# Environmental Impact Assessment Report

Chapter 1 Introduction

**Grangemouth Flood Protection Scheme 2024**
**Falkirk Council**

GRANGEMOUTH
Flood Protection Scheme
Protecting the heart of our communities

# Grangemouth Flood Protection Scheme

# Environmental Impact Assessment Report

Prepared by:
Jacobs
95 Bothwell Street
Glasgow, Scotland G2 7HX
United Kingdom
T +44 (0)141 243 8000
F +44 (0)141 226 3109
www.jacobs.com

## Contents



### Tables



### Photographs



### Appendices

## Acronyms

| | |
|---|---|
| EIA | Environmental Impact Assessment |
| FRM | Flood Risk Management |
| HRA | Habitats Regulations Appraisal |
| IEMA | Institute of Environmental Management and Assessment |
| MHWS | Mean High Water Springs |
| NTS | Non-technical summary |
| MW | Marine Works |

# 1. Introduction

## 1.1 Overview of the Scheme

This Environmental Impact Assessment Report (EIA Report) is provided under the Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Regulations 2010 as amended by The Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Amendment Regulations 2017 (hereby referred to as the FRM Regulations) (Scottish Government, 2010 and Scottish Government, 2017a) in support of the proposed Grangemouth Flood Protection Scheme (the Scheme). The Scheme is being promoted by Falkirk Council as a flood protection scheme under Part 4 of the Flood Risk Management (Scotland) Act 2009 (hereby referred to as the FRM Act) and is being developed in accordance with the FRM Regulations, to address flood risk predominately in Grangemouth and the surrounding areas, which include Wholeflats, Glensburgh, Langlees, Carron and Carronshore.

The FRM Act legislates for a sustainable and integrated approach to flood risk management at national and local level, with a focus on the principles of flood avoidance, awareness, assistance and alleviation. It places important responsibilities on Scottish Local Authorities and other agencies including the Scottish Environment Protection Agency (SEPA) and Scottish Water, to work collaboratively to, responsibly and sustainably, seek to reduce flood risk from all sources across Scotland.

The FRM Act requires the production of two sets of complementary flood risk management plans: Local Flood Risk Management Strategies (led by SEPA) and Local Flood Risk Management Plans (produced by Lead Local Authorities). More detail on the Flood Risk Management Strategy and Local Flood Risk Management Plans is provided in Section 1.3.

The Scheme also falls under the requirements of the Marine (Scotland) Act 2010 where aspects of the Scheme which represent licensable marine activities (i.e. where works are downstream of the normal tidal limit and works are below MHWS) will require a marine licence. As such, the Marine Works (Environmental Impact Assessment (Scotland) Regulations 2017 (as amended) (the MW Regulations) (Scottish Government, 2017b) are considered to apply. This EIA Report includes consideration of the environmental impacts associated with these activities. For further detail on the legislative and regulatory framework related to the Scheme, refer to Section 1.3: Need for the Scheme and Chapter 2: Legislative and Regulatory Framework. The Scheme comprises approximately 28 km of flood defences, consisting of flood walls, embankments, coastal revetment, the relining of the flood relief channel, modifications to several existing bridges and a new flow control structure on the Grange Burn. To accommodate access, the Scheme also includes pedestrian and vehicular flood gates, ramps and access tracks or footpaths. Following construction, river channels/ banks temporarily affected during construction will be restored. Appropriate landscaping measures will be incorporated to reduce the effects the Scheme has on views and the local landscape; these will be finalised once the Scheme has been confirmed by Falkirk Council or the Scottish Ministers. A detailed description of the Scheme is provided in Chapter 4: The Scheme, and an overview of the Scheme location can be found in Figure A1.1 in Appendix A. Figure A1.2 shows the areas at risk from flood risk, Figure A1.3 shows the Flood Cells and Working Areas, and Figure A1.4 shows the Scheme Components.

The Scheme will provide flood risk protection up to the 1 in 200-year level. In addition to protecting against coastal flood risk from the Firth of Forth, the Scheme will address fluvial flood risk, primarily from the Rivers Carron and Avon, the Grange Burn and associated flood relief channel, as well as short sections of their tributaries (the Westquarter, Polmont, Chapel and Millhall Burns). Overall, the Scheme is anticipated to protect 2,760 residential properties, 6,025 people, 23 km of roads and 1,200 non-residential properties including a petrochemical complex, a major port and associated nationally important infrastructure (i.e. pipelines importing crude oil and gas from the North Sea and exporting refined products to industrial installations in northeast England) (Falkirk Council and Jacobs, 2023). Some secondary drainage measures will also be integrated into the Scheme to protect against seepage and pluvial (high intensity rainfall) flood risk.

