River Ness Flood Alleviation Scheme (Tidal Section)

Environmental Management Plan (Post-Planning)

May 2013

The Highland Council

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Comhairle na Gàidhealtachd

Mott MacDonald

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Contents

1. Introduction

1.1 Project Overview

The Highland Council applied to Scottish Government in December 2011 for funding towards developing the River Ness Flood Alleviation Scheme (FAS) for the City of Inverness.

The flood defences are to be developed between Ness Bridge and the mouth of the River Ness (shown in Figure 1.1).

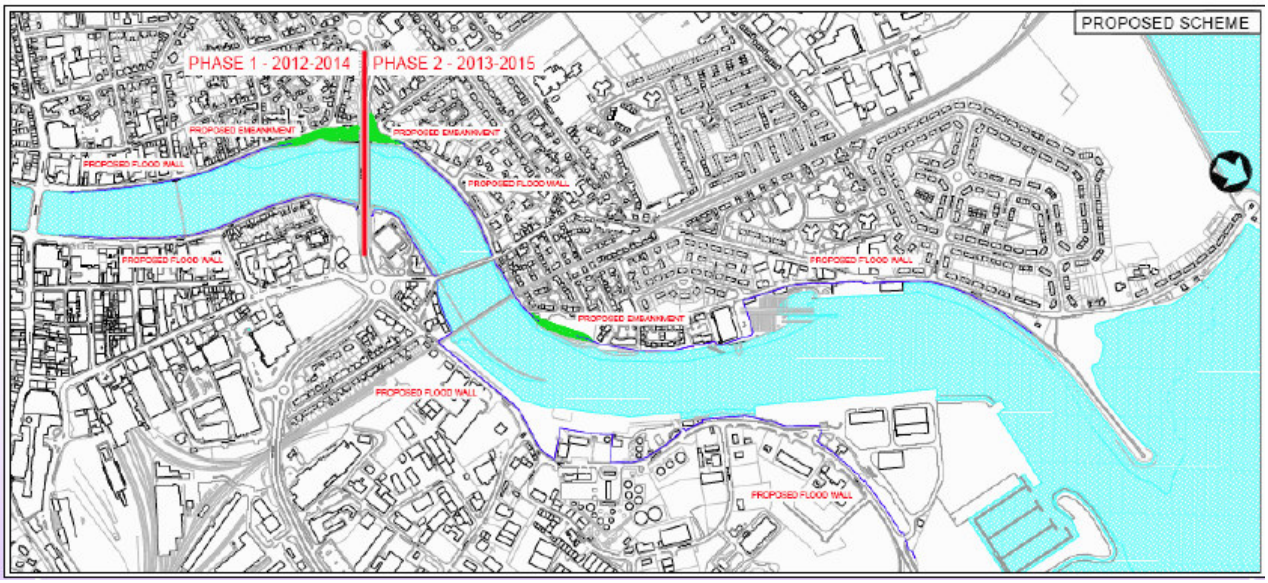


Figure 1.1: City of Inverness proposed flood alleviation scheme phases

The section of the River Ness between Ness Bridge and the mouth of the river (hereafter referred to as the Tidal Section) obtained a Flood Prevention Order in 2008 under the 1961 Flood Prevention Act and Planning Permission in 2008/9. The proposals include raising the existing flood defences along both banks of the river in the form of short walls and embankments. This scheme is designed to protect 795 residential properties and 188 non-residential properties from a 1:100 return period flood (including allowances for climate change and freeboard[1]).

In January 2012 Scottish Government agreed to fund 80% of the scheme costs which are currently estimated at £21M, with the Highland Council providing the remainder.

[1] Often defined as the difference between the flood defence level and the design flood level. It can also however be the difference between the design flood level and the finished floor levels of any development. A minimum freeboard of 500 mm to 600 mm is recommended by SEPA. Freeboard is required to account for (a) the uncertainties involved in flood design and (b) physical imponderables such as post-construction settlement or wave action. CIRIA Report C624 also recommends a freeboard allowance of 600 mm. Any allowance for climate change should be independent of the freeboard allowance. (source: www.sepa.org.uk)

Construction is currently programmed to commence towards the end of 2012/beginning of 2013 and is being progressed in two phases. 'Phase 1' includes the central areas of Bank Street and Huntly Street, and 'Phase 2' will continue downstream of Friars Bridge.[2]

1.2 Planning Conditions

A planning application, to construct Riverbank Defences on both banks of the River Ness between Ness Bridge and the Mouth of the River (Inverness), was submitted to The Highland Council in September 2008 together with the documents that comprise the River Ness Flood Prevention Scheme Environmental Impact Assessment.

Planning permission was granted on the 18th December 2009 (reference Number 08/00862/FULIN) under the Town and Country Planning (Scotland) Act 1997 as amended by the Planning Etc. (Scotland) 2006 Act.

Condition 6 of the Planning Consent outlined the requirement for a full site specific Environmental Management (Construction Phase) Plan hereafter referred to as EMP.

The Highland Council granted planning permission for the flood defences along the lower reaches of the River Ness subject to 14 No. conditions.

A summary of the key environmental requirements of the planning consent conditions is provided below (a copy of the full planning consent can be found in Appendix A).

