Arrangement:</b>	Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, East Lothian Council's responsibilities for emergency response are largely funded by East Lothian Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>The East Lothian Council Flooding Team works closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## Berwickshire Coast (Potentially Vulnerable Area 10/26)

Local Plan District	Local authority	Main catchment
Forth Estuary	Scottish Borders Council	Berwickshire coastal

### Background

This Potentially Vulnerable Area is 40km<sup>2</sup> and part of the East Lothian and Berwickshire catchment group (shown below). This is a small, coastal area covering part of Eyemouth, St Abb's Head and Coldingham. The main watercourses are the Eye Water, the Milldown Burn and the Dowlaw Burn. There are also a number of unnamed burns which also contribute to flooding.

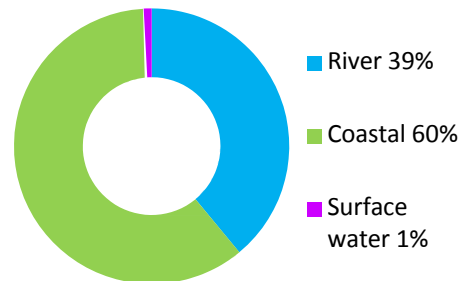


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Coastal and river flood interaction occurs on the Eye Water with coastal flooding extending upstream for approximately 1.5km. The majority of flood damages in this Potentially Vulnerable Area are caused by coastal flooding.

There are approximately 70 residential properties and 50 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £300,000.



**Figure 1: Annual Average Damages by flood source.** Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).

### Summary of flooding impacts

The highest risk of coastal flooding is from the North Sea to Eyemouth. The highest risk of river flooding is from the Eye Water to Eyemouth.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Berwickshire Coast (Potentially Vulnerable Area 10/26)'



## History of flooding

This area has a long history of flooding. The following significant floods have been recorded:

- 4 January 2014: A tidal surge combined with a storm surge affected coastal areas across the east of Scotland, particularly around the Forth Estuary.
- 25 July 2013: Surface water flooding in Albert Road, Church Street and Harbour Road, Eyemouth resulted in both residential and commercial property being flooded.
- 5 December 2013: 1m North Sea surge combined with a high spring tide of 5.4m caused flooding along the east coast. Eyemouth was affected. Almost all of Harbour Road in Eyemouth was flooded but water inundated only 10 properties. This is less than would have been expected as a result of preventative actions taken by the local authority and property owners.
- 28 June 2012: Surface water flooding in Albert Road, Church Street and Harbour Road, Eyemouth resulted in both residential and commercial properties being flooded.
- 30 and 31 March 2010: A tidal surge coincided with highest mean tides of the year and caused extensive flooding along the east coast of Scotland, with the Firth of Forth being one of the worst affected areas. Locations within this coastal area affected include Leith, Musselburgh, Prestonpans, Port Seton, Dunbar, Eyemouth and North Berwick. Impacts included flooding of properties, damage to harbours, seawalls and roads.
- 7 January 2005: Combination of river and coastal flooding affected properties at Harbour Road and various other premises in Eyemouth.
- 22 October 2002: A storm caused combined river and coastal flooding in Eyemouth. Impacts included flooding of properties in Harbour Road and the High Street.
- 12 August 1948: A major flood on Eye Water resulted in water inundating Eyemouth and up to the second floor of some buildings. The harbour was completely awash and houses were evacuated. Seven railway bridges and two road bridges were washed away. Multiple buildings were flooded. The railway was destroyed with long term restrictions on travel. This is thought to have been greater than a 1 in 200 year flood event in Eyemouth.
- 1881: The 'Eyemouth Disaster' resulted in 191 fishermen drowning.

## Objectives to manage flooding in Berwickshire Coast

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. The objectives below have been set for the Berwickshire Coast Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties in Eyemouth caused by coastal flooding (Objective ID: 10084);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);



- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

### Actions to manage flooding in Berwickshire Coast

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. The actions shaded below have been selected as the most appropriate for Berwickshire Coast Potentially Vulnerable Area.

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

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Community flood action groups					
			Flood protection study		
Maintain flood warning					
Awareness raising					
Emergency plans/response					
Strategic mapping and modelling (SEPA)					
		Strategic mapping and modelling (Scottish Water)			
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100840005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Eyemouth caused by coastal flooding (10084)		
<b>Delivery lead:</b>	Scottish Borders Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>66 of 168</b>	<b>4 of 6</b>	<b>10 of 26</b>
<b>Delivery Period:</b>	2019-2022		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Eyemouth to assess whether flood defences, sediment management and natural flood management could reduce flood risk. The study should also consider the viability of property level protection. Natural flood management options that should be considered include wave attenuation. The study should be carried out in conjunction with the Shoreline Management Plan (2016-2018). The study should take a sustainable approach and consider the interaction between actions and potential effects on coastal processes along the shoreline.		
<b>Related Actions:</b>	Community flood action groups, Emergency plans/response, Maintaining flood warning, Planning Policy, Strategic mapping and modelling.		
<b>Coordination Arrangement:</b>	This study will assess the existing and future flood risk from coastal flooding also considering the combined effects of flooding from the Eye Water. An assessment of the effectiveness of the current sea wall structure going forward in the future will also be carried out. The study will also take into consideration the Scottish Borders Shoreline Management Plan which will be developed by Scottish Borders Council prior to the flood study commencing. Data relating to previous wave overtopping studies will also be considered. Scottish Borders Council will coordinate the study with Scottish Water, SEPA, Eyemouth Harbour Trust, Scottish Natural Heritage, and Local Community Groups/Businesses including the Town Council.		
<b>Funding Arrangement</b>	Funding for the Flood Protection Study will be subject to budget allocations over the six years of the plan 2016-2022.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 34 residential properties and 21 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £5.7 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example		

**Environmental:**

through natural flood management. To be in accord with the Forth Estuary Local Flood Risk Management Plan the competent authority must demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (Special Protection Area or Special Area of Conservation) before any consents or permissions are granted. Conservation areas, listed buildings and designated bathing waters are also present in the study area and could be positively or negatively impacted.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Strategic mapping improvements in this area are dependant on local authority study and the timings of surface water study. SEPA will await the outputs from these studies with a view of incorporating them into the strategic maps subject to a positive assessment. Timescales are indicative only and SEPA will seek to better understand these during 2016 in order to further refine timescales.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will work with the local authority to review the existing study data and establish any further work required to enable an update of the flood maps in the Eyemouth coastal area. SEPA will support the local authority if further work beyond a strategic scale is required.
<b>Related Actions:</b>	Flood protection study, Planning Policy.
<b>Coordination Arrangement:</b>	A flood protection study is proposed for Eyemouth. SEPA will work with the local authority to ensure that new information about flood risk resulting from the proposed flood protection study is considered in SEPA's strategic mapping and modelling developments where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	Eyemouth 2018-2020
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Eyemouth sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study.
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD WARNING (100990030)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	SEPA will continue to maintain the Grantshouse to Eyemouth flood warning area which is part of the Eye river flood warning scheme. SEPA will continue to maintain the Eyemouth Coastal flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme. When flood events occur in an area with an existing flood warning service, SEPA will seek to verify the flood forecasts and warnings. SEPA will use feedback and post-event data to ensure that our flood warning service is timely and accurate.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Emergency plans/response, Flood forecasting, Flood protection study, Self help.
<b>Coordination Arrangement:</b>	A flood protection study is proposed for Eyemouth. SEPA will work with the local authority to ensure that any new information about flood risk resulting from the proposed flood protection study is considered in the existing flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (100840012)</b>
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Eyemouth caused by coastal flooding (10084)
<b>Delivery lead:</b>	Community
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. Scottish Borders Council will continue to develop and retain relationships already in place with residents and community groups through the Resilient Communities Initiative.
<b>Description:</b>	Eyemouth Resilient Community Group and the St Abbs Resilient Community Group operate in this area. The groups could help increase community resilience to flooding.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning, Maintenance, Self help.
<b>Coordination Arrangement:</b>	Scottish Borders Council will engage with the community to continue to develop local resilient communities groups as required. This will be done by developing and reviewing emergency plans and facilitating resilient communities plans.
<b>Funding Arrangement:</b>	This will be funded by Scottish Borders Council Revenue Budget.



<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. Scottish Borders Council will continue to develop and retain relationships already in place with residents and community groups through the Resilient Communities Initiative.
<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. Scottish Borders Council offers discounted flood protection products to homes and businesses at risk in the Scottish Borders.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Emergency plans/response, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	Scottish Borders Council will work with other responsible authorities to support residents, businesses and local resilient communities groups as required. This will be done by developing and reviewing emergency plans, facilitating resilient communities plans, and continuing to provide and develop Scottish Borders Council's subsidised flood products scheme.
<b>Funding Arrangement:</b>	This will be funded by the property owner. In the event of severe issues this is to be funded by Scottish Borders Council Revenue Budget.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. Scottish Borders Council will continue to develop and retain relationships already in place with residents and community groups through the Resilient Communities Initiative. Local authorities will raise awareness when developing discrete proposals. Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Community flood action groups, Emergency plans/response, Flood forecasting, Maintain flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Scottish Borders Council, SEPA and Scottish Water will continue to work together to raise awareness. This will include utilising the resilient communities groups setup by Scottish Borders Council and assisting those groups at a local level to raise awareness within their communities. Engagement with communities relating to other actions will also help develop awareness within this PVA.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Funding will be shared by the responsible authorities with Scottish Borders Council continuing to utilise the Resilient Communities Initiative.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Borders Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning.
<b>Coordination Arrangement:</b>	Scottish Borders Council will coordinate with landowners and other responsible authorities as required where a risk is identified and carry out works should it be deemed necessary in accordance with the duties placed on Local Authorities as detailed in the Flood Risk Management (Scotland) Act 2009. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Scottish Borders Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. Scottish Borders Council continues to review and develop their Emergency Plans as new information becomes available. This emergency plan/response also includes the continued use of Community Sandbag Stores located at publically accessible areas including fire stations and school grounds. Resilient Communities sandbag stores are now also widely distributed across the Scottish Borders in areas that have signed up to the Resilient Communities Initiative.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	Scottish Borders Council, the Emergency Services and SEPA will initiate the relevant Emergency Plan as appropriate in relation to MET office weather warnings and SEPA flood warning information. This includes a coordinated approach with representation from all Category 1 and Category 2 responders including voluntary groups, through the Joint Agency Control Centre (Bunker) at Scottish Borders Council.
<b>Funding Arrangement:</b>	Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Scottish Borders Council's responsibilities for emergency response are largely funded by Scottish Borders Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>Scottish Borders Council will work with their planners to ensure that appropriate policies and measures are put in place to ensure that the council Planning Policy takes account of the objectives to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

# South Gyle, Broxburn and Bathgate (Potentially Vulnerable Area 10/27)

Local Plan District	Local authority	Main catchment
Forth Estuary	The City of Edinburgh Council, West Lothian Council	River Almond

## Background

This Potentially Vulnerable Area is 154km<sup>2</sup> and situated in the lower reaches of the River Almond catchment (shown below). It includes the western areas of Edinburgh including Edinburgh Airport and South Gyle, Bathgate, Broxburn and Livingston.



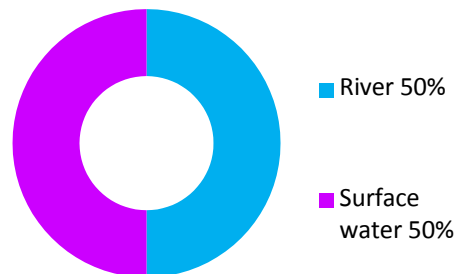
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The main watercourses are the River Almond and its tributaries the Brox Burn and the Gogar Burn.

The area has a risk of river and surface water flooding.

There are approximately 1,600 residential properties and 330 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £2.4 million.



**Figure 1:** Annual Average Damages by flood source. *Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).*

## Summary of flooding impacts

The highest risk of river flooding is from the Gogar Burn, Brox Burn and the River Almond to South Gyle (Edinburgh), Broxburn and Kirkliston. The highest risk of surface water flooding is in Edinburgh, Broxburn, Livingston and Bathgate.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth



Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'South Gyle, Broxburn and Bathgate (Potentially Vulnerable Area 10/27)'

## History of flooding

The following significant floods have been recorded in this area:

- 20 August 2008: Over 100 properties flooded including at least five businesses.
- 2004 and 2005: A series of flood events in Broxburn resulted in the promotion of the Broxburn Flood Protection Scheme.
- 8 November 2000: High water levels on the River Almond caused flooding in Kirkliston.
- 26 April 2000: High water levels on the Gogar Burn caused flooding at Edinburgh Airport and nearby hotel.