The design life of the Scheme is 100 years, meaning it will continue to provide protection during this period. However, during the same period, climate change is predicted to cause sea levels to rise and precipitation events to increase in frequency and severity (IPCC 2023). To allow the Scheme to be adaptable and resilient to the future effects of climate change, the foundations for the flood defences have been designed such that the height of the structures can be increased by up to 0.7 m at a future date. Whilst the Scheme allows for these height raising measures to be implemented in the future, these measures do not form part of the Scheme as currently designed and proposed and therefore do not form part of this EIA. Any future measures to implement an increase in flood defence heights will require further environmental review at the stage they are proposed. Although any raising of defence heights may be sufficient in some areas to mitigate the effects of climate change, it is possible that additional measures may also be explored at a future date, for example, implementation of upstream flood storage and/ or large-scale nature-based solutions.

Subject to obtaining the relevant permissions and funding being secured, the detailed design will commence, followed by the construction phase which is anticipated to start in 2026. Construction of the Scheme is expected to last approximately ten years and will take place in discrete sections. Further details of the anticipated construction process are provided in Chapter 4: The Scheme.

## 1.2 Location and Context

The Scheme is mostly located within the town of Grangemouth, which is situated along the southern shore of the Firth of Forth, approximately 5 km northeast of the town of Falkirk and 30 km west of the city of Edinburgh. Some sections of the Scheme extend into the boundaries of smaller settlements, including Wholeflats, Glensburgh, Langlees, Carron and Carronshore (refer to Figure A1.1 in Appendix A).

Grangemouth has a population of approximately 15,991 (Scottish Government, 2021), and most residential properties are located around the centre of the town, bounded by the M9 to the south, with the refinery/ petrochemical plant, the Port of Grangemouth and other commercial buildings predominating to the east, north and west (refer to Appendix A). The Port of Grangemouth is Scotland's largest sea container port, and it facilitates the flow of over £6 billion worth of goods annually (Forth Ports Group, 2023). The petrochemical plant is home to Scotland's only crude oil refinery which provides the country with the majority of its fuel needs (INEOS, 2022). Thirty percent of the UK's oil from the North Sea oil fields is transported by pipelines to the Grangemouth site, while substantial amounts of petrochemical products are exported to industries across the UK. As such, the on-going functioning of the facilities at Grangemouth has economic relevance to other areas beyond the town and it is therefore a site of national economic importance. While the specific operation of certain areas of the petrochemical plant may change over time, the site is anticipated to remain one of national economic significance for the foreseeable future.

National Planning Framework 4 (NPF4) (Scottish Government, 2023) has identified Industrial Green Transition Zones to support the generation of significant economic opportunities for low carbon industries and to help minimise carbon emissions. Grangemouth lies within the 'Scottish Cluster' of these Zones, which includes the 'Grangemouth Investment Zone', with the Scheme being designated as a key national development vital to supporting their successful delivery.

Grangemouth also lies within the area for the proposed Forth Green Freeport. The Freeport will include tax sites, which would offer significant tax benefits to incoming investors on development land. The focus for these sites is to promote manufacturing, innovation and net zero transition investment. The tax sites are also able to benefit from customs freedoms, which are particularly relevant to manufacturing, assembly and export operations, with all investors required to sign up to the key principles of fair work and skills development (Falkirk Council, 2023).

## 1.3 Need for the Scheme

### 1.3.1 Introduction

This section sets out the need for the Scheme in terms of its national and local context.

### 1.3.2 National Context

#### 1.3.2.1 National Flood Risk Assessment (NFRA)

The FRM process in Scotland is driven by the FRM Act and the legislative framework outlined within. It established a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences of flooding on human health, the environment, cultural heritage and economic activity.

The National Flood Risk Assessment (NFRA) (SEPA, 2018b), first published in 2011 (updated in 2018), provides an evaluation of the risk of flooding and the impacts of flooding on human health, economic activity, the environment, and cultural heritage (SEPA, 2018a) within Scotland. With the support of key stakeholders, the NFRA is reviewed and updated every six years. This national analysis informs a strategic approach to flood management and identifies areas requiring appraisal.

#### 1.3.2.2 Potentially Vulnerable Areas (PVAs)

To provide support in reducing flood risk, and based on the results of the NFRA, SEPA identified Potentially Vulnerable Areas (PVAs) as required by the FRM Act. PVAs are areas which have been identified as facing nationally significant flood risk or which are likely to be at risk in the future. A total of 235 PVAs were identified by the 2018 NFRA (SEPA 2018b).