- The development shall be constructed in accordance with the provisions of the application, all mitigation as set out in the Environmental Statement and the submitted plans.
- A programme of archaeological work to record any archaeological features affected by the proposed development.
- A full site specific 'surface water' scheme to be prepared and submitted for approval by the Planning Authority and SEPA.
- A full site specific Environmental Management Plan (Construction Phase) to be prepared and submitted for the Planning Authorities approval.
- Piling operations in the area between the pier south-east of Thornbush Quay and the river mouth should be avoided during the most sensitive period for dolphins (May – September).
- Measures must be put in place to mitigate the impacts of construction on valued wildlife.
- Trees that are to be felled or lopped must be surveyed in advance for squirrels, squirrel dreys or signs of squirrel activity and also for their potential as bat roosts prior to any work being carried out.
- A suitably qualified Aboroculturalist shall be appointed by the developer to advise and supervise all construction works in the vicinity of tree roots with a clear responsibility for safeguarding all riverside trees.

[2] http://www.highland.gov.uk/yourenvironment/flooding/06aRiverNessFloodAlleviationSheme.htm

1.3 Aims of the EMP

The aim of the EMP is to clearly set out the following:

- To meet the requirements of Planning Permission 08/00862/FULIN;
- To define the environmental roles and responsibilities of the key stakeholders;
- To outline the monitoring, reporting and reviewing procedures that will be adhered to for the duration of the construction programme;
- To detail the required environmental permits and consents; and
- To establish the environmental requirements that shall be adhered to during the construction phase to limit the impact of the construction phase of the project on the environment.

This EMP sets out how the residual environmental risks and opportunities that were identified in the Environmental Impact Assessment (EIA) Environmental Statement Volume 2: Technical Report will be managed during the construction phases of the River Ness FAS.

A Site Waste Management Plan (SWMP) (Appendix D) has been produced. The SWMP Regulations currently do not apply to Scotland, however to support sustainable development and manage waste appropriately a SWMP has been produced. This plan aims, to ensure that all construction waste is managed, stored and disposed of in an appropriate manner by appropriate contractors in accordance with all relevant legislation and shall be used by the Contractor and regularly updated by the Contractor. The Contractor's use of the SWMP will be monitored by the Environmental Clerk of Works.

The EMP has been developed to provide a clear and concise framework to provide sound environmental management on the River Ness Flood Alleviation Scheme and to draw together the information and work already undertaken. The EMP is based on:

- The Highland Council Guidance Note: Construction Environmental management process for Large Scale Projects (August 2010);
- CIRIA Environmental Good Practice Site Guide, Environment Agency (2010);
- The principles of ISO 14001: 2004 the international standard for Environmental Management Systems; and
- The Institute of Environmental Management and Assessment Practitioner Volume 12: Environmental Management Plans (December 2008).

The EMP should be made available to all members of the Construction Team (including their sub-contractors) to allow an understanding of their roles and responsibilities in attaining the necessary level of environmental performance.

NOTE: This is a working document to be updated regularly as the project progresses.

Actions arising from the EMP, planning conditions or current best practise have been tabled in a Schedule of Mitigation (Appendix C to this report). The Schedule of Mitigation is a checklist to confirm that the key environmental requirements for the scheme are being addressed. Progress of the scheduled actions will be reviewed periodically during the project by the Environmental Clerk of Works.

2. The Proposed Development

2.1 Introduction

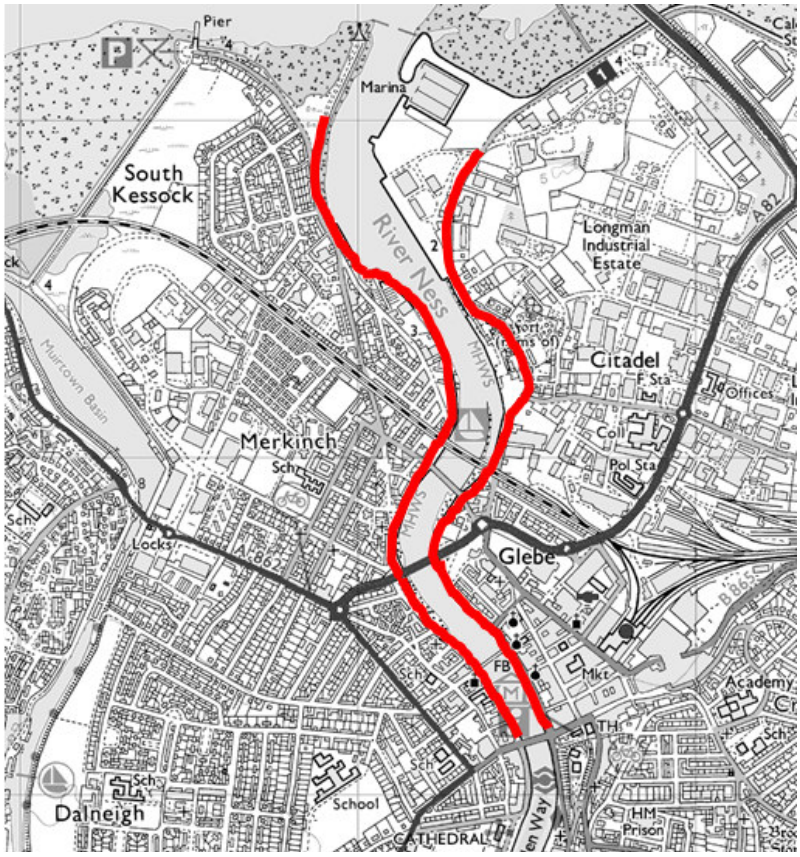
The flood defence scheme on the River Ness will provide protection for properties at risk of flooding from a 1:100 year return period flood within the riverside area of the City of Inverness, 2 kilometres downstream from the Ness Bridge on both banks of the river.