## Objectives to manage flooding in South Gyle, Broxburn and Bathgate

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. The objectives below have been set for the South Gyle, Broxburn and Bathgate Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties in Edinburgh caused by flooding from the Gogar Burn (Objective ID: 10088);
- Accept that significant flood risk in Broxburn is managed appropriately. Maintain existing actions that reduce economic damages to residential and non-residential properties in Broxburn caused by flooding from the Brox Burn. (Objective ID: 10089);
- Reduce risk to community facilities in the South Gyle, Broxburn and Bathgate Potentially Vulnerable Area caused by river flooding (Objective ID: 10090);
- Reduce risk to people from river flooding in Broxburn and South Gyle (Objective ID: 10091);
- Reduce economic damages to residential and non-residential properties in Broxburn, West Main Street, caused by flooding from the Brox Burn (Objective ID: 10096);
- Reduce the physical or disruption risk related to the transport network for rail (Objective ID: 10303);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Bathgate where practical (Objective ID: 10045);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (Objective ID: 10052);

- Reduce economic damages and number of residential properties at risk of surface water flooding in Broxburn and eastern Uphall where practical. (Objective ID: 10085);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Livingston and Mid Calder where practical (Objective ID: 10102);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.



## Actions to manage flooding in South Gyle, Broxburn and Bathgate

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. The actions shaded below have been selected as the most appropriate for South Gyle, Broxburn and Bathgate 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>	Site protection plans
<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
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning Policy

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection scheme/works					
Community flood action groups					
Site protection plans					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Maintain flood protection scheme					
Strategic mapping and modelling (SEPA)					
Strategic mapping and modelling (Scottish Water)					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100960006)</b>		
<b>Objective (ID):</b>	Reduce risk to people from river flooding in Broxburn and South Gyle (10091)		
<b>Delivery lead:</b>	West Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>36 of 42</b>	<b>1 of 1</b>	<b>6 of 7</b>
<b>Delivery Period:</b>	At present as there is uncertainty over funding therefore a delivery period is yet to be confirmed. This will be reviewed once funding is secured.		
<b>Status:</b>	Under development		
<b>Description:</b>	A flood protection scheme has been proposed for Broxburn (Liggat Syke) to complete the Broxburn flood prevention scheme. The scheme would consist of two flood storage basins in the catchment of the Liggat Syke and provide a 1 in 100 year standard of protection.		
<b>Related Actions:</b>	Awareness raising, Planning Policy, Strategic mapping and modelling.		
<b>Coordination Arrangement:</b>	Construction arrangements are to be coordinated with affected parties.		
<b>Funding Arrangement:</b>	West Lothain Council have been advised that the scheme is not eligible for Scottish Government funding. 20% of the funding could be sourced from West Lothian Council Revenue Budget but the remaining funding has yet to be identified.		
<b>Potential impacts</b>			
<b>Economic:</b>	The flood protection scheme has an estimated benefit cost ratio of 1.22.		
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection scheme area. There may be negative impacts through disturbance to the local community during the construction phase.		
<b>Environmental:</b>	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100850006)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Livingston and Mid Calder where practical (10102) Reduce economic damages and number of residential properties at risk of surface water flooding in Broxburn and eastern Uphall where practical (10085)
<b>Delivery lead:</b>	West Lothian Council
<b>Delivery Period:</b>	2016-2021. This is a lengthy project which will cover first and future Flood Risk Management planning cycles.
<b>Status:</b>	Under development
<b>Description:</b>	A surface water management project looking at 'legacy' sustainable drainage systems has been proposed for Livingston and Broxburn. The project would look to move 'legacy' sustainable drainage systems into public ownership and would be taken forward jointly by West Lothian Council and Scottish Water.
<b>Related Actions:</b>	Awareness raising, Planning Policy, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	Scottish Water are working with West Lothian Council to prioritise non adopted legacy SUDS systems within this PVA.
<b>Funding Arrangement:</b>	This scheme will be jointly funded by West Lothian Council relevant budget and Scottish Water Capital Programme.
<b>Potential impacts</b>	
<b>Economic:</b>	The economic impacts have not been defined at this stage.
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. There may be negative impacts through disturbance to the local community during the construction phase.
<b>Environmental:</b>	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed.

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (100850026)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Livingston and Mid Calder where practical (10102) Reduce economic damages and number of residential properties at risk of surface water flooding in Broxburn and eastern Uphall where practical (10085)
<b>Delivery lead:</b>	West Lothian Council
<b>Delivery Period:</b>	At present there is uncertainty over funding therefore a delivery period is yet to be confirmed. This will be reviewed once funding is secured.
<b>Status:</b>	Under development
<b>Description:</b>	Surface water management works have been proposed for West Lothian as recommended in the West Lothian surface water management plan. The works include a range of local surface water management activities in specific locations in Livingston and Broxburn.
<b>Related Actions:</b>	Strategic Mapping and Modelling (Scottish Water).
<b>Coordination Arrangement:</b>	This scheme will be developed and coordinated between West Lothian Council and Scottish Water.
<b>Funding Arrangement:</b>	Some of these surface water management works may require a joint approach; once the scheme or works is fully developed an appropriate funding approach for these actions will be discussed.
<b>Potential impacts</b>	
<b>Economic:</b>	The economic impacts have not been defined at this stage.
<b>Social:</b>	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. There may be negative impacts through disturbance to the local community during the construction phase.
<b>Environmental:</b>	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed.

<b>Action (ID):</b>	<b>FLOOD PROTECTION SCHEME/WORKS (10303021)</b>
<b>Objective (ID):</b>	Reduce the physical or disruption risk related to the transport network for rail (10303)
<b>Delivery lead:</b>	Network Rail
<b>Delivery Period:</b>	2017-2024
<b>Status:</b>	Under development. Winchburgh planned drainage improvement works to protect railway from flooding are now completed. Further work planned 2017/18 with Niddry Burn bridge replacement in planned in Network Rail Capital Programme, 2019/2024.
<b>Description:</b>	Network Rail will carry out civil engineering work which will reduce the risk of flooding on identified sections of the rail network within this Potentially Vulnerable Area.
<b>Related Actions:</b>	Maintenance, Planning policy.
<b>Coordination Arrangement:</b>	Delivery of Actions during CP6 (Control Period 6) 2019 to 2024 will be coordinated with appropriate responsible authorities and project partners.
<b>Funding Arrangement:</b>	The Network Rail Initial Industry Plan (IIP) is being developed for submission to The Scottish Government September 2016. This will include a bid to carry out drainage work associated with FRM Strategy actions for the period 2019 to 2024. Delivery of FRM Strategy actions will be prioritised in accordance with allocated funding.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100450018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Bathgate where practical (10045)
<b>Delivery lead:</b>	West Lothian Council
<b>Delivery Period:</b>	SWMP is complete.
<b>Status:</b>	Complete
<b>Description:</b>	The area has been covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water provided local knowledge and understanding of the sewer network. This included Scottish Water corporate data (where applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Flood protection scheme (ID: 100850026), Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	This surface water management plan has been completed.  Scottish Water worked with and supported surface water management planning through ensuring that best available knowledge and data was used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This was funded from the West Lothian Council relevant budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100450019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Bathgate where practical (10045)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2017-2020
<b>Status:</b>	Ongoing
<b>Description:</b>	<p>An integrated catchment study covering the Bathgate catchment will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network i.e. the sewer network, and watercourses.</p> <p>This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and West Lothian Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions the significant flooding issues.</p>
<b>Related Actions:</b>	Surface water plan/study (West Lothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with West Lothian Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by West Lothian Council.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	<b>The City of Edinburgh Council</b> , Midlothian Council, East Lothian Council
<b>Delivery Period:</b>	The City of Edinburgh SWMP will commence in 2021.
<b>Status:</b>	Scottish Water is leading on an Integrated Catchment Study (ICS) for The City of Edinburgh, East Lothian and Midlothian Councils and this is progressing well. Scottish Water presented the findings to date in December 2015 to these local authorities as part of their validation exercise. It was concluded that the results presented accurately reflected flooding as understood by these authorities at present. Scottish Water has now entered the Pre-optioneering Phase of this study. The work on SWMP will start towards the end of the cycle (2021).
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water), Surface water plan/study (The City of Edinburgh Council, Midlothian Council, East Lothian Council)
<b>Coordination Arrangement:</b>	The City of Edinburgh Council will lead on the development of surface water management plans for their area in partnership with other relevant authorities where required, Scottish Water and SEPA. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by The City of Edinburgh Council Revenue Budget.



<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100520019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith where practical (10052)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	An integrated catchment study for parts of Edinburgh, East Lothian and Midlothian was carried out in between 2010-2015 to improve knowledge and understanding of surface water flood risk and interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and the sea. The Solution Development phase of this study will be carried out in 2016-2021, to establish the preferred solution(s) to the significant flooding within the catchment.
<b>Related Actions:</b>	Surface water plan/study (The City of Edinburgh Council, East Lothian Council and Midlothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with The City of Edinburgh Council, East Lothian Council and Midlothian Council.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100850018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Broxburn and eastern Uphall where practical (10085)
<b>Delivery lead:</b>	West Lothian Council
<b>Delivery Period:</b>	SWMP is complete.
<b>Status:</b>	Complete
<b>Description:</b>	The area has been covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water provided local knowledge and understanding of the sewer network. This included Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water), Flood protection scheme (ID: 100850026).
<b>Coordination Arrangement:</b>	This surface water management plan has been completed.  Scottish Water worked with and supported surface water management planning through ensuring that best available knowledge and data was used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This was funded from the West Lothian Council relevant budget.

<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (101020018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Livingston and Mid Calder where practical (10102)
<b>Delivery lead:</b>	West Lothian Council
<b>Delivery Period:</b>	SWMP is complete.
<b>Status:</b>	Complete
<b>Description:</b>	The area has been covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water provided local knowledge and understanding of the sewer network. This included Scottish Water corporate data (where applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Flood protection scheme (ID 10085002 Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	This surface water management plan has been completed.  Scottish Water worked with and supported surface water management planning through ensuring that best available knowledge and data was used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This was funded from the West Lothian Council relevant budget.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990016)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Strategic mapping improvements in this area are dependant on a local authority study. SEPA will await the outputs from these studies with a view of incorporating them into the strategic maps subject to a positive assessment. Timescales are indicative only and SEPA will seek to better understand these during 2016 in order to further refine timescales. SEPA led surface water mapping improvements are expected to be undertaken in 2016.
<b>Status:</b>	Not started
<b>Description:</b>	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 2,600km <sup>2</sup> of improved surface water data is currently available within this Local Plan District. The inclusion of additional surface water hazard data resulting from the completion of local authority surface water management plans and Scottish Water integrated catchment studies will be considered when these projects are completed.
<b>Related Actions:</b>	Flood protection scheme, Planning Policy, Surface water plan/study.
<b>Coordination Arrangement:</b>	Flood protection works relating to surface water management are proposed for Livingston, Broxburn and West Lothian. A surface water management plan is proposed for the Livingston and Mid Calder area and the Broxburn and eastern Uphall area. A surface water management plan and associated integrated catchment study are proposed for the Bathgate area and the Edinburgh, Musselburgh, Penicuik, Lasswade, Loanhead, Newtongrange and Dalkeith area. SEPA will work with the local authority to ensure that strategic mapping and modelling developments reflect the changes in flood risk resulting from the proposed flood protection works and new information about flood risk resulting from the proposed surface water studies where appropriate and relevant.
<b>Funding Arrangement:</b>	SEPA's strategic mapping and modelling activities are funded by Scottish Government through SEPA's grant in aid settlement.

<b>Action (ID):</b>	<b>STRATEGIC MAPPING AND MODELLING (100990019)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Scottish Water
<b>Delivery Period:</b>	AVSE PFI Edinburgh 2016-2019. Bathgate 2018-2020. Blackburn 2018-2020. East Calder 2018-2019. Livingston 2018-2020. Newbridge 2018-2020. Winchburgh 2018-2020.
<b>Status:</b>	Not started
<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. Scottish Water will undertake further investigation and modelling in the Almond Valley, Seafield and Esk Water Private Finance Initiative (AVSE PFI), Edinburgh, Bathgate, Blackburn, East Calder, Livingston, Newbride and Winchburgh sewer catchments to improve knowledge and understanding of flood risk in this area, as required under Section 16 of the Flood Risk Management (Scotland) Act 2009.
<b>Related Actions:</b>	Surface water plan/study (The City of Edinburgh Council, Midlothian Council, East Lothian Council).
<b>Coordination Arrangement:</b>	Scottish Water will work with responsible authorities to incorporate relevant information into these studies and by regularly keeping the responsible authorities informed of their progress. Scottish Water will provide responsible authorities with the outputs of the Section 16 assessment which, where relevant, may be used to inform surface water management plans and SEPA flood hazard and risk maps.
<b>Funding Arrangement:</b>	Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers.