### 1.3.3 Local Context

#### 1.3.3.1 Local Plan District Flood Risk Management Strategies (FRMSs)

Fourteen Local Plan Districts have been set up for flood management purposes in Scotland. These districts are based on river catchments and coastal areas and cross administrative boundaries.

Following the NFRA, SEPA produced a Flood Risk Management Strategy (FRMS) for each of these Local Plan Districts which set out objectives and actions for flood risk management and which focus on the PVAs identified in the NFRA. Flood protection schemes are one type of measure identified in the strategies to meet objectives, with a total of 42 proposed across all of the 14 FRMSs for the Local Plan Districts (SEPA, 2015b).

The Forth Estuary Local Plan District FRMS is the strategy that covers the Grangemouth area, with PVA 10/11 (Falkirk, Grangemouth, Lauriston, Denny, Redding, Dunipace, Cumbernauld, Carron and Stenhousemuir) identified as one of 30 PVAs within the Plan district. The Forth Estuary Local Plan District FRMS identifies the requirement for a flood protection scheme for the Grangemouth area. Out of the 42 flood protection schemes proposed across Scotland in the FRMSs for each Local Plan District, the Scheme for Grangemouth is ranked as the highest priority scheme (SEPA, 2015a).

The Forth Estuary Local Plan District FRMS provides the following objectives for the Scheme (SEPA, 2015):

- Objective 10041: Reduce risk to people in Bonnybridge, Denny, Carron and Grangemouth from river and coastal flooding.
- Objective 10040: Reduce economic damages to residential and non-residential properties in Grangemouth caused by river flooding and coastal flooding.
- Objective 10036: Reduce economic damages to residential and non-residential properties in Falkirk caused by flooding from the River Carron.

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

The Forth Estuary Local Plan District FRMS identifies a 1 in 200-year scheme as being appropriate.

#### 1.3.3.2 Local Flood Risk Management Plan (LFRMP)

A Local Flood Risk Management Plan (LFRMP) has been prepared by the lead local authority within each of the 14 Local Plan Districts, with a Strategic Environmental Assessment (SEA) and a Habitats Regulations Appraisal undertaken by SEPA to accompany all the LFRMPs (SEPA, 2021).

Alongside the FRMS for each Local Plan District that SEPA has produced, the LFRMPs take forward the objectives and actions set out in the FRMS, and provide further information on the delivery, costs, arrangements and co-ordination of targeting actions within the Local Plan District throughout each six-year flood risk management planning cycle.

As the initial lead authority for the Forth Estuary Local Plan District, the City of Edinburgh Council prepared the Forth Estuary LFRMP for the first six-year implementation cycle from 2016 to 2022 (The City of Edinburgh Council, 2016). Falkirk Council then replaced the City of Edinburgh Council as the lead authority for the Forth Estuary Local Plan District and produced the second LFRMP for the second six year-implementation cycle from 2022-2028 (Falkirk Council, 2022).

Within the most recent LFRMP (Falkirk Council, 2022), the Grangemouth area falls within PVA 02/10/10 (Falkirk and Grangemouth). For the PVA, a number of target areas have been identified, with the following outlining the Grangemouth Flood Protection Scheme as the key action to manage flood risk in the area (the Scheme):

- Carron and Carronshore (target area 211)
- Falkirk (target area 228)
- Grangemouth West (target area 232)
- Larbert and Stenhousemuir (target area 243)
- Polmont, Redding and Westquarter (target area 308)
- The Grangemouth area further extends into PVA 02/10/11 Bo'ness in the LFRMP, which includes the target area Grangemouth East (target area 262), which also references the Scheme as a key action for managing flood risk.

For each target area, further information about the development of the Scheme, including a description, funding and coordination details is described in the LFRMP.

### 1.3.4 Current Flood Risk Around Grangemouth

Since 2016, detailed hydrological modelling has been undertaken and the extent of flood risk across the area subject to development of the Scheme identified. Figure A1.2 in Appendix A shows the areas at risk from a 1 in 200-year period (combined fluvial and tidal) covering the Grangemouth and Carron-Carronshore-Bainsford areas (unpublished draft Hydraulic Modelling Report, Jacobs) (refer to Chapter 10: Water Environment, Section 10.3.6.4 for details). Figure A1.3 in Appendix A shows the Flood Cells and Working Areas, while Appendix Figure A1.4 shows the Scheme Components.
Fluvial flood risk (i.e. from rivers breaching banks) along the River Avon is predominantly located around the sparsely populated Wholeflats Road area, with tidal flood risk dominating the lower reaches of the river. Fluvial flood risk from both the River Carron and Grange Burn (which have been heavily modified over the past 200 years) is in more intensely populated urban areas. Both these watercourses are also influenced by tides in their lower reaches.