There will be twelve sections of flood defences that will be approximately 1 metre in height. There is one significant exception to this at South Kessock where the wall height required is 1.4 metres. Where the location has been proven to be suitable, landscaped moundings will be used for the flood defences instead of a wall.

2.2 Site Description

The site extends along the east and west banks of the River Ness downstream of the Ness Bridge. A map of the location is provided in Figure 2.1.

Figure 2.1: River Ness flood alleviation scheme – site extents



2.3 The River Ness FAS

The River Ness FAS will comprise a flood defence in the form of walls and embankments, along the banks of the River Ness from Ness Bridge to the river mouth by the harbour. Refer to scheme drawings in Appendix B for further details.

The scheme is required to protect the city centre of Inverness, comprising a mix of residential and business properties, from fluvial and tidal flooding from the River Ness and to ensure that other sources of flood risk are not increased. The level of flood protection will be up to the 1:100 year return event (1% Annual Exceedance (Joint) Probability (AEP[3]) and includes an allowance to account for climate change.

2.4 Key Components of the Development

2.4.1 Phase 1

The key elements of Phase 1 of the River Ness FAS will comprise the following:

- Wall between 0.8 and 1.2m height, with railing to bring minimum height to 1.1m.
- Wall is reinforced concrete, clad in pink Tarradale sandstone with a decorative coping.
- Wall width 0.6m
- Flood gates at each end of Greig St footbridge.
- Reinforced concrete retaining wall foundation, with a pile and shallow beam foundation around existing trees.
- Sheetpiled cut off wall on Bank St and Huntly St routed around existing trees to form root protection zones
- Landscaped embankment at Friars Green to 1.1m.
- Streetscaping – Caithness flagstone paving on footways, foorways made wider, roads resurfaced. Some shared surfaces. Tree corridor retained and enhanced on west bank. Reduced car parking areas.

2.4.2 Phase 2

The key elements of Phase 2 of the River Ness FAS will comprise the following:

- In the harbour area the wall will be patterned concrete, formed to have the appearance of stonework,
- In other areas it will be faced with stone as in Phase 1.
- Gates will be installed at access points in the harbour and Thornbush Quay.

[3] NOTE: 1% AEP event means that you could get flooding in for example a joint 50 year rainfall and 30 year fluvial event.

2.5 Indicative Programme of Works

The start date of the construction works is subject to the mobilisation of the Contractor. The enabling works including the utility diversion works are proposed to commence September 2012.

An indicative programme is outlined in **Table 2.1** below:

Table 2.1: Indicative Construction Programme

Activity	Estimated Start	Estimated Completion
Enabling works (utility diversion works)	October 2012	March 2013
Construction Phase 1	July 2013	December 2014
Construction Phase 2	October 2013	December 2015

3. Approach to Environmental Management

3.1 Introduction

The River Ness FAS Project team is a collaboration of The Highland Council, contractors and consultants, providing an integrated design and construction team.

The Highland Council is the developer of the River Ness FAS and Mott MacDonald is the design consultant providing design, environmental and planning services.

The scheme contractors have still to be appointed.

This EMP has been developed to manage any construction issues and to manage environmental impacts. The following sections outline the management structure to be applied and key roles and responsibilities.

3.2 Environmental Management Systems

The appointed Contractor should hold ISO14001 certified Environmental Management systems. The project will operate within the overall framework of these management systems as well as under the requirements of The Highland Council.

3.3 Management Structure

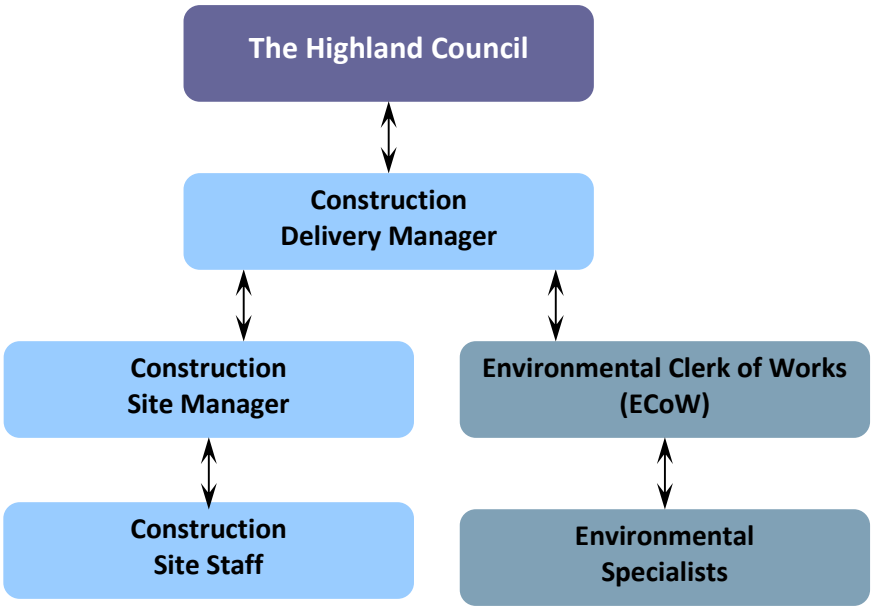


Figure 3.1: Organogram

3.4 Roles and Responsibilities

Various organisations have involvement in the safe and environmentally responsible delivery of this project. The following key roles have been identified within these organisations to ensure that effective control is established both on site and in the back office support structure, to manage activities within the framework of this Environmental Management Plan.

3.4.1 The Highland Council

The Highland Council shall provide general oversight and strategic direction to the project.

3.4.2 Contractor

The **Construction Contractor** shall execute the work and take on direct responsibility for updating and implementing the EMP.