<b>Action (ID):</b>	<b>MAINTAIN FLOOD PROTECTION SCHEME (100890017)</b>
<b>Objective (ID):</b>	Accept that significant flood risk in Broxburn is managed appropriately. Maintain existing actions that reduce economic damages to residential and non-residential properties in Broxburn caused by flooding from the Brox Burn. (10089)
<b>Delivery lead:</b>	West Lothian Council
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<b>Description:</b>	West Lothian Council will continue to maintain the existing Broxburn Flood Protection Scheme. The scheme consists of flood walls and embankments together with the replacement road bridges. West Lothian Council will also continue to maintain direct flood defences on West Main Street, Broxburn, completed in March 2015.
<b>Related Actions:</b>	Awareness raising, Community action groups, Emergency plans/response, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	West Lothian Council will work with private owners of flood protection infrastructure to ensure that works are coordinated and that the infrastructure is maintained. West Lothian Council will liaise with Scottish Natural Heritage, SEPA etc.
<b>Funding Arrangement:</b>	This will be funded by the West Lothian Council relevant budget.

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>COMMUNITY FLOOD ACTION GROUPS (100890012)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Community
<b>Delivery Period:</b>	N/A
<b>Status:</b>	Existing
<b>Description:</b>	East Burnside Village Community Flood Action Group operated in this area.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning, Maintenance, Self help.
<b>Coordination Arrangement:</b>	Since the publication of the Forth Estuary Flood Risk Management Strategy in December 2015 the East Burnside Village Community Flood Action Group has disbanded therefore no coordination can be arranged.
<b>Funding Arrangement:</b>	N/A



<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Flood forecasting.
<b>Coordination Arrangement:</b>	In the event of severe issues responsible authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. For the new flood protection scheme, SEPA will support the local authority's communications and engagement activities with media activity, local public awareness events and education engagement with schools. SEPA will also deliver joint communications with local authorities for Floodline customers in any newly protected flood warning area.</p> <p>Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Community flood action groups, Emergency plans/response, Flood forecasting, Flood protection scheme, Self help.
<b>Coordination Arrangement:</b>	<p>A flood protection scheme is proposed for Broxburn. SEPA will support the local authority's communications and engagement activities. SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Awareness raising will be coordinated through the Local Plan District (LPD) between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>

**Funding  
Arrangement:**

SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Local authorities, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, Maintain flood protection scheme.
<b>Coordination Arrangement:</b>	Local authorities will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Local authorities will liaise with SEPA, Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	The relevant local authority will fund maintenance and repair work from its relevant budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>SITE PROTECTION PLANS (100900015)</b>
<b>Objective (ID):</b>	Reduce risk to community facilities in the South Gyle, Broxburn and Bathgate Potentially Vulnerable Area caused by river flooding (10090)
<b>Delivery lead:</b>	Edinburgh Airport
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Edinburgh Airport operates a site protection plan.
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Emergency plans/response, Maintenance, Maintain flood protection scheme, Self help.
<b>Coordination Arrangement:</b>	<p>Edinburgh Airport's Chief Operating Officer is accountable for flood management. The Airport will continue to review their surface water run-off in light of any planned developments. Edinburgh Airport is currently able to attenuate their run-off to some degree within their surface water network.</p> <p>Edinburgh Airport will continue its inspection programme of all river bunds including CCTV coverage and a robust maintenance and cleaning regime of Airport culvert to ensure maximum flows to the River Almond. Furthermore, Edinburgh Airport will continue to ensure that security measures across the Gogar Burn are not an impediment to flow.</p> <p>Edinburgh Airport will operate a range of contingency plans and on site equipment to deal with "out of bank" flood events.</p> <p>Edinburgh Airport currently has no firm plans to fund any significant new flood management activities. Edinburgh Airport are however reliant on responsible upstream activities and development ensuring no additional flows within the burn.</p> <p>Edinburgh Airport will continue to contribute to the West Edinburgh Development Board.</p>
<b>Funding Arrangement:</b>	The inspection programme, maintenance and cleaning regime of culverts and contingency plans for out of bank flow events will be funded by Edinburgh Airport's Operational Engineering Maintenance Budget. The development of site protection plans will be funded by Capital Expenditure, subject to approval by Edinburgh Airport's capital works tollgate approvals process.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	<p>Existing. The City of Edinburgh Council maintains a Flooding Emergency Plan specifically intended for use in the event of advance warning being received that one or more watercourses in the Edinburgh area may cause flooding. The City of Edinburgh Council's Flood Prevention service in Transport Maintenance regularly assess river levels and flows and liaise with SEPA whenever certain criteria are identified. In the event of a warning of potential river flooding affecting Edinburgh being passed by SEPA to Police Scotland (Edinburgh Division), an assessment of the need to convene a multi-agency Edinburgh Flood Group will be made by the Senior Police Officer. Council representatives on the Edinburgh Flood Group will establish liaison with the Corporate Incident Management Team (if convened) at the Council Incident Coordination Centre, City Chambers and with the Flood Response Group based at Bankhead Depot, Sighthill.</p> <p>West Lothian Council has and will maintain a Severe Weather Plan and a Major Incident Plan which are intended for use to initiate and coordinate a response and possible actions in the event of a flooding incident.</p>
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. The City of Edinburgh Council operates Emergency Action Packs to determine where people should be deployed during flood events. The City of Edinburgh Council owns temporary flood barriers and sandbags that can be used to protect properties from river flooding. West Lothian Council provides sandbags and Aquasacs for public use in emergencies.</p>
<b>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, local authorities will work in partnership with the emergency responders, SEPA, Met Office, Scottish Water, voluntary organisations and other agencies to coordinate the response to the incident. The City of Edinburgh responsibilities may include activating flood defence systems (where appropriate), provision of sandbags and other flood prevention controls, road traffic management – closures and diversions, assisting with warning and

	<p>alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment.</p> <p>West Lothian Council may provide sandbags and 'Aquasacs' subject to resources being available. Sandbag supplies are also available at Scottish Fire &amp; Rescue Stations in Linlithgow, Broxburn, Polbeth and Livingston. West Lothian Council will also arrange road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer-term recovery measures for rehabilitation of the community and restoration of the environment all in accord with its Severe Weather and Major Incident Plans.</p>
<p><b>Funding Arrangement:</b></p>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, local authorities responsibilities for emergency response are largely funded by the relevant local authorities' relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection scheme, Surface water plan/study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>The local authorities' Flood Prevention Teams work closely with their Planning colleagues to ensure that appropriate policies and measures are put in place to reduce flood risk. The relevant Planning Authority is responsible for consulting SEPA and relevant services within responsible authorities.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' relevant budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.



# Cowdenbeath (Candidate Potentially Vulnerable Area 10/28c)

Local Plan District	Local authority	Main catchment
Forth Estuary	Fife Council	River Ore (Fife)

## Background

This candidate Potentially Vulnerable Area is 21km<sup>2</sup> and part of the Firth of Forth catchment (shown below). It includes the urban areas of Cowdenbeath and Bowhill.

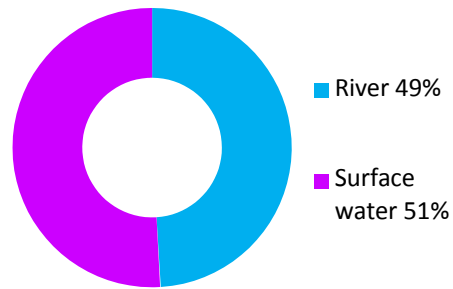


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Damages in this candidate Potentially Vulnerable Area are evenly distributed between surface water and river flooding.

There are approximately 150 residential properties and 40 non-residential properties at risk of flooding.

The Annual Average Damages are approximately £580,000.



**Figure 1:** Annual Average Damages by flood source. Reproduced from Forth Estuary Flood Risk Management Strategy, SEPA (December 2015).

## Summary of flooding impacts

Whilst this area was not identified as a Potentially Vulnerable Area in 2011, the information on flood risk from the new hazard maps identified that this area should be regarded as a candidate future Potentially Vulnerable Area due to the potential risk to people and properties.

The highest risks of river flooding are at Cardenden (Bowhill) from the River Ore and the Den Burn, and at Cowdenbeath from the Lochgelly Burn. The highest risk of surface water flooding is in Cowdenbeath.

Further details of the risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is available in the Flood Risk Management Strategy for Forth

Estuary, (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>), search 'Cowdenbeath (Potentially Vulnerable Area 10/28c)'

## History of flooding

One significant river flood event has been recorded in this area. On 8 February 1903 roads were flooded, and significant areas of land were under water from the River Ore and River Lochty. This flooding also caused the Dunfermline-Thornton junction of railway line to be submerged.

## Objectives to manage flooding in Cowdenbeath

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. The objectives below have been set for the Cowdenbeath Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties from river flooding in Cardenden (Bowhill) (Objective ID: 10097);
- Reduce economic damages to residential and non-residential properties from river flooding in Cowdenbeath (Objective ID: 10098);
- Reduce economic damages and number of residential properties at risk of surface water flooding in Cowdenbeath, Leuchatsbeath and Lumphinnans where practical (Objective ID: 10092);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in Cowdenbeath

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. The actions shaded below have been selected as the most appropriate for Cowdenbeath 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>	<i>Maintain flood warning</i>	<b>Awareness raising</b>	<b>Surface water plan/study</b>	<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 Policy</b>

The delivery of selected actions over the six-year plan cycle is summarised by year below.

Delivery of selected actions					
<b>Year 1 (2016/17)</b>	<b>Year 2 (2017/18)</b>	<b>Year 3 (2018/19)</b>	<b>Year 4 (2019/20)</b>	<b>Year 5 (2020/21)</b>	<b>Year 6 (2021/22)</b>
			New flood warning		
Flood protection study					
Awareness raising					
Surface water plan/study					
Emergency plans/response					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>NEW FLOOD WARNING (100990010)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Hydrometry developments are to begin in spring 2019. The new flood warning service is to be launched in May 2021.
<b>Status:</b>	Not started
<b>Description:</b>	The area under consideration includes properties affected by flooding in Fife and Perth and Kinross and is likely to include Bowhill which is affected by flooding from the River Ore. Further feasibility assessment will be required to assess delivery potential and the final detail of communities for which warnings can be provided will be determined during the scoping process.
<b>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood protection study, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	Flood protection studies are proposed for Cardenden and Cowdenbeath. SEPA will work with the local authority to ensure that new information about flood risk resulting from the proposed studies is considered in developing the new flood warning system.
<b>Funding Arrangement:</b>	The maintenance of SEPA's flood warning service is funded by Scottish Government through SEPA's grant in aid settlement. In addition, Scottish Government provides grant funding to enable SEPA to implement new flood warning schemes.

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100970005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties from river flooding in Cardenden (Bowhill) (10097)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>70 of 168</b>	<b>8 of 16</b>	<b>12 of 26</b>
<b>Delivery Period:</b>	2016-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Cardenden to assess whether flood storage, flood defences, sediment management and natural flood management could reduce flood risk. The study should also consider the viability of property level protection. Natural flood management options that should be considered include river/ floodplain restoration and sediment management. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
<b>Related Actions:</b>	Maintain flood warning, New flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Fife Council will arrange a study with a Consultant to establish fluvial flood risk and identify potential options to mitigate flood risk. Fife Council will discuss and seek advice from SEPA.		
<b>Funding Arrangement:</b>	This will be funded from Fife Council Revenue and Capital Flood Protection Budgets.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 55 residential properties and five non-residential properties at risk of flooding in this location, with potential damages avoided of up to £4.7 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. The Den Burn (water body ID 6311) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. Listed buildings and ancient woodlands are also present in the study area and could be positively or negatively impacted.		

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100980005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties from river flooding in Cowdenbeath (10098)		
<b>Delivery lead:</b>	Fife Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>104 of 168</b>	<b>14 of 16</b>	<b>18 of 26</b>
<b>Delivery Period:</b>	2016-2020		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Cowdenbeath to assess whether flood storage, modification of conveyance and sediment management could reduce flood risk. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
<b>Related Actions:</b>	Maintain flood warning, New flood warning, Planning Policy, Strategic mapping and modelling, Surface water plan/study.		
<b>Coordination Arrangement:</b>	Fife Council will arrange a study with a Consultant to establish fluvial flood risk and identify potential options to mitigate flood risk. Fife Council will discuss and seek advice from SEPA.		
<b>Funding Arrangement:</b>	This will be funded from Fife Council Revenue and Capital Flood Protection Budgets.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 42 residential properties and five non-residential properties at risk of flooding in this location, with potential damages avoided of up to £2.5 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. Den Burn (water body ID 6311) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. 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 (100920018)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Cowdenbeath, Leuchatsbeath and Lumphinnans where practical (10092)
<b>Delivery lead:</b>	Fife Council
<b>Delivery Period:</b>	2016-2021
<b>Status:</b>	Not started
<b>Description:</b>	The area will be covered by a surface water management plan or plans (SWMP) that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. Scottish Water will provide local knowledge and understanding of the sewer network. This includes Scottish Water corporate data (as applicable) and, where available, outputs of Section 16 or integrated catchment studies, to assist with the surface water management planning process.
<b>Related Actions:</b>	Strategic mapping and modelling (Scottish Water).
<b>Coordination Arrangement:</b>	Fife Council will lead on the development of surface water management plans for their area in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. Scottish Water will work with and support surface water management planning through ensuring that best available knowledge and data is used to input into the surface water management plans.
<b>Funding Arrangement:</b>	This will be funded by Fife Council Revenue Budget.