The main receptors at risk of flooding include:

- residential and non-residential properties;

- infrastructure including buildings, roads and open/ green spaces;
- utility infrastructure;
- Port of Grangemouth;
- refinery and petrochemical plant; and
- environmentally sensitive sites such as:
  - Firth of Forth Special Protection Area (SPA)
  - Firth of Forth Site of Special Scientific Interest (SSSI)
  - Firth of Forth Ramsar Site
  - Antonine Wall World Heritage Site
  - Antonine Wall Scheduled Monument

### 1.3.5 Flooding Around Grangemouth

The Grangemouth area has an extensive history of flood events that have occurred since the 1920s. Some of the known key flood events that the Grangemouth area has experienced are provided in Table 1-1 (Falkirk Council, 2023a). Example images of flooding events are provided in Photograph 1-1 and Photograph 1-2.

**Table 1-1: History of Key Known Flooding Events Around Grangemouth**

| Source of flooding | Date | Description of flooding/event |
|---|---|---|
| Snow melt and rainfall | 2022 | Flooding around Dorrator Bridge and Falkirk Golf Course and various other locations along the River Carron. Grange Burn very high and surface water flooding to Zetland Park. |
| High intensity thunderstorm | 2020 | Flooding from the Polmont/ Westquarter Burns at Cadgers Brae/ Klondyke and Beancross resulted in properties being inundated. Disruption to roads and railway network, flooding from the River Avon on Wholeflats Road. Highest ever flow recorded on the River Avon at Polmonthill. Surface water flooding in parts of Grangemouth. |
| River Carron | 2020 | Widespread flooding of the River Carron catchment, closure of Stirling Road and properties at Threepwood were flooded. |
| High intensity thunderstorm | 2019 | Flooding from the Polmont Burn at Klondyke resulted in the Premier Inn and Brewers Fayre being flooded. Disruption to roads and railway network. |
| Grange Burn | 2018 | Predicted tide level of 3.93 m Above Ordnance Datum (AOD) caused water levels in the Grange Burn to rise significantly and come within centimetres of bank top and bridge structure. |
| Tidal Surge | 2014 | Tidal surge coupled with high tide was predicted to affect the Forth Estuary, very high water levels on the Grange Burn. |
| Grange Burn | 2013 | Tidal surge coupled with high tide was predicted to affect the Forth Estuary, very high water level in the Grange Burn and some flooding within the Port and Petrochemical complex. |
| River Carron | 2011 | Blocked culvert at the Chapel Burn led to flooding of properties in the vicinity. |
| Westquarter Burn/ Polmont Burn | 2011 | Significant flooding across the Falkirk/ Grangemouth area, flooding at Beancross/ Klondyke and Reddoch Road. |
| River Carron | 2006 | Widespread flooding throughout the Falkirk area with residential and business properties affected. Larbert bus depot impacted and Anchor Burn footbridge was washed away. Closure of A883 at Checkbar, five properties flooded at Threepwood (River Carron). Carronside Place in Dunipace evacuated amid fear of flooding. Flooding of the Tor Burn affected Bogend Road. |

| Source of flooding | Date | Description of flooding/event |
|---|---|---|
| River Carron/Chapel Burn | 2002 | 22 properties flooded on Alloa Road in Stenhousemuir. |
| Forth Estuary | 1959 | Grangemouth Docks flooded with highest tide recorded at 4.47 m. |
| Grange Burn | 1927 | Abbots Road, Kerse Road and Jackson Avenue flooded. |
| Grange Burn | 1926 | Sudden rise of 1.67 m of water level in Grange Burn, flooding was recorded on Jackson Avenue at Grangemouth, rising approximately 0.9 m above the ground level. |

**Photograph 1-1: Flooding on the River Carron between Stirling Road and the Old Carron Works (February 2022)**

**Photograph 1-2: Flooding at Beancross (August 2020)**

### 1.3.6 Existing Flood Protection Interventions Around Grangemouth

There are several existing flood protection measures in the Grangemouth area. These comprise a variety of forms, including earth embankments, gabion baskets, rock revetments, rock groynes, masonry/ concrete walls, sheet piles and rubble causeways. Table 1-2 presents a summary of the lengths of flood defences and their grades across the River Carron, Grange Burn, River Avon and Forth Estuary (Halcrow, 2012).