The **Construction Delivery Project Manager** shall manage and be responsible for all environmental, quality and safety elements of this project and report on all matters to the client.

The **Construction Site Manager** shall be responsible to the **Construction Delivery Project Manager** for the day-to-day running of the project, ensuring all works are completed in line with company procedures and the Plan.

3.4.3 Environmental Clerk of Works (ECoW)

The Highland Council will appoint an on-site ECoW to supervise operations on site during construction ensuring that best environmental practice is adhered to throughout the duration of the works.

The on-site ECoW will be responsible for overseeing the construction contractual requirements of the Planning Consent and the requirements of the EMP. This will be monitored through monthly evaluations of performance against contractual requirements. Central to this role will be the provision of constructive advice on managing environmental issues as they arise.

The **ECoW** will be responsible for ensuring all stakeholders and environmental constraints are managed in line with procedures set out in the Environmental Management Plan. Their role will include:

- the provision of technical guidance on legislative and best practice measures which should be applied to the project;
- monitoring of activities and highlighting areas for improvement;
- provision of materials and information for inductions, training and toolbox talks;
- assistance in the occurrence of environmental incidents;
- ensuring environmental incidents are appropriately reported both internally and to statutory authorities;
- conducting of audits to ensure compliance with the organisation's environmental standards; and
- all employees shall be responsible for implementation of the relevant parts of the Environmental Policy and Environmental Standards.

3.5 Training

The Contractor's staff will be appropriately trained in all aspects of the works to enable the project to be managed in line with their procedures. This training shall include construction, environmental and safety training.

All site personnel and visitors must attend an induction on their first arrival on site. The induction will include basic details of the site environmental arrangements, such as segregation of waste, and how to report any incident or condition with the potential to cause environmental harm. In addition, specific 'toolbox' talks will be delivered to particular staff undertaking relevant operations.

3.6 Reporting Requirements

The **Construction Delivery Project Manager** shall arrange monitoring during construction in accordance with commitments presented set out in planning conditions or environmental consents. A monthly report shall be prepared by the Construction Contractor documenting in brief project progress and any environmental incidents that have occurred.

3.7 Legislative Requirements

All work performed must be carried out in compliance with the relevant requirements of UK environmental law, as applicable to the project. Relevant legislation includes but is not limited to the following:

- Control of Pollution Act (COPA) 1974;
- Environmental Protection Act 1990;
- Environment Act 1995;
- Environment Act 1995;
- Protection of Wild Mammals (Scotland0 Act 2002;
- Nature Conservation (Scotland) Act 2004;
- The Waste (Scotland) Regulations 2005;
- The Waste Management Licensing Amendment (Scotland) Regulations 2003;
- Town and Country Planning (Scotland) Act 1947 as amended;
- Water Environment and Water Services (Scotland) Act 2003.
- Water Resources Act 1991;
- Water (Scotland) Act 1980;

The Environmental Clerk of Works and Contractor will be responsible for complying with all legislative requirements as well as any other requirements specified by the relevant regulatory authorities including the Scottish Environmental Protection Agency (SEPA) and The Highland Council.

Due to the outlined construction programme spanning several years there is an ongoing requirement throughout the construction programme for the Environmental Clerk of Works and Contractor to undertake a review of the relevant existing legislation and regulations (minimum quarterly).

3.8 Reference Documents

- Environmental Statement - Non technical summary
- Environmental Statement - Technical Report
- Environmental Statement - Plates and Figures
- Environmental Statement - Technical Appendices
- The Highland Council Guidance Note Construction Environmental Management (August 2010)
- The Highland Council Planning Application Review: 08/00862/FULIN (8 December 2009)
- River Ness Tidal Section Flood Prevention Scheme 2008 drawings
- 303686 13 A Utilities Diversion Option Report
- River Ness 303686 010 Stakeholder Management Plan
- River Ness FAS: Detailed Design Central Section Design Freeze Document (April 2008)

4. Access and Traffic

4.1 Purpose

A number of roads and cycle and pedestrian paths will be disrupted during the construction phase. This will affect traffic flows, with reduced carriageway widths impacting on road safety in the immediate vicinity of the works. There will be a loss of parking during the construction phase in order to accommodate the construction works. The Contractor shall agree the construction traffic management proposals with the Roads Authority and shall develop and implement a Traffic Management Plan in order to manage and minimise the disruption. Restrictions to construction traffic movements are set out in the Contract document.

4.2 Anticipated Risks

- Construction traffic movements are likely to result in congestion and delays in the local traffic network. Traffic flows will also be affected and there will be health and safety issues associated with reduced carriageway widths.
- Parking facilities will be lost on roads subject to construction works.
- There are health and safety risks to pedestrians and cyclists with the loss of designated cycle and pedestrian ways, and in particular the loss of the safe crossing of the A82 beneath Friar's Bridge. There will also be potential disruption to pedestrian access to suspension bridge at Huntly Street

4.3 Requirements

4.3.1 Construction Vehicles

The Contractor must discuss Traffic Management Plan (TMP) requirements with the Roads Authority and Project Manager to determine the management options with least impact without unduly restricting construction traffic. Construction vehicles will travel routes as identified in the TMP in order to minimise the impact on local traffic.

The timing and frequency of vehicle movements will be managed during the construction phase to ensure that disruption caused by vehicle movements is minimised at peak periods.

4.3.2 Pedestrians

During construction pedestrians will be directed to alternative footways. All pedestrian routes will be accommodated via alternatives where practicable. This will need specific attention with sectioned off walking routes in parts of Douglas Row, where such footways are not continuously provided.