<b>Action (ID):</b>	<b>SURFACE WATER PLAN/STUDY (100920019)</b>
<b>Objective (ID):</b>	Reduce economic damages and number of residential properties at risk of surface water flooding in Cowdenbeath, Leuchatsbeath and Lumphinnans where practical (10092)
<b>Delivery lead:</b>	Scottish Water in partnership with local authorities
<b>Delivery Period:</b>	2018-2021
<b>Status:</b>	Ongoing
<b>Description:</b>	<p>An integrated catchment study covering the Leven Valley catchment will be carried out to improve knowledge and understanding of the interactions between the above ground and below ground drainage network e.g. the sewer network, watercourses and (where applicable) the sea.</p> <p>This will improve the understanding of local surface water flood risk. The stated timescales and funding arrangements between Scottish Water and Fife Council will take the studies through the Scoping and Modelling phases to define the significant flooding issues in the catchment. After this has been completed, it is expected that the integrated catchment study partnerships will remain in place and will progress to develop solutions to the significant flooding issues.</p>
<b>Related Actions:</b>	Surface water plan/study (Fife Council).
<b>Coordination Arrangement:</b>	Scottish Water will work collaboratively with project partners throughout the studies. Scottish Water will provide project partners with the outputs of the integrated catchment study which, where relevant, may be used to inform surface water management plans.
<b>Funding Arrangement:</b>	This project is being funded by Scottish Water in partnership with Fife Council. Scottish Water funding is committed in its capital programme through Q&S 4a (2015-2021) which is approved by its regulators and customers. Contributory funding up to an agreed proportion is to be provided by Fife Council Revenue Budget.



<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, New flood warning, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Emergency plans/response, Flood forecasting, Maintain flood warning, New flood warning.
<b>Coordination Arrangement:</b>	Fife Council will work with the public to support community resilience. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner. In the event of severe issues this is to be funded by Fife Council Revenue and Capital Budgets.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. To support the delivery of the new SEPA flood warning scheme, SEPA will carry out a local launch event and engage directly with residents in the area. This will be supported by local and national media communications. SEPA will also support and participate in local public awareness events, in partnership with the local authority, community council or other local representative organisations, including schools.</p> <p>Fife Council will raise awareness when developing discrete proposals. Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, New flood warning, Self help.
<b>Coordination Arrangement:</b>	<p>A new flood warning scheme is under consideration for properties in Bowhill. To support the delivery of the new SEPA flood warning scheme, SEPA will carry out communications and engagement activities. SEPA's awareness raising activities will be coordinated with activities of other responsible authorities as required.</p> <p>Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will</p>

	<p>share good practice, provide information on property level protection and develop and review emergency plans. Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed through the LPD group.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<p><b>Funding Arrangement:</b></p>	<p>SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Fife Council will fund awareness raising activities from Council Revenue and Capital budgets.</p>

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Fife Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Maintain flood warning, New flood warning.
<b>Coordination Arrangement:</b>	This regular maintenance and inspection regime will be carried out by Fife Council Inspectors with clearance and repair works instructed as required. Fife Council will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. Fife Council will liaise with Scottish Water, SEPA, Scottish Natural Heritage, Landowners etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	Fife Council will fund maintenance and repair work from its Revenue Budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.</p>
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintaining flood warning, Maintenance, New flood warning.
<b>Coordination Arrangement:</b>	<p>During severe flooding, Fife Council will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Fife Council will work with local communities to raise awareness and assist SEPA in relation to the flood warning system. Fife Council will work with community flood action groups to develop emergency plans/response. Fife Council will build and develop the outcomes detailed in the Shoreline Management Plan (2011). Fife Council will maintain bodies of water as required within the council's schedule of clearance and repair. Fife Council will share good practice, provide information on property level protection and develop and review emergency plans.</p>
<b>Funding Arrangement:</b>	<p>Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, Fife Council's responsibilities for emergency response are largely funded by Fife Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.</p>

<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Strategic mapping and modelling, Surface water management plan/study.
<b>Coordination Arrangement:</b>	<p>Fife Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies takes account of the objective to reduce flood risk.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' Revenue Budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.







## History of flooding

The following significant floods have been recorded in this area:

- 18 January 1909: A large flood event known to have affected many areas in the southern and central counties of Scotland.
- 1 February 1884: Overtopping on the River Almond resulted in large areas of flooding in Whitburn.

## Objectives to manage flooding in Whitburn

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. The objectives below have been set for the Whitburn Potentially Vulnerable Area.

- Reduce economic damages to residential and non-residential properties in Whitburn caused by flooding from the White Burn (Objective ID: 10094);
- Avoid an overall increase in flood risk (Objective ID: 10001);
- Reduce overall flood risk (Objective ID: 10099);
- 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 or the Local Flood Risk Management Plans.

Actions to manage flood risk and deliver the objectives are shown in the following section.

## Actions to manage flooding in Whitburn

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. The actions shaded have been selected as the most appropriate for Whitburn 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>	<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 Policy

The delivery of selected actions by year over the six-year plan cycle is summarised below.

Delivery of selected actions					
Year 1 (2016/17)	Year 2 (2017/18)	Year 3 (2018/19)	Year 4 (2019/20)	Year 5 (2020/21)	Year 6 (2021/22)
Flood protection study					
Awareness raising					
Emergency plans/response					
Flood forecasting					
Self help					
Maintenance					
Planning Policy					

<b>Action (ID):</b>	<b>FLOOD PROTECTION STUDY (100940005)</b>		
<b>Objective (ID):</b>	Reduce economic damages to residential and non-residential properties in Whitburn caused by flooding from the White Burn (10094)		
<b>Delivery lead:</b>	West Lothian Council		
<b>Priority:</b>	National:	Within local authority:	Within LPD 10:
	<b>68 of 168</b>	<b>1 of 4</b>	<b>11 of 26</b>
<b>Delivery Period:</b>	2016-2017		
<b>Status:</b>	Not started		
<b>Description:</b>	A flood protection study has been recommended for Whitburn to assess whether modification of conveyance, flood defences and sediment management could reduce flood risk. The study should also investigate the viability of property level protection. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
<b>Related Actions:</b>	Planning Policy, Strategic mapping and modelling.		
<b>Coordination Arrangement:</b>	West Lothian Council will seek advice on the progression of the study from discussions with SEPA and Scottish Water.		
<b>Funding Arrangement:</b>	This study will be funded by West Lothian Council's Capital Grant Funding.		
<b>Potential impacts</b>			
<b>Economic:</b>	The study could benefit 137 residential properties and one non-residential property at risk of flooding in this location, with potential damages avoided of up to £5.4 million.		
<b>Social:</b>	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community.		
<b>Environmental:</b>	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management.		

<b>Action (ID):</b>	<b>FLOOD FORECASTING (100990009)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	SEPA
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 flood guidance statements provide an assessment of the risk of flooding for a five day period allowing responders time to put preparations in place to reduce the impact of flooding. 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>Related Actions:</b>	Awareness raising, Emergency plans/response, Self help.
<b>Coordination Arrangement:</b>	This is a joint initiative between SEPA and the Met Office. Hydrological information is provided by SEPA and meteorological information is provided by the Met Office. SEPA uses the information to predict the likelihood and timing of river, coastal and surface water flooding.
<b>Funding Arrangement:</b>	SEPA's flood forecasting service is funded through Scottish Government's grant in aid allocation. The Met Office receives funding from the UK Government.

<b>Action (ID):</b>	<b>SELF HELP (100990011)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	—
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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>Related Actions:</b>	Awareness raising, Community flood action groups, Flood forecasting, Maintain flood warning.
<b>Coordination Arrangement:</b>	In the event of severe issues responsible authorities will work with the public to support community resilience where appropriate. This will be done by developing and reviewing emergency plans, facilitating community plans, and providing information on property level protection.
<b>Funding Arrangement:</b>	This will be funded by the property owner.

<b>Action (ID):</b>	<b>AWARENESS RAISING (100990013)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Responsible authorities
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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. Across Scotland, SEPA will create and share communication and education resources with other responsible authorities. These resources will include awareness campaigns, media and marketing activity and promotion of SEPA's flood forecasting and warning services (Floodline). Where they exist, SEPA will engage with community resilience groups and community safety partnerships. Local authorities will raise awareness when developing discrete proposals.</p> <p>Scottish Water will support SEPA and responsible authorities with their awareness raising activities as required and provide targeted flooding communications for Scottish Water specific activities. Scottish Water will raise awareness by producing and supplying targeted information to the public on large capital projects and detailed local studies. More general information and flooding guidance will be available on the Scottish Water website (Annex 4).</p>
<b>Related Actions:</b>	Emergency plans/response, Flood forecasting, Self help.
<b>Coordination Arrangement:</b>	<p>SEPA's awareness raising activities will be coordinated with the activities of other responsible authorities as required.</p> <p>Local Plan District (LPD) awareness raising will be coordinated by the Lead Local Authority and developed between SEPA, responsible authorities and community flood action groups.</p> <p>Scottish Water will keep responsible authorities informed of its awareness raising activities through the LPD partnerships.</p>
<b>Funding Arrangement:</b>	SEPA's awareness raising activities are funded by Scottish Government through SEPA's grant in aid settlement. Discrete proposals will be funded by the relevant local authority.

<b>Action (ID):</b>	<b>MAINTENANCE (100990007)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	West Lothian Council, asset / land managers
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 risk based inspection, maintenance 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>Related Actions:</b>	Awareness raising, Emergency plans/response.
<b>Coordination Arrangement:</b>	West Lothian Council will work with private landowners to ensure that works are coordinated and that local authority owned infrastructure is maintained. West Lothian Council will liaise with Scottish Water, SEPA and Scottish Natural Heritage etc. Scottish Water will keep responsible authorities informed of large scale capital maintenance work to identify opportunities for coordination.
<b>Funding Arrangement:</b>	West Lothian Council will fund maintenance and repair work from its relevant budget, where it has that responsibility. Other asset owners (including the public) will be encouraged to fund works associated with maintenance and repair. Scottish Water is funded by customer charges as set by its economic regulator, all business activities required under this action by Scottish Water are accounted for in its Capital Maintenance expenditure.

<b>Action (ID):</b>	<b>EMERGENCY PLANS/RESPONSE (100990014)</b>
<b>Objective (ID):</b>	Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Category 1 and 2 Responders
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing. West Lothian Council has and maintains a Severe Weather Plan and a Major Incident Plan which are intended for use to initiate and coordinate a response and possible actions in the event of a flooding incident.
<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. Scottish Water are a Category 2 responder under the Civil Contingencies Act 2004 and will support regional and local resilience partnerships as required. The emergency response by these organisations is coordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. West Lothian Council provides sandbags and Aquasacs for public use in emergencies.
<b>Related Actions:</b>	Awareness raising, Flood forecasting, Maintenance.
<b>Coordination Arrangement:</b>	During severe flooding, West Lothian Council will work in partnership with the emergency responders, SEPA, Met Office, Scottish Water, voluntary organisations and other agencies to coordinate the response to the incident. West Lothian Council may provide sandbags and 'Aquasacs' subject to resources being available. Sandbag supplies are also available at Scottish Fire & Rescue Stations in Linlithgow, Broxburn, Polbeth and Livingston. West Lothian Council will also arrange road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer-term recovery measures for rehabilitation of the community and restoration of the environment all in accord with its Severe Weather and Major Incident Plans.
<b>Funding Arrangement:</b>	Funding is allocated to Category 1 and 2 responders by the Scottish Government for dealing with emergency response. In extreme cases Scottish Government may reimburse responders after an extreme event. Where required, West Lothian Council's responsibilities for emergency response are largely funded by West Lothian Council's relevant budget. SEPA's emergency plan/response activities are funded by Scottish Government through SEPA's grant in aid settlement.