**Table 1-2: Length of Existing Flood Protection Interventions Across the River Carron, Grange Burn, River Avon and Forth Estuary (Grade 1 - Very Good to Grade 5 - Very Poor)**

| | Total Length (m) | Grade 1 Flood Defence | Grade 2 Flood Defence | Grade 3 Flood Defence | Grade 4 Flood Defence | Grade 5 Flood Defence | No Flood Defence |
|---|---|---|---|---|---|---|---|
| River Carron | 13,720 | 0 | 476 | 4,091 | 2,894 | 1,479 | 4,780 |
| Grange Burn | 10,348 | 0 | 3,748 | 2,422 | 442 | 66 | 3,670 |
| River Avon | 7,500 | 0 | 0 | 427 | 3,131 | 977 | 2,965 |
| Forth Estuary | 12,240 | 0 | 2,955 | 3,039 | 3,650 | 605 | 1,991 |
| Total | 43,808 | 0 | 7,179 | 9,979 | 10,117 | 3,127 | 13,406 |

In addition, there is a 2,040 m long flood relief channel in Grangemouth, commencing at an overflow weir on the Grange Burn and terminating at the downstream confluence with the River Avon. As part of the flood relief channel scheme (which was constructed in the late 1960's), embankments were constructed along Grangeburn Road.

Scottish Canals also extended the Forth & Clyde Canal to Glensburgh by incorporating a short waterway known as the Queen Elizabeth II Canal as part of the development of the Helix (park) green space. An embankment was constructed at the rear properties/land that back onto the canal extension, forming a further flood defence in this area.

### 1.3.7 Objectives of the Scheme

Objectives were set for the Scheme at the start of its development, covering different themes including general, social, economic, environmental, hydraulic and technical (Falkirk Council, 2023b), as set out in the following subsections.

#### 1.3.7.1 General Objectives

- To develop a Flood Protection Scheme (the Scheme) in accordance with measures set out in the Forth Estuary Flood Risk Management Strategy and Local Flood Risk Management Plan to reduce flood risk at Grangemouth.
- The Scheme will be promoted under the FRM Act.
- The Scheme will consider all possible practical options for reducing flood risk.
- The Scheme will provide multiple benefits to the local community.

#### 1.3.7.2 Social Objectives

- The Scheme meets the goals and values of Falkirk Council, namely by:
  - Further developing a thriving sustainable and vibrant economy.
  - Continuing to improve the health, safety and well-being of citizens and communities.
  - Increasing efforts to tackle disadvantage and discriminations.
  - Enhancing and sustaining an environment in which people want to live and visit.
  - Promoting public service, performance and partnership.
- The Scheme is aligned with Falkirk Council's priorities set out in Falkirk Council's Corporate Plan and Development Services – Service Performance Plan.
- The Scheme is compliant with Falkirk Council's Strategic Outcomes and Local Delivery Plan.
- Community benefits will be incorporated into the Scheme.

#### 1.3.7.3 Economic Objectives

- The Scheme has a Benefit Cost Ratio (BCR) greater than one.
- An Economic Assessment is undertaken to evidence the economic benefit and cost associated with the Scheme. This assessment is produced prior to the outline design stage.
- The preferred Scheme represents the best value for money for Falkirk Council.
- The Scheme is delivered in line with the National Planning Framework Action Program for the Grangemouth investment zone.
- The Scheme aims to increase development activity in the Falkirk/Grangemouth corridor such as Falkirk Tax Incremental Finance initiative.
- The Scheme provides a platform for the regeneration of Grangemouth.

#### 1.3.7.4 Environmental Objectives

- Achieves a neutral impact on the environment.
- Incorporates appropriate natural flood management measures, where feasible.
- Maximises environmental benefits where feasible.
- Delivered sustainably with the following aims:
  - Minimise construction waste
  - Maximise the reuse of materials
  - Adopt low carbon construction strategies

– Minimise carbon footprint where feasible.

#### 1.3.7.5 Hydraulic Objectives

- The Scheme reduces overall flood risk.
- The Scheme delivers the required level of protection.
- The Scheme will not materially increase flood risk to residential and non-residential properties in Grangemouth.

#### 1.3.7.6 Technical Objectives

- The Scheme is technically viable.
- Residual flood risk will be documented and identified to Falkirk Council.

## 1.4 Habitats Regulations Appraisal

The Scheme has been subject to a Habitats Regulations Appraisal (HRA) in relation to potential adverse effects on the integrity of European designated nature conservation sites. The HRA is reported in a separate document, which defines the compensatory measures required to address disturbance impacts on the Firth of Forth Special Protection Area, however, the main issues considered therein are also discussed in Chapter 7: Biodiversity.