The Contractors procedures will take account of the need to maintain pedestrian access (by all users, including pushchairs, wheelchairs and those wheeling cycles) at each end of the Greig St foot suspension bridge. The crossing of Bank Street will also be maintained where practicable as part of this preserved access throughout the duration of the construction programme.

Any lighting, CCTV or other security measures in place along pedestrian routes will be maintained throughout the construction phase.

The existing pedestrian and cyclist routes below Friars Bridge on each bank are widely used. Therefore provision of alternative or assisted methods for pedestrians and cyclists to cross at Friar's Bridge will be required. Measures to maintain cycle and pedestrian access will be included in the TMP and will be finalised prior to construction activities starting.

4.3.3 Public Transport

The TMP will identify the best construction procedures so as to not impede the bus routes along Bank Street, with the right turn into the city centre maintained, even if the separate turning lane is temporarily suspended.

4.3.4 Parking

Table 5.1 summarises the car parking that will be affected during construction. Care should be taken to mitigate the loss of parking. This will require temporary changes to parking management.

Table 5.1 Temporary (construction) Impact on Car Parking

Road	Estimated parking spaces	Impact	Dates affected	Mitigation*[1]
Gilbert Street / Huntly Place (north of Friars Bridge)	63	All spaces lost on river side	TBC	None – cars may park on surrounding streets
Huntly Place (south of Friars Bridge)	5	All spaces lost on both sides	TBC	Temporary changes to management of resident parking to allow cars to park on surrounding streets
Huntly Street	60	All spaces lost on both sides	TBC	Temporary changes to management of resident parking to allow cars to park on surrounding streets
Riverside Street	7	All spaces lost on both sides	TBC	To Portland Street car park
Bowling Club car park	20	Lost private parking	TBC	To Portland Street car park
Douglas Row	43	All spaces lost on both sides	TBC	To on-street in Friars St; city centre car parks
Bank Street (loading bays only)	-	All loading bays lost on both sides	TBC	Alternative loading arrangements required: possibilities in car parks and Church Street

*[1] – The Construction Contractor will provide alternative space for permit parking places within 500m of their allocated spare.

4.4 Responsibilities

A temporary Traffic Order for construction is currently being progressed (September 2012) by the Highland Council, and a TMP will be developed by the Contractor and approved by The Highland Council prior to construction works starting.

The TMP will be reviewed and updated as required throughout the construction programme. The Highland Council will approve and sign off any future amendments to the Plan throughout the construction programme.

The primary aims of the Traffic Management Plan are to:

- Minimise impacts of the work on the highways, parking and public rights of way
- Minimise disruption to the local road network and pedestrian and cycle access/ paths
- Reduce the risk of accidents

5. Air emissions

5.1 Purpose

Construction activities have the potential to cause dust nuisance to surrounding receptors and result in wider environmental damage if not controlled.

5.2 Anticipated Risks

Potential sources of emissions to air during the construction phase which could affect local air quality include:

- Construction activities which could lead to the generation of dust
- Demolition and excavation which could lead to the generation of dust
- Natural winds or the movement of materials by vehicles and site plant potentially generating dust

The effects of increased dust include:

- Soiling of surfaces, e.g. windows, cars and laundry (effects are generally limited to within 200 metres).
- Adverse affects to existing habitats and species present in the zone of influence

5.3 Requirements

Dust control measures are well developed and are capable of eliminating or reducing emissions to a level such that nuisance is unlikely to occur. The key activities in mitigating dust nuisance are: firstly, to prevent dust from being released (by using techniques that minimise the production of dust); secondly, to prevent the liberation of this dust as far as practicable through dampening and cleaning techniques; and thirdly, to enclose the construction area or protect sensitive receptors.

5.3.1 Construction Traffic

All loads entering and leaving construction sites will be covered. The Contractor will maintain clean roads on all routes that construction traffic use.

On roads vehicles will comply with set emission standards. Vehicles will obey the appropriate speed limit around site and have their engines switched off when stationary. In general construction traffic movement around site will be minimised.

Main haul routes will be dampened and site runoff of water or mud will be prevented. Hard surfacing and effective cleaning of haul routes will further help to reduce dust.

5.3.2 Demolition Works

Water will be used as dust suppressant during demolition works. All chutes will be enclosed and skips will be covered.

5.3.3 General

The Contractor will undertake an assessment of potentially sensitive receptors to dust and plan the site layout accordingly. Also; if activities are planned to be undertaken that have the potential to create dust nuisance the Contractor will advise local sensitive receptors e.g outdoor cafes,

Where specific risks are identified the contractor will implement measures consistent with those identified in the CIRIA Environmental Good Practice Site Guide (C692) 2010 and the recently released CIRIA Environmental good practice on site – pocket book (C715) and in accordance with procedures.

5.4 Responsibilities

The Contractor will be responsible for implementing management measures to minimise air quality problems and causing a nuisance from dust.

The ECoW will undertake regular site inspections of the site in order to determine whether the mitigation measures employed are sufficient to avoid generation of dust nuisance.

The grievance procedure as established by The Highland Council and managed by the Public Liaison Officer will be followed by Contractor to manage any grievances raised with any site staff during the construction phase of the River Ness FAS. The Construction Site Manager will be made aware of any issues involving air quality or dust and implement appropriate measures to minimise the risk as the project progresses.

A Stakeholder Management Plan will be implemented by the Contractor to deal with any complaints with regards to air quality or dust.