<b>Action (ID):</b>	<b>PLANNING POLICIES (100010001)</b>
<b>Objective (ID):</b>	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)
<b>Delivery lead:</b>	Planning authority
<b>Delivery Period:</b>	Ongoing
<b>Status:</b>	Existing
<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 national planning policies see Annex 5.</p> <p>SEPA has a statutory role in relation to the provision of flood risk advice to planning authorities. This role is expressed in Section 72 of the FRM Act, 2009. SEPA also has a duty to cooperate with planning authorities in the preparation of development plans. When consulted in relation to planning applications for development or for site allocations in development plans, or where the planning authority considers there may be a risk of flooding, SEPA will provide advice. The advice provided by SEPA will be with respect to the risk of flooding and on the basis of the relevant information it holds which is suitable for planning purposes. It will also be in line with the principles and duties set out in the FRM Act. Further information about how SEPA engage in the planning system, including guidance on flood risk and planning is available on SEPA website.</p> <p>Scottish Water is a statutory consultee within the planning legislation and is required to comment on all outline or full planning applications which are referred by a local authority.</p>
<b>Related Actions:</b>	Flood protection study, Strategic mapping and modelling.
<b>Coordination Arrangement:</b>	<p>West Lothian Council Flood Professionals will work directly with their planning colleagues to educate and ensure that appropriate policies and measures are put in place to ensure that the council Planning Policies takes account of the objective to reduce flood risk. The relevant Planning Authority is responsible for consulting SEPA and relevant services within responsible authorities.</p> <p>SEPA's land use planning activities will be coordinated with the activities of other responsible authorities as required.</p>
<b>Funding Arrangement:</b>	The responsible authorities' land use planning activities will be funded by the responsible authorities' relevant budget. SEPA's land use planning activities are funded by Scottish Government through SEPA's grant in aid settlement.

## **Annex 2: Local Plan District roles & responsibilities**

### **1. Roles and responsibilities for flood risk management planning**

Individuals are the first line of defence against 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 in the main to SEPA, local authorities and Scottish Water. However, individuals have a personal responsibility to protect themselves and their property.

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 (<http://www.sepa.org.uk/environment/water/flooding/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 (<http://www.floodlinescotland.org.uk/>) website including a quick guide on whom to contact in the event of a flood. You can also check how your area could be affected by flooding by looking at SEPA's flood maps\_ (<http://www.sepa.org.uk/environment/water/flooding/flood-maps/>)

#### **SEPA**

SEPA is Scotland's national flood forecasting, flood warning and strategic flood risk management authority. SEPA have a statutory duty to produce Scotland's Flood Risk Management Strategies. SEPA 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 is the use of the natural features of the land to store and slow down the flow of water. In running Floodline, SEPA provide 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 forecast for flooding SEPA work closely with the Met Office (<http://www.metoffice.gov.uk/>).

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. SEPA 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**

Local authorities work together for flood risk management planning purposes through a single lead authority which has the responsibility to produce a Local Flood Risk Management Plan. Local authorities have worked collaboratively in the manner described above to develop these.

It is the responsibility of your local authority to implement its flood risk management actions agreed within the Flood Risk Management Strategy, assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. You can help your local authority to manage flooding by letting them know if debris is blocking watercourses or if flood defences are tampered with.

During severe flooding, local authorities will work in partnership with the Emergency and Health Services, SEPA, Met Office, Scottish Water, Voluntary Organisations and other agencies to coordinate the response to the incident. Local authority responsibilities may include activating flood defence systems (where appropriate), road traffic management – closures and diversions, assisting with warning and alerting arrangements, contributing to media and public information strategies, establishing emergency rest centres for the care and welfare of persons evacuated or affected, coordinating the longer term recovery measures for rehabilitation of the community and restoration of the environment. Local authorities may provide sandbags and other flood prevention controls, though there is no requirement for local authorities to do this.

The City of Edinburgh Council was responsible for the development and publishing of this Plan.

Other local authorities who are responsible authorities within the Forth Estuary Local Plan District are:

- Clackmannanshire Council
- East Dunbartonshire Council
- East Lothian Council
- Falkirk Council
- Fife Council
- Midlothian Council

- North Lanarkshire Council
- Perth & Kinross Council
- Scottish Borders Council
- South Lanarkshire Council
- Stirling Council
- West Lothian Council

### **Scottish Water**

Scottish Water is a responsible authority for flood risk management and is working closely with SEPA, local authorities and other responsible authorities 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. To find out more about waste water flooding visit the Scottish Water website (<http://www.scottishwater.co.uk/you-and-your-home/your-home/flooding-information>)

### **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 Government has also approved the Flood Risk Management Strategy.
- **Scottish Natural Heritage** has provided general and local advice in the development of the Flood Risk Management Strategy for the Forth Estuary Local Plan District. Flooding is seen as a natural process that can maintain the features of interest at many designated sites, so Scottish Natural Heritage helps to ensure that any changes to patterns of flooding do not adversely affect the environment. Scottish Natural Heritage also provides advice on the impact 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. Forestry Commission Scotland can contribute to resourcing tree planting projects for natural flood management through the Forestry Grant Scheme.

It also can manage flood risk through its controls on tree felling and woodland removal

- During the preparation of the first 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.
- **Edinburgh Airport** has constructed flood protection measures within the airport boundary and operates a site protection plan.
- **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 forecasts and weather warnings. SEPA and the Met Office work together through the Scottish Flood Forecasting Service (<http://www.sepa.org.uk/environment/water/flooding/forecasting-flooding/>).
- The **emergency services** provide emergency relief 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 their regular site assessments. As such, flooding is considered as one of the many factors which inform the development and delivery of its management and maintenance programmes.
- The **Coal Authority** is a consultee for planning applications in defined areas within East Lothian local authority area.
- **Marine Scotland** is a consultee for planning applications, studies etc. in defined areas around East Lothian's coastline.
- The **National Health Service** is constructing flood protection measures at the Edinburgh Royal Infirmary in Little France, Edinburgh.
- **National Trust for Scotland** is the Reservoir Manager under the Reservoirs (Scotland) Act 2011 for Mire Loch located to the West of St Abbs Head. The Loch is the only reservoir located in Potentially Vulnerable Area 10/26 Berwickshire Coast, currently assessed under Reservoir (Scotland) Act 2011. As required under the act the National Trust for Scotland will fulfil their duties as Reservoir Manager, ensuring the appropriate management of the reservoir which will mitigate the risk of an uncontrolled release of water from the Loch which may result in flooding.
- **Forth Ports** operate at six locations within the Forth Estuary Local Plan district: Leith, Grangemouth, Rosyth, Kirkcaldy, Methil and Burntisland. Within and around

the Forth Estuary, Forth Ports is also responsible for the management of navigable waters including dredging. Tidal levels within each port are monitored locally and in the case of Leith, Grangemouth, Methil and Rosyth and live updates are available. Forth Ports receive flood warnings from SEPA and has the ability to discharge water. Forth Ports impounds the Water of Leith, as this is necessary to undertake its routine business. In the case of Leith, Forth Ports operates the dock gates and the overflow culvert in an appropriate manner. It retains the water at a given level and monitors water levels (having access to telemetry and receive flood alerts) and weather forecasts. Forth Ports then draw the water level down if necessary. It should also be noted that, should flooding occur, this would have an impact on the docks, therefore, it is in the interest of Forth Ports, to manage the situation appropriately. Forth Ports dredges the area of the harbour under its control for the requirements of ship movements.

- **Scottish Flood Forum** is a Scottish charitable organisation that provides support for those who are affected by, or are at risk of, flooding. It provides flood advice, information, awareness, education and training to individuals and communities to help reduce the risk of flooding; in partnership with the local authority, provides support during the recovery process following a flood incident and aims to support the development of resilient communities.

## **Annex 3: Consultation and engagement**

A full public consultation was held during the development of the Forth Estuary Flood Risk Management Strategy and the Plan. The consultation held in 2015 was a joint exercise between SEPA and the lead authority. The purpose of the consultation was to seek views from everyone – from individuals and businesses at risk to flooding, from interested community groups as well as from those organisations with an interest in how flood risk is managed and delivered.

The Forth Estuary Consultation was viewed on 3,737 occasions and comments were made by 22 respondents. Of those that left comments the majority were broadly in agreement with the information presented and the actions promoted to address the issues<sup>14</sup>. The views and representations of the respondents were taken into account in developing and finalising this Plan.

As detailed in Chapter 1 of the Plan, following the consultation on the Flood Risk Management Strategies which closed on 2 June 2015, there has not been any further formal communications or engagement in relation to this Plan.

The following councils presented the findings of their consultation to elected members as follows:

### **City of Edinburgh Council**

The City of Edinburgh Council presented the findings of the consultation to their elected members on 25 August 2015 as detailed here: [http://www.edinburgh.gov.uk/meetings/meeting/3735/transport\\_and\\_environment\\_committee](http://www.edinburgh.gov.uk/meetings/meeting/3735/transport_and_environment_committee) under item 7.5.

### **East Lothian Council**

East Lothian Council presented the findings of the consultation in a Flood Risk Management update report to their elected members on 1 December 2015 as detailed here: [http://www.eastlothian.gov.uk/meetings/meeting/5672/members\\_library\\_service\\_under\\_items\\_31-33](http://www.eastlothian.gov.uk/meetings/meeting/5672/members_library_service_under_items_31-33).

### **Falkirk Council**

Falkirk Council presented the findings of the consultation in a Flood Risk Management update report to their elected members on 16 December 2015 as detailed here: <https://www.falkirk.gov.uk/coins/submissiondocuments.asp?submissionid=11730> under Part 3.

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<sup>14</sup> Public Consultation for Forth Estuary Local Plan District Number 10 Digest, City of Edinburgh Council ( July 2015)

### **Fife Council**

Fife Council presented the findings of the consultation to their elected members on 23 June 2015 as detailed here:

<http://www.fifedirect.org.uk/publications/index.cfm?fuseaction=publication.pop&pubid=00D35649-0D6A-6C03-88A22B9F288F29A8> under item No. 17.

### **North Lanarkshire Council**

North Lanarkshire Council presented the findings of the consultation in a Planning and Transportation Committee update to their elected members on 23 September 2015 as detailed here:

<https://mars.northlanarkshire.gov.uk/egenda/images/att81747.pdf> under Part 4.

### **Perth and Kinross**

Perth and Kinross Council presented the findings of the consultation in a Flood Risk Management update report to their elected members on 9 September 2015 as detailed here:

<http://www.pkc.gov.uk/CHttpHandler.ashx?id=32972&p=0>

### **West Lothian Council**

During the 2015 consultation West Lothian Council informed all Local Members, advised all Community Councils and met with and advised the relevant Council Departments through a local Flood Group set up to discuss the flood risk management processes. West Lothian Council presented the findings of the consultation to their elected members on 10 March 2015 as detailed here:

<http://coins.westlothian.gov.uk/coins/viewSelectedDocument.asp?c=P62AFQDX2U0G81Z3> under Part 2.

Further consultation has been undertaken by the following councils:

### **City of Edinburgh Council**

Since June 2015, the Council has held two Public Information Open Days for the Water of Leith Flood Prevention Scheme Phase 2. These were held at Roseburn Primary School, one on 19 August 2015 and most recently on 13 January 2016. The City of Edinburgh Council has also held Stakeholder Engagement Group meetings, which were on 27 October 2015, 26 January 2016 and 25 May 2016.

There have also been many regular meetings with individual residents, businesses and local communities such as the Friends of Roseburn Park. The Contractor for the works, McLaughlin and Harvey, have also commenced their public stakeholder management duties which include the requirement to keep all interested parties advised of the works.



### **East Lothian Council**

Public Consultation is to be undertaken at various stages of the Musselburgh Flood Protection Scheme. This is likely to be in the form of Public Information Open Days and Stakeholder Engagement Group meetings.