## 1.5 Positive Effects for Biodiversity

In addition to mitigating potentially significant effects on the environment associated with construction and operation of the Scheme at the EIA stage, since the publication of NPF4 in February 2023, all EIA development is required to achieve positive effects for biodiversity. The approach to achieving positive effects for biodiversity for the Scheme is provided within Appendix B7.4 and as set out in Chapter 7: Biodiversity of this EIA Report.

## 1.6 Document Structure

This EIA Report presents the findings of the EIA process undertaken for the Scheme. Table 1-3 sets out the structure of the EIA Report and lists what is included in each chapter. As far as is practicable, the chapters are written in a non-technical style to make the EIA Report accessible to a wide, non-specialist audience.

**Table 1-3: Structure of the EIA Report**

| EIA Report Component | Description |
|---|---|
| **Non-Technical Summary (NTS)** | |
| Non-Technical Summary (NTS) | Summary of the EIA Report in non-technical language. This is available as a separate document. |
| **Volume 1: Main Report** | |
| Chapter 1: Introduction | Provides an overview and the background to the Scheme, including the need for the Scheme. |
| Chapter 2: Legislative and Regulatory Framework | Provides the legislative and regulatory background to the Scheme. |
| Chapter 3: Environmental Impact Assessment Methodology | Provides an overview of the EIA assessment process, setting out the environmental parameters considered, and explaining how the assessment of environmental impacts and effects was undertaken. |
| Chapter 4: The Scheme | Provides a description of the Scheme and the Scheme evolution and consideration of alternatives. |

| EIA Report Component | Description |
|---|---|
| Chapter 5: Stakeholder Engagement | Summarises the EIA stakeholder engagement, consultation process and provides a summary of the key issues raised and how these have been taken into account. |
| Chapter 6: Population and Human Health<br>Chapter 7: Biodiversity<br>Chapter 8: Noise and Vibration<br>Chapter 9: Landscape and Visual<br>Chapter 10: Water Environment<br>Chapter 11: Soils, Geology and Land Contamination<br>Chapter 12: Air Quality and Climate<br>Chapter 13: Cultural Heritage<br>Chapter 14: Traffic and Transportation | Chapters 6 to 14 report the specialist environmental parameters/factors assessed and provide the following:<br>• An introduction to the subject area<br>• Policy and legislative framework<br>• The approach and methods used in the assessment, including any limitations to the assessment<br>• Baseline conditions<br>• Potential impacts/effects of the Scheme<br>• Mitigation<br>• Residual effects of the Scheme (taking account of proposed mitigation)<br>• Monitoring<br>• References |
| Chapter 15: Cumulative Effects | Provides details of the overall (cumulative) effects of the Scheme in relation to receptors affected by impacts from multiple disciplines and potential cumulative effects with other developments in the area. |
| Chapter 16: Schedule of Environmental Commitments | Chapter 16 details the measures envisaged to prevent, reduce and offset any significant adverse effects on the environment, as identified in each of the environmental topic chapters (Chapters 6-14). |
| Chapter 17: Summary of Residual Effects | Chapter 17 summarises the significant residual effects, associated mitigation and monitoring. |
| **Volume 2: Appendices** | |
| Appendix A | Scheme figures. |
| Appendix B | Technical chapter figures and reference information, such as calculations and detailed background data. Appendix number corresponds to the relevant EIA Report chapter (e.g. Figure B7.1 relates to Chapter 7). |
| Appendix C | Technical chapter supporting information. |

## 1.7 Statement of EIA Quality

The EIA was undertaken, managed and compiled by Jacobs, an Institute of Environmental Management and Assessment (IEMA) Registered EIA Quality Mark Company. Relevant expertise and qualifications of the assessment team are provided in Table 1-4.

**Table 1-4: Jacobs Lead EIA Contributors, Qualifications and Experience**

| Role / Chapter | Name | Qualifications | Years of Professional Experience |
|---|---|---|---|
| EIA Management | Pauline Graham (Coordinator) | MSc, BSc (Hons), MIEnvSc | 28 |
| | Danny McCluskey (Author / Coordinator) | MSc, BSc (Hons), CEnv | 17 |
| | Adam Boyden (Coordinator) | BSc (Hons), MSc, CEnv MIEMA | 28 |
| | Carolyn Francis (Reviewer) | PhD, BA (Hons), CEnv, MIEMA | 34 |