6. Cultural Heritage and Archaeology

6.1 Purpose

Inverness has been a centre of political and religious importance since c.2,600 - 1,500 years ago and so there is the potential for undetected archaeological artefacts to be buried on site. Works undertaken as part of construction have the potential to disturb buried items of archaeological and cultural heritage importance. This section outlines the mitigation measures to be undertaken as part of the construction phase.

6.2 Anticipated Risks

There is potential for direct damage to buried artefacts whilst excavating and use of construction plant.

6.3 Requirements

6.3.1 General

The methods of construction that will be employed to construct the flood defences will where possible without avoid the use of vibrator equipment that could destabilise nearby walls or buildings. The foundations of the flood wall will be constructed using sheet piling and this is likely to cause vibration. During piling activities vibration shall be monitored and managed by the construction contractor to avoid causing damage to historic buildings within the vicinity of the works.

If any item of potential archaeological or cultural heritage is found during construction The Highland Council will be notified immediately.

6.3.2 Watching Brief

An archaeological watching brief will be implemented to identify and record any archaeological evidence revealed by excavations during construction work. This will cover the following areas:

- Bank Street;
- Riverside Street;
- Waterloo Place;
- Shore Street;
- Harbour and Cromwell's Fort;
- Huntly Street;
- Gilbert Street;
- Anderson Street;
- Thornbush Quay;
- South Kessock (Cairn Arc).

6.3.3 Artefacts

Any artefacts that are discovered during archaeological fieldwork will be recorded, analysed, and reported following standard Scottish Treasure Trove procedures.

6.3.4 Trees and Aesthetics

Many sections of the River Ness banks have been carefully planted and deliberately enhanced in the late Victorian and Edwardian periods, and the overall effect is now of cultural heritage interest in its own right.

Considerable care will be taken to minimise any damage to the trees and to replant where necessary; and to finish the wall in a sympathetic material to minimise visual impacts on the surrounding Victorian riverside.

6.4 Responsibilities

The Highland Council will appoint a suitably qualified Archaeologist to undertake the watching brief during excavation and construction.

The Site Manager shall ensure that staff are aware of the potential for buried archaeological evidence on site and are briefed properly on procedures should artefacts be uncovered.

Every effort will be made by the Contractor to ensure that changes affecting archaeology are carefully considered, authoritatively based, properly planned and executed, and where possible reversible.

A report on any mitigation work will be produced by the Archaeologist and deposited with any archive material in the National Monuments Record for Scotland, with copies of the report and all digital records also lodged with the Highland Council Historic Environment Record

7. Ecology and Nature Conservation

7.1 Purpose

The River Ness supports a number of species of conservation importance and is connected with sites of European importance. The construction and operation of flood defence structures can have impacts on ecological features beyond the confines of the site itself.

This section draws together the required mitigation requirements for the construction phase.

7.2 Anticipated Risks

Construction activities have the potential to impact on the following ecological features:

- **Bats –** there is a small risk of impact on bats during construction; the main risk is the removal of trees from along the riverbank and lighting from the work compounds.
- **Breeding birds –** the main risk posed to breeding birds during the construction phase is from the removal of trees and general disturbance caused by the works being undertaken in close proximity to any active nests.
- **Fish –** risk posed to fish are mainly from water pollution incidents during the construction phase and any changes that are made to the existing habitat.
- **Marine mammals –** underwater noise and vibration caused by piling activities undertaken at the mouth of the River Ness where it transitions to the Moray Firth have potential to disturb marine mammals; the Moray Firth is known to be used by dolphins.
- **Otters -** no active holts were identified during previous surveys however otters have been known to use the River Ness and have been seen swimming up the river through the city centre. The main risk posed to otters is disturbance from construction activities or injury caused by machinery and tools in the work compounds.
- **Red Squirrels –** the removal of trees that potentially contain red squirrel dreys has the potential to harm red squirrels. In addition to this general construction activities have the potential to disturb any red squirrels in the vicinity of works being undertaken. Red squirrels were not present during the previous surveys therefore the likelihood of impact is considered to be low.

7.3 Requirements

7.3.1 Surveys

A programme of ecological surveys will be developed prior to the start of construction. Once appointed the ECoW will undertake walk-over surveys of the entire site to identify any protected species prior to construction activities starting in 2013.

Throughout the construction period the ECoW will undertake regular walkover surveys prior to work starting in each section to confirm the absence or presence of protected species. The programme will be developed with the Contractor on an ongoing basis throughout the construction period.

7.3.2 Bats

Works near buildings that may be maternity sites or used during hibernation should be programmed so that the more disruptive activities are undertaken in these areas at times when bats are absent or less vulnerable. Table 10.1 provides the optimum times for carrying out these works.

Table 10.1 Optimum Times for Works in Relation to Bat Activity

Bat Usage of Site	Optimum Period for Undertaking Works
Maternity	1st October – 1st May
Summer (not a proven maternity site)	1st September – 1st May
Hibernation	1st May – 1st October
Mating / swarming	1st November – 1st August

All bat species are nocturnal and inappropriate lighting during construction may disturb their routines. If artificial lighting is required it will be appropriately shielded and directed away from any buildings, structures or trees that are potential bat roosts.

7.3.3 Breeding Birds

Efforts will be made to avoid vegetation clearance within the breeding bird season (March to August inclusive). If this is unavoidable a nesting bird survey will be undertaken by the ECoW on the day the vegetation removal is scheduled. If any active nests are discovered the nest will be left in situ and it and a 3 metre buffer area left undisturbed until the chicks have fledged.