## Annex 4: Links to other plans, policies, strategies and legislative requirements

### 1. Links to other plans, policies, strategies and legislative requirements

Responsible Authority	Details of Plan	Hyperlink or web access
SEPA	The river basin management plan for the Scotland river basin district: 2015–2027	<a href="https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf">https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf</a>
SEPA	FRM Strategy Forth Estuary Local Plan District, December 2015	<a href="http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html">http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html</a>
SEPA	FRM Strategies for Scotland Environmental Report, December 2015	<a href="http://www.gov.scot/Topics/Environment/environmental-assessment/sea/SEAG">http://www.gov.scot/Topics/Environment/environmental-assessment/sea/SEAG</a>
SEPA	Land use planning guidance	<a href="http://www.sepa.org.uk/environment/and/planning/">http://www.sepa.org.uk/environment/and/planning/</a>
The City of Edinburgh Council	A Strategic Environmental Assessment Screening Report Case title: Forth Estuary Local Flood Risk Management Plan (Local FRM Plan) Case ID:SEA\01138	<a href="http://www.gov.scot/Topics/Environment/environmental-assessment/sea/SEAG">http://www.gov.scot/Topics/Environment/environmental-assessment/sea/SEAG</a>
The City of Edinburgh Council	Forth Estuary Local FRM Plan SEA Screening Report and Responses	<a href="http://www.gov.scot/Topics/Environment/environmental-assessment/sea/SEAG">http://www.gov.scot/Topics/Environment/environmental-assessment/sea/SEAG</a>
The City of Edinburgh Council	Local Development Plan	<a href="http://www.edinburgh.gov.uk/info/20069/local_plans_and_guidelines/64/local_plans">http://www.edinburgh.gov.uk/info/20069/local_plans_and_guidelines/64/local_plans</a>
The City of Edinburgh Council	Strategic Development Plan	<a href="http://www.edinburgh.gov.uk/info/20013/planning_and_building/1311/strat">http://www.edinburgh.gov.uk/info/20013/planning_and_building/1311/strat</a>

Responsible Authority	Details of Plan	Hyperlink or web access
		<a href="#">egic development plan</a>
Clackmannanshire Council	Local Development Plan	<a href="http://www.clacksweb.org.uk/property/developmentplanupdate/">http://www.clacksweb.org.uk/property/developmentplanupdate/</a>
East Lothian Council	Local Development Plan	<a href="http://www.eastlothian.gov.uk/info/204/statutory_development_plans/231/statutory_development_plans">http://www.eastlothian.gov.uk/info/204/statutory_development_plans/231/statutory_development_plans</a>
East Lothian Council	Shoreline Management Plan	<a href="http://www.eastlothian.gov.uk/smp">http://www.eastlothian.gov.uk/smp</a>
Falkirk Council	Local Development Plan	<a href="http://www.falkirk.gov.uk/services/planning-building/planning-policy/local-development-plan/">http://www.falkirk.gov.uk/services/planning-building/planning-policy/local-development-plan/</a>
Falkirk Council	National Planning Framework 3	<a href="http://www.gov.scot/Publications/2014/06/3539/0">http://www.gov.scot/Publications/2014/06/3539/0</a>
Fife Council	TAYPlan and SESPlan are the soon to be adopted Strategic Development Plans	<a href="http://www.fifedirect.org.uk/topics/index.cfm?fuseaction=service.display&amp;2sid=BA85256B-C559-16FB-C2D8A09D3FEB7E83&amp;themeid=2B482E89-1CC4-E06A-52FBA69F838F4D24">http://www.fifedirect.org.uk/topics/index.cfm?fuseaction=service.display&amp;2sid=BA85256B-C559-16FB-C2D8A09D3FEB7E83&amp;themeid=2B482E89-1CC4-E06A-52FBA69F838F4D24</a>
Fife Council	Local Development Plan due to be adopted in 2016	<a href="http://www.fifedirect.org.uk/topics/index.cfm?fuseaction=service.display&amp;2sid=BA85256B-C559-16FB-C2D8A09D3FEB7E83&amp;themeid=2B482E89-1CC4-E06A-52FBA69F838F4D24">http://www.fifedirect.org.uk/topics/index.cfm?fuseaction=service.display&amp;2sid=BA85256B-C559-16FB-C2D8A09D3FEB7E83&amp;themeid=2B482E89-1CC4-E06A-52FBA69F838F4D24</a>
Fife Council	Adopted St Andrews & East Fife Local Plan	<a href="http://fife-consult.objective.co.uk/portal/local_view_fusion/eflp/eflp">http://fife-consult.objective.co.uk/portal/local_view_fusion/eflp/eflp</a>
Fife Council	Adopted Mid Fife Local Plan	<a href="http://fife-consult.objective.co.uk/portal/local_view_fusion/mid_fife_local_plan/mflp">http://fife-consult.objective.co.uk/portal/local_view_fusion/mid_fife_local_plan/mflp</a>
Fife Council	Adopted Dunfermline & West Fife Local Plan	<a href="http://fife-consult.objective.co.uk/portal/local_view_fusion/dunfermline_west_fife_local_plan/wflp">http://fife-consult.objective.co.uk/portal/local_view_fusion/dunfermline_west_fife_local_plan/wflp</a>
Fife Council	South East Scotland and Tay Strategic Transport Plans	<a href="http://www.sestran.gov.uk/">http://www.sestran.gov.uk/</a> <a href="http://www.tactran.gov.uk/">http://www.tactran.gov.uk/</a>
Fife Council	Shoreline Management Plan	<a href="http://www.fifedirect.org.uk/minisites/index.cfm?fuseaction=page.display&amp;pageid=C040877C-B767-3F71-8454BE5167C5BC58&amp;siteID=C03E446A-0241-A6A5-">http://www.fifedirect.org.uk/minisites/index.cfm?fuseaction=page.display&amp;pageid=C040877C-B767-3F71-8454BE5167C5BC58&amp;siteID=C03E446A-0241-A6A5-</a>

Responsible Authority	Details of Plan	Hyperlink or web access
		<a href="#">7462DD169B215841</a>
North Lanarkshire Council	Glasgow and Clyde Valley City Deal	<a href="http://www.northlanarkshire.gov.uk/index.aspx?articleid=31901">http://www.northlanarkshire.gov.uk/index.aspx?articleid=31901</a>
North Lanarkshire Council	Local Development Plan	<a href="http://www.northlanarkshire.gov.uk/index.aspx?articleid=16016">http://www.northlanarkshire.gov.uk/index.aspx?articleid=16016</a>
North Lanarkshire Council	Strategic Development Plan	<a href="http://www.clydeplan-sdpa.gov.uk/sdp/approved-strategic-development-plan-may-2012">http://www.clydeplan-sdpa.gov.uk/sdp/approved-strategic-development-plan-may-2012</a>
Midlothian Council	Local Development Plan and Strategic Development Plan	<a href="http://www.Midlothian.gov.uk">www.Midlothian.gov.uk</a>
Perth and Kinross Council	Local Development Plan	<a href="http://www.pkc.gov.uk/developmentplan">http://www.pkc.gov.uk/developmentplan</a>
Perth and Kinross Council	Local Development Plan	<a href="http://www.pkc.gov.uk/CHttpHandler.ashx?id=23633&amp;p=0">http://www.pkc.gov.uk/CHttpHandler.ashx?id=23633&amp;p=0</a>
Perth and Kinross Council	Strategic Development Plan	<a href="http://www.tayplan-sdpa.gov.uk/system/files_force/publications/Approved_TAYplanSDP_June2012_0.pdf?download=1">http://www.tayplan-sdpa.gov.uk/system/files_force/publications/Approved_TAYplanSDP_June2012_0.pdf?download=1</a>
Perth and Kinross Council	Strategic Development Plan (TAYPlan Website)	<a href="http://www.tayplan-sdpa.gov.uk/strategic_development_plan">http://www.tayplan-sdpa.gov.uk/strategic_development_plan</a>
Perth and Kinross Council	Supplementary Guidance on Flood Risk and Flood Risk Assessments	<a href="http://www.pkc.gov.uk/floodriskassessments">http://www.pkc.gov.uk/floodriskassessments</a> <a href="http://www.pkc.gov.uk/CHttpHandler.ashx?id=24772&amp;p=0">http://www.pkc.gov.uk/CHttpHandler.ashx?id=24772&amp;p=0</a>
Scottish Borders Council	Local and Statutory Development Plans	<a href="http://www.scotborders.gov.uk/info/178/local_and_statutory_development_plans">http://www.scotborders.gov.uk/info/178/local_and_statutory_development_plans</a>
Scottish Borders Council	Harbour Road, Eyemouth Development Framework.	<a href="http://www.scotborders.gov.uk/directory_record/32521/harbour_road_eyemouth_development_framework">http://www.scotborders.gov.uk/directory_record/32521/harbour_road_eyemouth_development_framework</a>
Scottish Water	General Guidance on Flooding	<a href="https://www.scottishwater.co.uk/you-and-your-home/your-home/flooding-">https://www.scottishwater.co.uk/you-and-your-home/your-home/flooding-</a>

Responsible Authority	Details of Plan	Hyperlink or web access
		<a href="#">information</a>
West Lothian Council	West Lothian Local Plan 2009	<a href="http://www.westlothian.gov.uk/WLLP">http://www.westlothian.gov.uk/WLLP</a>
West Lothian Council	West Lothian Local Development Plan (at consultation stage at the moment and will replace 2009 Local Plan)	<a href="http://www.westlothian.gov.uk/LDP">http://www.westlothian.gov.uk/LDP</a> -
West Lothian Council	Strategic Development Plan	<a href="http://www.sesplan.gov.uk/assets/sets/files/docs/290813/SESplan%20Strategic%20Development%20Plan%20Approved%2027%20June%202013.pdf">http://www.sesplan.gov.uk/assets/sets/files/docs/290813/SESplan%20Strategic%20Development%20Plan%20Approved%2027%20June%202013.pdf</a> –

## 2. S18 Schedule of Clearance and Repair

The following are links for each local authority to access schedules of clearance and repair under Section 18 of the Flood Risk Management (Scotland) Act 2009:

Local Authority	Method of public access to the S18 Schedule	Hyperlink ,web access or contact details
The City of Edinburgh Council	Council website	<a href="http://www.edinburgh.gov.uk/info/20045/flooding">http://www.edinburgh.gov.uk/info/20045/flooding</a>
Clackmannanshire Council	Council website	<a href="http://www.jbamap.co.uk/ClacksAssetRegister/">http://www.jbamap.co.uk/ClacksAssetRegister/</a>
East Lothian Council	By request via e-mail enquiries	<a href="mailto:customerservices@eastlothian.gov.uk">customerservices@eastlothian.gov.uk</a>
Falkirk Council	By request via telephone and email enquiries	Requests to inspect records can be made by telephoning, 01324 506070 or by emailing: <a href="mailto:contact.centre@falkirk.gov.uk">contact.centre@falkirk.gov.uk</a>
Fife Council	Council website	<a href="http://www.fifedirect.org.uk/topics/index.cfm?fuseaction=page.display&amp;">http://www.fifedirect.org.uk/topics/index.cfm?fuseaction=page.display&amp;</a>

Local Authority	Method of public access to the S18 Schedule	Hyperlink ,web access or contact details
		<a href="http://www.floodrisk.gov.uk/portal/p2sid=618DD563-ABBC-ECA5-1675450324EED528&amp;themeid=81E299FB-1BCF-4994-8C8A-233463B738F6">p2sid=618DD563-ABBC-ECA5-1675450324EED528&amp;themeid=81E299FB-1BCF-4994-8C8A-233463B738F6</a>
Midlothian Council	By request via enquiries on our public Website	<a href="http://www.Midlothian.gov.uk">http://www.Midlothian.gov.uk</a> <a href="mailto:enquiries@midlothian.gov.uk">enquiries@midlothian.gov.uk</a>
North Lanarkshire Council	By request via enquiries	Available for inspection From Roads & Transportation at Fleming House, 2 Tryst Road, Cumbernauld G67 1JW
Scottish Borders Council	Council website	<a href="http://www.scotborders.gov.uk/info/1228/emergencies-flooding">http://www.scotborders.gov.uk/info/1228/emergencies-flooding</a>
Perth and Kinross Council	Council website	<a href="http://www.pkc.gov.uk/CHttpHandler.ashx?id=22028&amp;p=0">http://www.pkc.gov.uk/CHttpHandler.ashx?id=22028&amp;p=0</a>
West Lothian	By request via enquiries	Flood Risk Management Team, Guildyhaugh Depot, Blackburn Road, Bathgate , EH48 2EB Tel: 01506 776591

### 3. Integrated Catchment Studies

As discussed in Section 1.7.3 of this Plan, Scottish Water is working in partnership with local authorities to develop Integrated Catchment Studies across the Forth Estuary Local Plan District. The outputs of these studies may be used to inform the surface water management planning process and the production of the Surface Water Management Plan led by the local authority. The following summarises each local authority's input to Integrated Catchment Studies within the Forth Estuary Local Plan District (only areas with an Integrated Catchment Study have been included):

#### **Edinburgh & Lothian's Integrated Catchment Study**

The City of Edinburgh Council, East Lothian Council and Midlothian Council are working in partnership with Scottish Water to undertake an Integrated Catchment Study (ICS) covering the Seafield Drainage Operation Area (covering the City of Edinburgh and parts of East & Midlothian). The study is undergoing final verification stage prior to completion of the catchment flood risk assessment. Following agreement of this stage, the project will progress to solution development. The

outputs of this study may be used to inform the surface water management planning process and inform the Surface Water Management Plan that the local authorities will produce.

#### **Falkirk Integrated Catchment Study**

Falkirk Council is working in partnership with Scottish Water to undertake the Falkirk Integrated Catchment Study covering the sewer catchment area of Bo'ness Waste Water Treatment Works (WWTW), Dalderse and Kinneil Kerse WWTW. A further smaller study following the same principle is being undertaken in parallel for Slamannan WWTW catchment.

The study has completed the modelling and catchment flood risk assessment stages, and will progress to solution development.

The outputs of these studies may be used to inform the surface water management planning process and inform the overall Falkirk Council Surface Water Management Plan.

#### **Dunfermline/Ironmill Bay & Levenmouth Integrated Catchment Studies**

Fife Council is working in partnership with Scottish Water to undertake two Integrated Catchment Studies which will cover Dunfermline and Ironmill Bay, and Levenmouth (Leven Valley). The outputs of these studies may be used to inform the surface water management planning process within the Fife Council area.