| Role / Chapter | Name | Qualifications | Years of Professional Experience |
|---|---|---|---|
| | Abbie Bell (Assistant coordinator) | MA (Hons), MSc, AMIEnvSc | 2 |
| Legislative and Regulatory Framework | Iain Pattenden | BSc (Hons), MSc, MRTPI, MRICS, PIEMA | 24 |
| | Danny McCluskey | MSc, BSc (Hons), CEnv | 17 |
| Population and Human Health | Danny McCluskey | MSc, BSc (Hons), CEnv | 17 |
| | Jenny Wade | BA (Hons) MSc MPH CEnv MIEMA, Associate Practitioner FPH | 21 |
| Biodiversity | Rosanna Mooney | BSc (Hons), MRes, MCIEEM, MRSB, CBiol | 11 |
| | Matthew Pannell | B.For.Sc, CEnv, MCIEEM | 20 |
| Noise & Vibration | Richard Stait | BSc, PgDip, MIA | 28 |
| | Laura Lopez | BSc, MSc | 8 |
| Landscape and Visual Impact Assessment | Jeni Rowe | BA, Grad Dip, CMLI | 23 |
| | Maria Klimek | BA (Hons), BA (H), CMLI | 11 |
| | Mark Lancaster | BA (Hons), CMLI | 34 |
| Water Environment | Mark Uren | BSc (Hons), MSc | 9 |
| | Ian Griffin | PhD, BSc (Hons), CEnV, CWEM, MCIWEM | 21 |
| | Rebecca Westlake | PhD, LLM, MSc, BSc, CSci, CMarSci, MIMarEst | 24 |
| | Vanina Saint-Martin | MSc | 22 |
| Soils, Geology and Land Contamination | Will Huston | MSc, BSc (Hons), CGeol (FGS), CSci (FGS) | 25 |
| | Jacqueline Jones | BSc (Hons), MIEnvSc | 22 |
| | Abigail Urquhart | MCs, BSc (Hons), AMIEenvSci | 3 |
| Air Quality and Climate | Steven Byrne | MSc, BSc (Hons), MIAQM | 23 |
| | Sam Pollard | MSc, BENg, MIAQM, MIEnvSci, CENnv | 20 |
| Cultural Heritage | Aisling Mulcahy | MA, PgDip | 20 |
| | Michal Wosinski | MA | 11 |
| Traffic and Transportation | David Marshall | MSc, BSc | 9 |
| | Alan Kerr | BEng, CEng, MCIHT | 23 |

## 1.8 Opportunity for Comment/Representation

This EIA Report has been published along with the Non-Technical Summary and other Scheme documents to allow any person to comment/make representation as required. All documents can be viewed online at http://www.grangemouthfloodscheme.com/scheme-documents.

Printed copies of the documents can be inspected or viewed without payment of fee at the following Falkirk Council office:

Falkirk Council
Falkirk Stadium
4 Stadium Way
Falkirk
FK2 9EE

Copies of the EIA Report may be purchased at a cost of £1,320 for a printed set (including VAT) by writing to Falkirk Council, Falkirk Stadium, 4 Stadium Way, Falkirk, FK2 9EE. Alternatively, requests can be made by email to grangemouthfps@falkirk.gov.uk.

Copies of the Non-Technical Summary of the EIA Report are available free of charge on request by writing to the same postal address or email address noted above.

Any person wishing to make any representations about the EIA Report or any of the Scheme documents may do so via email at **objectionsgfps@falkirk.gov.uk** or in writing to the following address before 16 June 2024:

Chief Governance Officer
GFPS Objections
Falkirk Council
The Foundry
4 Central Boulevard
Central Park
Larbert
FK5 4RU

## 1.9 References

European Commission (1985) 'Directive 85/337/EEC regarding the assessment of the environmental effects of certain public and private projects.' [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31985L0337 (Accessed March 2023)

European Commission (1997) Directive 97/11/EC regarding the assessment of the environmental effects of certain public and private projects. [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31997L0011 (Accessed March 2023)

European Commission (2003) Directive 2003/35/EC regarding the assessment of the environmental effects of certain public and private projects. [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32003L0035 (Accessed March 2023)

European Commission (2006) Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy. [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060 (Accessed March 2023)

European Commission (2009) Directive 2009/31/EC regarding the assessment of the environmental effects of certain public and private projects. [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0031 (Accessed March 2023)

European Commission (2011) Directive 2011/92/EU regarding the assessment of the environmental effects of certain public and private projects. [Online] Available at: https://eur-lex.europa.eu/legal-content/PL/TXT/?uri=celex%3A32011L0092 (Accessed March 2023)

European Commission (2014) Directive 2014/52/EU regarding the assessment of the environmental effects of certain public and private projects. [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052

Falkirk Council (2022). Local Flood Risk Management Plan Cycle 2: Forth Estuary Local Plan District. [Online] Available at: https://www.edinburgh.gov.uk/downloads/file/32867/estuary-local-flood-risk-management-plan-2022-2028 (Accessed March 2023)