7.3.4 Fish

The FAS construction work may result in the formation or removal of habitat patches other than those recorded by the surveys undertaken as part of the ES. Little in-stream work is anticipated other than construction of the outfalls from the drainage system. Efforts will be made to avoid in-river works during the spawning and egg incubation periods (February – June) and will ideally be timed to occur during August and September.

Bankside excavation below Mean High Water Springs (MHWS) level will be undertaken in manageable sized areas (25m lengths) to minimise the risk of bank instability and silt and nutrient run-off. Regular Contractor/ECoW liaison with SEPA and Marine Scotland is required to inform them of project progress.

7.3.5 Marine Mammals

In the area between the pier south-east of Thornbush Quay and the river mouth, specific measures apply to piling activities to avoid any disturbance to bottlenose dolphins:

- Piling will be avoided in this area during May – September.
- An exclusion zone of 500m radius (JNCC 1990 guidelines) will be scanned around the work area for at least 30 minutes prior to the start of piling. If dolphins are observed in the exclusion zone, marine works will be delayed until they have left the area. If dolphins enter the exclusion zone after piling has commenced, marine works will cease until they have left the area.

- A competent officer will monitor for the presence of dolphins within the exclusion zone by scanning the sea both with and without binoculars whilst positioned at a suitable vantage point. This will be done regularly throughout the piling operation. The vantage point shall enable an extensive view of the 500 metre exclusion zone in all directions around the works. The officer shall communicate with the supervising engineer via a dedicated telecommunications device.
- Before piling commences, a warning signal will be made consisting of striking an iron pipe held in the water. The amplitude of this signal will be ramped up gradually to a maximum.
- Piling operations will be confined to states of low tide.
- Blasting will not be permitted.
- Only vibratory pile hammers will be used.

7.3.6 Otters

Otters are nocturnal and susceptible to disturbance. Where otter activity is evident works will not occur until at least one hour after sunrise and after one hour before sunset.

7.3.7 Red Squirrels

Trees to be felled will be checked for red squirrel dreys. If dreys are found and felling is unavoidable, trees will only be felled between October and February, outside the breeding season. Outside this season, a buffer zone of at least a 30 metre radius will be established around the drey.

7.3.8 Japanese Knotweed

There is the possibility that Japanese knotweed is present (it was previously identified at Thornbush Quay in 2005). The Environment Agency produced a Knotweed Code of Practice which is endorsed by SEPA (Environment Agency, 2005). The methods proposed within the Code of Practice will be adhered if the removal of Japanese Knotweed is required.

7.3.9 Habitat

A minimal working corridor will be clearly defined to avoid unnecessary traffic and limit damage to the surrounding area.

Turf will be carefully removed and if stored on site will be covered to prevent wind and water erosion. All turfs will be reinstated where possible. If this is not possible, areas will be re-seeded with appropriate grass species.

An Arboriculturalist has been appointed by the The Highland Council and will provide advice to the Contractor including identifying root protection zones and determining the best method for the removal of trees (where required). The trees lost during construction will be replaced with trees of appropriate species and maturity in suitable areas to enhance the streetscaping and landscaping works.

7.4 Responsibilities

- The Highland Council are responsible for appointing the ECoW prior to construction.
- The ECoW will develop the Ecological Monitoring Programme with the Contractor, this will be updated throughout the construction phase.
- The ECoW will undertake the pre-commencement surveys, and the ongoing site monitoring for the duration of the construction programme.
- The ECoW will be responsible for responding to Contractor ecological or nature conservation queries for the duration of the construction programme.
- The ECoW will support the Contractor, if required, during method statement preparation.

7.4.1 Best Practice

The following best practice guidance will be followed:

- Construction method statements will be produced for each of the key ecological issues on the site and approved by the ECoW and The Highland Council.
- Timely discussions will be carried out with the ECoW and pre-construction surveys will be undertaken to ensure base-line conditions have not changed.
- All contractors will attend an ecological toolbox talk (during the Health and Safety induction) prior to the start of construction works on site. The toolbox talk will include information on the presence and location of protected species.
- All construction works will be undertaken within a clearly defined and minimal working corridor. Any proposed changes to the working area will be discussed with the appointed ECoW prior to the event.

8. Geology, Soils and Contamination

8.1 Purpose

Previous ground investigations (undertaken for the EIA in 2008) indicate that the River Ness FAS ground conditions consist mainly of made ground overlying freshwater alluvial deposits. The alluvial deposits generally consist of either sands or gravels and generally contain very little fine material.

It was not considered likely that the FAS posed a risk to the local geology. The main risk posed is from the presence of contamination within the soils and existing materials. It is anticipated that a significant volume of material will require excavation in order to form the foundations for the proposed flood scheme. Areas of the site may be contaminated and this poses risks to workers and the environment.

This section outlines the procedures and mitigation measures that are required to protect workers and environmental receptors.

8.2 Anticipated Risks

The environmental or human receptors which could be adversely affected by contaminants are:

- Groundwater
- Surface water (River Ness is a potential receptor via groundwater pollution)
- Workers involved in intrusive site investigation and in building flood defences are potential receptors, as are future maintenance workers (e.g. gardeners).
- Future users of the site, including the general public.
- Flora and fauna
- Materials used in construction of flood defences
- Workers could come into contact with contaminated soil, be exposed to ground gas, dust or contaminated ground water.

The main risks relating to geology and soils resulting from the construction works are as follows:

- Oil could be spilled during construction and have a major adverse impact on soils, groundwater and the River Ness.
- It is highly likely that hydrocarbon contamination is present on the River Ness east bank, downstream of the railway bridge. It is likely that hazardous as well as non-hazardous waste will be generated.
- Due to the industrial history of the area on the west and east banks upstream of the railway bridge there is a moderate risk that there are contamination hotspots.