#### **Dunnswood Integrated Catchment Study**

North Lanarkshire Council is working in partnership with Scottish Water to undertake an Integrated Catchment Study which will cover Cumbernauld (East) area covered by the Dunnswood WWTW sewer catchment. An initial scoping meeting has taken place for the Dunnswood Sewer Catchment serving Cumbernauld (East).

#### **Linlithgow & Bathgate Integrated Catchment Studies**

West Lothian Council is working in partnership with Scottish Water to undertake two Integrated Catchment Studies which will cover Linlithgow and Bathgate catchments. The overall aim of the Integrated Catchment Studies is to understand the interactions between all drainage pathways and flooding mechanisms in order for solutions to be identified and appraised to reduce overall flood risk. The Integrated Catchment Studies at Linlithgow and Bathgate are confirmed as actions in West Lothian Council's Surface Water Management Plan.

### **4. Surface water management planning**

As discussed in Section 1.7.4 of this Plan, Surface water flooding is experienced in all Local Plan Districts and therefore there is a need for surface water management planning to be undertaken. Areas which have a significant surface water flood risk to

residential properties and businesses have been identified as priority areas and are required to have Surface Water Management Plans (SWMP) developed.

These plans aim to identify the most sustainable range of actions that will manage and reduce flood risk, and set out how these will be delivered. It is likely that these actions could be delivered by single organisations, or jointly, or a combination of both in a phased manner.

The following summarises the work being planned/carried out by local authorities, in partnership with Scottish Water and SEPA, to address surface water flooding within the Forth Estuary Local Plan District

### **The City of Edinburgh Council, East Lothian Council and Midlothian Council**

A number of priority areas have been identified across The City of Edinburgh Council, East Lothian Council and Midlothian Council areas.

The City of Edinburgh Council and East Lothian Council's work on Surface Water Management Plan for their respective areas will start towards the end of the cycle (2021). Midlothian Council intends to progress the Surface Water Management Plan in the first half of the current six year Cycle.

For the priority areas which sit within the Edinburgh & Lothian's Integrated Catchment Study boundary area, the Surface Water Management Plan for these areas may be agreed to be carried out in partnership to make best available use of resources. The Surface Water Management Plan will involve collaborative working between the three Local Authorities, Scottish Water, and SEPA where required. This will include agreeing the most sustainable actions to manage surface water across this area and coordinating the implementation of these actions between all parties. For this area the outputs of the Integrated Catchment Study will inform the production of the Surface Water Management Plan.

### **Clackmannanshire Council**

Clackmannanshire Council has no Surface Water Management Planning Actions to deliver within the boundary of The Forth Estuary Local Plan District.

### **Falkirk Council**

The Surface Water Management Plan will be led by Falkirk Council but involve collaborative working with Scottish Water, SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions. An Integrated catchment study is being progressed collaboratively with Scottish Water covering the sewer catchment area of Bo'ness WWTW, Dalderse and Kinneil Kerse WWTW. A further smaller study following the same principle is being undertaken in parallel for Slamannan WWTW catchment. The outputs of these studies will inform the surface



water management planning process and inform the overall Falkirk Council Surface Water Management Plan.

### **East Dunbartonshire Council**

East Dunbartonshire Council has no Surface Water Management Planning Actions to deliver within the boundary of The Forth Estuary Local Plan District.

### **Fife Council**

Development of two surface water management plans are planned in Fife during the current flood risk management cycle which will cover 4 PVA's. Two Integrated Catchment Studies are being undertaken in partnership with Scottish Water. Fife Council will interact with Scottish Water as the Integrated Catchment Study will inform the Surface Water Management Plans that the local authority will produce. Fife Council will lead on the development of surface water management plans for their area in partnership with Scottish Water and SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.

### **North Lanarkshire Council**

North Lanarkshire Council will be starting work on a Surface Water Management Plan for Cumbernauld (East) in the first cycle (2016-2022) of the Local Flood Risk Management Plan. This will be supported by an Integrated Catchment Study led by Scottish Water working in partnership with North Lanarkshire Council that will also be undertaken in the first cycle. The indicative delivery period for the Cumbernauld (East) Surface Water Management Plan is 2016 to 2027. The Surface Water Management Plan will be led by North Lanarkshire Council but involve collaborative working with Scottish Water, SEPA and other relevant authorities where required. This will include agreeing the most sustainable actions to manage surface water and coordinating the implementation of these actions.

### **Perth and Kinross**

Following the Milnathort Surface Water Investigation report by consultants Atkins in 2011, Perth and Kinross Council's surface water management plan for Milnathort will be implemented through a surface water flood protection scheme in Milnathort. The scheme will involve new drainage measures, underground storage and pumping stations to provide a 1 in 100 year standard of protection against surface water flooding and will include an additional allowance for climate change. Outline design will commence in 2016/17 with the scheme set to be implemented by 2018/19, subject to funding. Perth and Kinross Council will coordinate all activity to implement the scheme with SEPA and Scottish Water, taking cognisance of Scottish Water's recent scheme to address internal sewer flooding.

**Scottish Borders Council**

There is no formal Surface Water Management Plan scheduled to be undertaken in PVA 10/26 Berwickshire Coast during the first flood risk management planning cycle 2016 – 2022.

**Stirling Council**

Stirling Council has no Surface Water Management Planning Actions to deliver within the boundary of The Forth Estuary Local Plan District.

**South Lanarkshire Council**

South Lanarkshire Council has no Surface Water Management Planning Actions to deliver within the boundary of The Forth Estuary Local Plan District.

**West Lothian Council**

Four surface water management plan priority areas have been identified in SEPA's catchment characterisation reports within the area administered by West Lothian Council. This is based on the number of residential and business properties estimated to be at risk of flooding. These priority areas are Bathgate, Broxburn, Linlithgow and Livingston.

The Surface Water Management Plan was prepared by and on behalf of the West Lothian Council by independent consultants, Mott MacDonald, in liaison with and managed by officers from the Flood Risk Management team. It was prepared in accordance with guidance published by the Scottish Advisory and Implementation Forum for Flooding (SAIFF) which includes representatives from the Scottish Government, local authorities, SEPA and Scottish Water. Works have been identified in the Surface Water Management Plan but no timescale can be set for these works until a funding process is agreed. It is likely these works will be implemented in a later plan.

## Annex 5: Land use planning

The following information has been extracted from the Forth Estuary Flood Risk Managing Strategy<sup>15</sup>.

### Flood risk management actions from national planning policies

#### 1. Avoid development in medium to high risk areas

- a. **Planning authorities** 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.
- b. **Planning authorities and SEPA** require the submission of flood risk assessments that accord with SEPA's *Technical Flood Risk Guidance for Stakeholders*, 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.
- c. **SEPA** 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.
- d. **SEPA and planning authorities** 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.

#### 2. Reduce impacts to existing buildings

- a. **SEPA, planning authorities and local communities** 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.

#### 3. Protect and enhance natural features that have a positive impact on reducing overall flood risk

- a. **SEPA, planning authorities** 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

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<sup>15</sup> Forth Estuary Flood Risk Management Strategy, SEPA (December 2015). Found at (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>)

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

**4. New developments are designed to ensure that surface water drainage does not increase flood risk on or off site**

- a. **SEPA** prepares guidance for planning authorities and developers on the use of surface water hazard maps for land use planning purposes.
- b. **Planning authorities** 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.
- c. **SEPA** 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.

**5. New development is resilient to predicted future changes in climate**

- a. **Planning authorities** 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.

## Annex 6: Supporting information

The following information has been extracted from the Forth Estuary Flood Risk Management Strategy<sup>16</sup>.

### 1. Sources of flooding described in the 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 the 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

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<sup>16</sup> Forth Estuary Flood Risk Management Strategy, SEPA (December 2015). Found at (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>)

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.

## 2. Commonly used terms

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

- Reference to flood risk.** During the development of the 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.

### **3. Flood risk management planning process**

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.

#### **3.1. 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.

#### **3.2. 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).

### **3.3. 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.



## **Annex 7: Acknowledgements**

The information described in this Annex relates to the Figures and Maps that have been generated by SEPA and have been reproduced in this Local Flood Risk Management Plan from the Forth Estuary Flood Risk Management Strategy. The Forth Estuary Local Plan District Partners gratefully acknowledges the cooperation and input that various parties have provided, including inter alia, the following organisations:

### **SEPA**

Local authorities acknowledge the inclusion of text generated by SEPA in preparation of the Forth Estuary Flood Risk Management Strategy. Figures and Maps produced by SEPA for the Forth Estuary Flood Risk Management Strategy have been reproduced in the Forth Estuary Local Flood Risk Management Plan with authorisation from SEPA under SEPA Licence number 100016991 (2015).

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**Local authorities**

Lead authorities acknowledge 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**

Local authorities acknowledge the inclusion of surface water flooding data generated by Scottish Water in preparation of flood risk information.

## Annex 8: Glossary

The following information has been extracted from the Forth Estuary Flood Risk Managing Strategy<sup>17</sup>.

Term	Definition
<b>Accretion</b>	Accumulation of sediment.
<b>Actions</b>	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.
<b>Annual Average Damages (AAD)</b>	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).
<b>Appraisal</b>	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.
<b>Appraisal baseline</b>	Defines the existing level of flood risk under the current flood risk management regime.
<b>Awareness raising</b>	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.
<b>Bathing waters</b>	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>18</sup>

<sup>17</sup> Forth Estuary Flood Risk Management Strategy, SEPA (December 2015). Found at (<http://apps.sepa.org.uk/FRMStrategies/forth-estuary.html>)

<b>Benefit cost ratio (BCR)</b>	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.
<b>Blue infrastructure</b>	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>19</sup> ), wetlands, rivers, canals (and their banks) and other watercourses <sup>20</sup>
<b>Candidate Potentially Vulnerable Area (PVAc)</b>	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.
<b>Catchment</b>	All the land drained by a river and its tributaries.
<b>Category 1 and 2 Responders (Cat 1 / 2)</b>	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>21</sup> .
<b>Channel improvement</b>	Where work has been carried out on a river channel allowing an increase in the volume of water it can carry.
<b>Characterisation</b>	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.
<b>Coastal flooding</b>	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

<sup>18</sup> <http://apps.sepa.org.uk/bathingwaters/> accessed 14/10/2015 last updated 2015

<sup>19</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>20</sup> <http://www.gov.scot/Resource/Doc/362219/0122541.pdf> accessed 12/10/2015 last updated 2011

<sup>21</sup> <http://www.legislation.gov.uk/ukpga/2004/36/schedule/1> accessed 12/10/2015 last updated 2004

	that are influenced by tidal flows.
<b>Combined sewer</b>	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.
<b>Combined sewer (overflow) (CSO)</b>	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.
<b>Community facility</b>	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
<b>Community flood action groups</b>	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.
<b>Confluence</b>	Where two or more rivers meet.
<b>Conveyance</b>	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.
<b>Cultural heritage site</b>	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.
<b>Culvert</b>	A pipe, channel or tunnel used for the conveyance of a watercourse or surface drainage water under a road, railway, canal or other obstacle.
<b>Damages</b>	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. 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. See also 'Annual Average Damages'
<b>Demountable defences</b>	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>22</sup>
<b>Deposition</b>	A natural process leading to an accumulation of sediment on a river bed, floodplain or coastline.
<b>Economic impact</b>	An assessment of the economic value of the positive and negative effects of flooding and / or the actions taken to manage floods.
<b>Embankment</b>	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.
<b>Emergency plans / response</b>	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.
<b>Environmental impact</b>	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.
<b>Environmental Impact Assessment (EIA)</b>	Environmental Impact Assessment (EIA) is a process which identifies the potential environmental impacts, both negative and positive, of a proposal.
<b>Environmental sites / environmental designated areas/ environmentally designated sites</b>	Areas formally designated for environmental importance, such as Sites of Special Scientific Interest (SSSI), Special Protection Area (SPA) or Special Areas of Conservation (SAC).
<b>Episodic erosion</b>	Erosion induced by a single event, such as a storm.
<b>Erosion</b>	A natural process leading to the removal of sediment from a river bed, bank or floodplain or coastline.
<b>Estuarine surge attenuation</b>	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

<sup>22</sup> <http://evidence.environment-agency.gov.uk/FCERM/en/FluvialDesignGuide/Chapter9.aspx?pagenum=10> accessed 12/10/2015 last update 07/03/2012

	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.
<b>Estuary</b>	A coastal body of water usually found where a river meets the sea; the part of the river that is affected by tides.
<b>Fault (fault line)</b>	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.
<b>Flash flood</b>	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.
<b>Flashy watercourse</b>	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 can be prone to flooding and leave a short time for warning or actions.
<b>Flood</b>	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.
<b>Flood bund</b>	A constructed retaining wall, embankment or dyke designed to protect against flooding to a specified standard of protection.
<b>Flood defence</b>	Infrastructure, such as flood walls, embankments or flood storage intended to protect an area against flooding to a specified standard of protection.
<b>Flood extent</b>	The area that has been affected by flooding, or is at risk of flooding from one or more sources for a particular likelihood.
<b>Flood forecasting</b>	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.
<b>Flood frequency</b>	The probability that a particular size/severity of flood will occur in a given year (see likelihood).
<b>Flood gate</b>	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.
<b>Flood guard</b>	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.
<b>Flood hazard</b>	In terms of the FRM Act, hazard refers to the characteristics (extent, depth, velocity) of a flood.
<b>Flood hazard map</b>	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.
<b>Flood Prevention Scheme / Flood Protection Scheme (FPS)</b>	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.
<b>Flood protection study</b>	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.
<b>Flood protection works</b>	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.
<b>Flood risk</b>	A measure of the combination of the likelihood of flooding occurring and the associated impacts on people, the economy and the environment.
<b>Flood Risk Assessment (FRA)</b>	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.
<b>Flood Risk Management (Scotland) Act 2009 (FRM Act)</b>	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.
<b>Flood risk management cycle</b>	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.
<b>Flood Prevention (Scotland) Act 1961</b>	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.
<b>Flood Risk Management Local Advisory Groups</b>	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.