Falkirk Council (2023) [Online]Available at: https://www.falkirk.gov.uk/news/article.aspx?aid=7330 (Accessed May 2023)

Falkirk Council and Jacobs (2023) Grangemouth Flood Protection Scheme. [Online] Available at: https://www.grangemouthfloodscheme.com/ (Accessed January 2023)

Falkirk Council and Jacobs (2023a) Grangemouth Flood Protection Scheme: Historic Flooding. [Online] Available at: https://www.grangemouthfloodscheme.com/historicflooding (Accessed January 2023)

Falkirk Council and Jacobs (2023b) Grangemouth Flood Protection Scheme: Objectives. [Online] Available at: https://www.grangemouthfloodscheme.com/objectives (Accessed March 2023)

Forth Ports Group (2023) Grangemouth. [Online] Available at: https://www.forthports.co.uk/our-ports/grangemouth/ (Accessed January 2023)

Halcrow (2012) Grangemouth Assessment of Flood Risk Asset Condition Survey: River Carron, Grange Burn, River Avon and Forth Estuary (FC internal document)

INEOS (2022) INEOS @ Grangemouth. [Online] Available at: https://www.ineos.com/sites/grangemouth/about/ (Accessed January 2023)

Intergovernmental Panel on Climate Change (IPCC; 2023) 'IPCC Sixth Assessment Report - Summary for Policymakers.' [Online] Available at: https://www.ipcc.ch/report/ar6/wg2/chapter/summary-for-policymakers/ (Accessed September 2023)

Scottish Government (2009) Flood Risk Management (Scotland) Act 2009. [Online] Available at: https://www.legislation.gov.uk/asp/2009/6/contents (Accessed August 2023)

Scottish Government (2010) The Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Regulations 2010. [Online] Available at: https://www.legislation.gov.uk/ssi/2010/426/contents/made (Accessed August 2023)

Scottish Government (2017a) The Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Amendment Regulations 2017. [Online] Available at: https://www.legislation.gov.uk/ssi/2017/112/made (Accessed August 2023)

Scottish Government (2017b) The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended). [Online] Available at: https://www.legislation.gov.uk/ssi/2017/115/contents/made (Accessed August 2023)

Scottish Government (2021) Electoral Ward: Grangemouth. [Online] Available at: https://statistics.gov.scot/atlas/resource?uri=http%3A%2F%2Fstatistics.gov.scot%2Fid%2Fstatistical-geography%2FS13002937 (Accessed January 2023)

Scottish Government (2022) Marine licensing and consenting: making a representation on an application. [Online] Available at: https://www.gov.scot/publications/marine-licensing-and-consent-making-a-representation-on-an-application/ (Accessed March 2023)

Scottish Government (2023) National Planning Framework 4. The Scottish Government, February 2023. [Online] Available at: https://www.gov.scot/publications/national-planning-framework-4/ (Accessed March 2023)

SEPA (2015a) Flood Risk Management Strategy: Falkirk, Grangemouth, Lauriston, Denny, Redding, Dunipace, Cumbernauld, Carron and Stenhousemuir (Potentially Vulnerable Area 10/11). Available at: https://www2.sepa.org.uk/frmstrategies/pdf/pva/PVA_10_11_Full.pdf (Accessed January 2023)

SEPA (2015b). Flood Risk Management Strategies. [Online] Available at: https://www2.sepa.org.uk/frmstrategies/ (Accessed March 2023)

SEPA (2018a) Flood Risk Management in Scotland: 2018 Consultation on Potentially Vulnerable Areas. Consultation outcome report. [Online] Available at: https://www.sepa.org.uk/media/375826/frm-in-scotland-pva-2018_consultation-outcome-report.pdf (Accessed March2023)

SEPA (2018b) Flood Risk Management in Scotland 2018 Publication of NFRA and PVAs: FAQ's. [Online] Available at: https://www.sepa.org.uk/media/399172/nfra-faq.pdf (Accessed January 2023)

SEPA (2018c). SEPA National Flood Risk Assessment (NFRA) Data Explorer Tool. [Online] Available at: https://www.sepa.org.uk/data-visualisation/nfra2018/ (Accessed January 2023)

SEPA (2023) Climate change allowances for flood risk assessment in land use planning: Version 2. [Online] Available at: https://www.sepa.org.uk/media/594168/climate-change-guidance.pdf (Accessed March 2023)

The City of Edinburgh Council (2016) Local Flood Risk Management Plan: Forth Estuary Local Plan District. [Online] Available at: https://www.edinburgh.gov.uk/downloads/file/32870/local-flood-risk-management-plan (Accessed March 2023)