<b>Flood Risk Management Plans (FRM Plans)</b>	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.
<b>Flood Risk Management Strategy (FRM Strategy)</b>	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.
<b>Flood risk map</b>	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.
<b>Flood wall</b>	A flood defence feature used to defend an area from flood water to a specified standard of protection.
<b>Flood Warning area (FWA)</b>	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>23</sup>
<b>Flood warning scheme</b>	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.
<b>Floods Directive</b>	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 actions to reduce this flood risk <sup>24</sup> .
<b>Floodplain</b>	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.
<b>Floodplain storage</b>	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.
<b>Gabion</b>	A metal cage filled with rocks often used in river bank protection.

<sup>24</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

<b>Green infrastructure</b>	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>25</sup>
<b>Groundwater flooding</b>	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.
<b>Integrated catchment study (ICS)</b>	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.
<b>Land use planning (LUP)</b>	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.
<b>Lead local authority</b>	A local authority responsible for leading the production, consultation, publication and review of a Local Flood Risk Management Plan.
<b>Likelihood of flooding</b>	The chance of flooding occurring. High likelihood: 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. Medium likelihood: 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. Low likelihood: 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.
<b>Local Flood Risk Management Plans (Local FRM Plan)</b>	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.
<b>Local Nature Reserve (LNR)</b>	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

<sup>25</sup> <http://www.gov.scot/Resource/Doc/362219/0122541.pdf> accessed 12/10/2015 last updated 2011

	designate local nature reserves using their powers under the National Parks and Access to the Countryside Act 1949 <sup>26</sup> .
<b>Local Plan District</b>	Geographical areas for the purposes of flood risk management planning. There are 14 Local Plan Districts in Scotland.
<b>Local Plan District Partnerships</b>	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.
<b>Maintenance</b>	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.
<b>Montane habitat</b>	This habitat encompasses a range of natural or near-natural vegetation occurring in the montane zone, lying above or beyond the natural tree-line.
<b>National Flood Management Advisory Group (NFMAG)</b>	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.
<b>National Flood Risk Assessment (NFRA)</b>	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>Natural flood management (NFM)</b>	A set of flood management techniques that aim to work with natural processes (or nature) to manage flood risk.
<b>Non-residential properties</b>	Properties that are not used for people to live in, such as shops or other public, commercial or industrial buildings.
<b>Objectives</b>	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.
<b>One in 200 year flood</b>	See 'likelihood of flooding' and 'return period'.
<b>Planning policies</b>	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

<sup>26</sup> <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/local-designations/lnr/> accessed 12/10/2015 last updated 12/07/2015

	may place further requirements within their area of operation to restrict inappropriate development and prevent unacceptable risk.
<b>Potentially Vulnerable Areas (PVA)</b>	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.
<b>Property level protection</b>	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.
<b>Property level protection scheme</b>	Some responsible authorities may have a formal scheme to provide, install and maintain property level protection for properties.
<b>Ramsar sites</b>	Ramsar sites are wetlands of international importance designated under the Ramsar Convention.
<b>Receptor</b>	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.
<b>Residual risk</b>	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.
<b>Resilience</b>	The ability of an individual, community or system to recover from flooding.
<b>Responsible authority</b>	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.
<b>Return period</b>	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)
<b>Revetment</b>	Sloping structures placed on banks or at the foot of cliffs in such a way as to deflect the energy of incoming water.
<b>Riparian</b>	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.
<b>River basin management planning (RBMP)</b>	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.
<b>Runoff reduction</b>	Actions within a catchment or sub-catchment to reduce the amount of runoff during rainfall events. This can include

	intercepting rainfall, storing water, diverting flows or encouraging infiltration.
<b>Scottish Advisory and Implementation Forum for Flooding (SAIFF)</b>	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.
<b>Scottish Water Investment Period</b>	Scottish Water's investment programme is set out in their business plan 2015-2021, which can be found on their website ( <a href="https://www.scottishwater.co.uk/about-us/publications/strategic-projections">https://www.scottishwater.co.uk/about-us/publications/strategic-projections</a> ).
<b>Sediment balance</b>	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.
<b>Sediment management</b>	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.
<b>Self help</b>	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.
<b>Sewer flooding (and other artificial drainage system flooding)</b>	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.
<b>Site protection plans</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.
<b>Shoreline Management Plan (SMP)</b>	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.
<b>Site of Special Scientific Interest (SSSI)</b>	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>27</sup> .
<b>Source of flooding</b>	The type of flooding. This can be coastal, river, surface water or groundwater.
<b>Special Area of</b>	Special Areas of Conservation are strictly protected sites

<sup>27</sup> <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/sssisi/> accessed 12/10/2015 last updated 21/01/2015



<b>Conservation (SAC)</b>	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>28</sup> .
<b>Special Protection Areas (SPA)</b>	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>29</sup> .
<b>Standard of protection (SoP)</b>	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.
<b>Storage area</b>	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.
<b>Strategic Environmental Assessment (SEA)</b>	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.
<b>Strategic Flood Risk Assessment (SFRA)</b>	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.
<b>Strategic mapping and modelling</b>	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.
<b>Surcharge</b>	Watercourses and culverts can carry a limited amount of water. When they can no longer cope, they overflow, or 'surcharge'.
<b>Surface water flooding</b>	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>30</sup>
<b>Surface water management plan (SWMP)</b>	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.
<b>Surface water</b>	The management of flooding from surface water sewers,

<sup>28</sup> <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/sac/> accessed 12/10/2015 last updated 01/03/2013

<sup>29</sup> <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/spa/> accessed 12/10/2015 last updated 01/03/2013

<sup>30</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

<b>plan/study</b>	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.
<b>Sustainable flood risk management</b>	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.
<b>Sustainable drainage systems (SuDS)</b>	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.
<b>UK Climate Change Projections (UKCP09)</b>	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>31</sup>
<b>Utility assets</b>	Within the FRM Strategies this refers to electricity sub stations, mineral and fuel extraction sites, telephone assets, television and radio assets.
<b>Voe</b>	A dialect term, common in place names and used to refer to a small bay or creek in Orkney or Shetland.
<b>Vulnerability</b>	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).
<b>Wave energy dissipation</b>	Process by which a wave loses its energy.
<b>Wave overtopping</b>	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>31</sup><http://ukclimateprojections.metoffice.gov.uk> Document © Crown copyright 2009 accessed 01/12/15 last updated 30/04/2012

## **Annex 9: Habitats Regulations Appraisal**

The Local Flood Risk Management Plan, Forth Estuary Local Plan District, was considered in light of the assessment requirements of regulation 48(1) of the Conservation (Natural Habitats, &c) Regulations 1994 (as amended) by City of Edinburgh Council which is the competent authority responsible for adopting the Plan and any assessment of it required by the Regulations.

Following screening out of sites where there were no credible impact pathways from the proposals within the Local Flood Risk Management Plan, a list of European sites potentially affected by the Plan is given below:

- Firth of Forth SPA
- Loch Leven SPA
- Imperial Docks Leith SPA
- Berwickshire and North Northumberland Coast SAC
- Slamannan Plateau SPA
- Blawhorn Moss SAC

Having carried out a 'screening' assessment of the Plan, the competent authority has concluded that 18 actions in the Plan have been assessed as having a likely significant effect on a European site. Therefore, to be in accord with the Local Flood Risk Management Plan, the competent authority must carry out an appropriate assessment to demonstrate that any proposals coming forward will not have an adverse effect on the integrity of any Natura site (SPA or SAC) before any consents or permissions are granted. This may require the inclusion of suitable mitigation during the development of these actions in the first planning cycle.

Scottish Natural Heritage (SNH) was consulted on this conclusion (18/03/16) and has agreed with it (following the adoption of recommended changes).



## **Annex 10: Contact details of Forth Estuary Local Plan District Partners**

For queries on the Forth Estuary Local Flood Risk Management Plan, please contact the relevant responsible authority using the following contact information:

### **The City of Edinburgh Council**

Tel: 0131 200 2000

Email: [Customer.Care@Edinburgh.gov.uk](mailto:Customer.Care@Edinburgh.gov.uk)

### **Clackmannanshire Council**

Clackmannanshire Council

Customer Services

Kilncraigs, Greenside Street, Alloa, FK10 1EB

Tel: 01259 450000

Email: [customerservice@clacks.gov.uk](mailto:customerservice@clacks.gov.uk)

### **East Lothian Council Contact Centre**

ELC Contact Centre

Penston House

Macmerry Industrial Estate

Macmerry

EH33 1EX

Tel: 01875 824305

Email: [customerservices@eastlothian.gov.uk](mailto:customerservices@eastlothian.gov.uk)

### **East Dunbartonshire Council**

Email: [customerservices@eastdunbartonshirecouncil.gov.uk](mailto:customerservices@eastdunbartonshirecouncil.gov.uk)

### **Falkirk Council Contact Centre**

Tel: 01324 506070

Email: [contact.centre@falkirk.gov.uk](mailto:contact.centre@falkirk.gov.uk)

### **Fife Council Contact Centre**

Tel: 03451 550000.

### **Midlothian Council Contact Centre**

Tel: 0131 663 7211.

Email: [ContactCentre@midlothian.gov.uk](mailto:ContactCentre@midlothian.gov.uk)

**North Lanarkshire Council**

Roads & Transportation (Flood Risk Management)

Fleming House

2 Tryst Road

Cumbernauld G67 1JW

Email: [roadsflooding@northlan.gov.uk](mailto:roadsflooding@northlan.gov.uk)

**Perth and Kinross Customer Service Centre**

Tel: 01738 475000

E-mail: [enquiries@pkc.gov.uk](mailto:enquiries@pkc.gov.uk)

Perth and Kinross Council Office Address

Pullar House

35 Kinnoull Street

Perth

PH1 5GD

**Scottish Borders Council**

Eyemouth Contact Centre

Old High School Building

Coldingham Road

Eyemouth

TD14 5AN

Duns Library Contact Centre

49 Newtown Street

Duns

TD11 3AU

Council Headquarters

Bowden Road

Newtown St Boswells

TD6 0SA

**Scottish Water Customer Contact Centre**

Tel: 0800 0778 778

**SEPA**

Email: [frmplanning@sepa.org](mailto:frmplanning@sepa.org)

**South Lanarkshire Council**

Tel: 0303 123 1015

**Stirling Council**

Customer First

5 Port Street,

Stirling, FK8 2EJ

Tel: 01786 404040

Web: <http://my.stirling.gov.uk/contact> (online form)

**West Lothian Council Customer Service Centre**

West Lothian Civic Centre

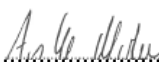
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Rev No	Revision	Comments	Checked by/org	Approved by/org	Date
1	Draft Plan	First Draft Plan	LVV/AECOM	DH/AECOM	11/03/2016
2	Final Draft Plan	Second Draft considering LPD partners comments	LVV/AECOM	DH/AECOM	25/03/2016
3	Committee Draft Plan	Third draft considering second round of comments from LPD partners	DH/AECOM	DH/AECOM	07/04/2016
4	ELC Committee Draft Plan	Fourth draft considering third round comments from East Lothian Council only	DH/AECOM	DH/AECOM	28/04/2016
5	Committee Final Draft Plan	Fifth draft considering third round comments from LPD partners	DH/AECOM	DH/AECOM	04/05/2016
6	Final Draft Plan	Sixth draft considering comments from Scottish Water and Scottish Borders Council	IC / CEC	TD / CEC	30/05/2016
7	Final Plan	Final approved plan considering comments from Scottish Water. Removed 'DRAFT' watermark	IC / CEC	TD / CEC	22/06/2016

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