8.3 Site Investigation

8.3.1 Site Investigation

In order to more accurately assess the risks posed by contaminated land to the various receptors, identified in Section 8.2, a ground investigation was carried out in 2012 by Soil Engineering along the length of the proposed scheme from Ness Bridge to the Harbour to inform the detailed design.

Phase 1 - of the site investigation is complete and the results and recommendations are included within this section.

Phase 2 - is currently being completed, the EMP will be updated once the report is complete.

8.3.2 Phase 1

The Phase 1 Site Investigation assessed the proposed drainage/seepage strategy for the section of the site between Ness Bridge and Friars Bridge and assessed the potential risks to groundwater and the River Ness from contamination.

The potential contamination linkages relating to the River Ness Flood Alleviation Scheme, using data from the 2012 Phase 1 site investigation are detailed in Table 8.1.

Table 8.1: Potential Contamination Linkages

Source	Potential Transport Pathways	Receptor
S1 – Made ground along banks of the River Ness	**P1** – Vertical migration of contaminants through the unsaturated zone **P2** – Horizontal and vertical migration of contaminants within the saturated zone (groundwater) and conduits **P3** – Surface water run-off **P4** – Contaminant migration/drive down due to piling activities	**R1** – Groundwaters within the underlying, highly permeable Alluvium superficial deposits **R2** – Surface Water (River Ness)
S2 – Contamination during construction of the River Ness Flood Alleviation Scheme (Fuels, silts, etc);	**P1** – Vertical migration of contaminants through the unsaturated zone **P3** – Surface water run-off	
S3 – Contamination from offsite sources within groundwaters and River Ness	**P1** – Vertical migration of contaminants through the unsaturated zone **P2** – Horizontal and vertical migration of contaminants within the saturated zone (groundwater) and conduits	
S1 – Made Ground along banks of the River Ness	**P5** – Human uptake	**R3** – Construction workers and site personnel

The key contamination linkages relating to the River Ness Flood Alleviation Scheme using data from the 2012 site investigation are not deemed to be significant.

There is a low risk to human health, there is a very low risk of short term exposure of construction workers to low levels of hydrocarbon contamination present in made ground. There is potential for previously unidentified soil contamination to be encountered during works.

With regards to the water environment there are no significant contamination linkages identified between site soils and the water environment although mercury and selenium were identified in groundwater.

8.3.3 Phase 1 recommended mitigation measures

The following recommendations are to be considered during and pre-construction of the flood wall to mitigate against potential risks from contaminated land:

- Risks to construction workers from potentially contaminated soil and groundwater will be primarily mitigated through good working practices and the provision and utilisation of suitable PPE. Best practice health and safety measures should be implemented across the site in accordance with the Health and Safety at Work Act 1974 and all relevant regulations including the Construction (Design and Management) Regulations 2007.
- The minimisation of dust generation will protect construction workers and sensitive human receptors in adjacent public areas.
- Groundwater from any dewatering operations in construction excavations shall not be discharged to foul sewer without express permission of SEPA and without suitable discharge consents in place.
- Best practice working methods such as the excavation of trenches during construction would remove any potentially unidentified contamination in the made ground.
- Runoff from areas with significant potential for hydrocarbon contamination should pass through an oil interceptor to minimise the risk of contamination impacts to the groundwater.

8.4 Construction Phase Requirements

8.4.1 Remediation

If deemed necessary by the Phase 2 Contamination Assessment remediation strategy will be developed and implemented prior to the start of construction to remove unacceptable risks from the site.

If a remediation strategy is not required mitigation including control measures (e.g PPE) will be put in place to reduce the risk posed to site workers.

If remediation is deemed necessary, a validation process will be implemented to ensure that the remediation has been undertaken correctly. This will be agreed with the relevant authorities. The Contractor responsible for remediation will implement a validation plan to ensure contamination has been removed/treated either at designed times / after designated activities; a verification plan stating how the remediation is to be verified; or a monitoring and maintenance plan should any contamination be left on site.

8.4.2 Imported Soils

All imported soils shall meet SEPA's Waste Management Guidelines and contaminant levels shall not exceed limits as per Appendix 6/15 of the Works Information. Suspect material identified through olfactory or visual observations shall be tested to ensure that these limits are not exceeded.

8.4.3 Excavated Materials

Any materials which are excavated will be subject to and managed in accordance with SEPA's Land Remediation and Waste Management guidelines. Any materials that are to be removed from site will be subject to disposal testing based on the requirements of the receiving treatment facility.

8.4.4 Asbestos

Should Asbestos be identified during excavation, work should stop immediately and specialist advice will be sought.

8.4.5 Dust Emissions

Mitigation measures detailed in Section 5 (Air Emissions) will help to prevent the spread of contaminants via dust and air pollution.

8.5 Responsibilities

The Contractor shall take precautionary and reasonable steps to prevent the pollution by developing construction Method Statements to be approved by The Highland Council and ECoW prior to construction starting. The Contractor will implement the practices outlined in the Method Statements as required throughout construction. The plan will also address safety, health and environmental incidents which could reasonably be foreseen to occur during the project.

The Contractor shall also update their Health and Safety Plan and outline the responsibilities of the site staff with regards to contaminated materials.

9. Landscape and Visual

9.1 Purpose

The River Ness is the central feature of Inverness and the river corridor combines natural, architectural and cultural features, and has an important amenity value. Paths have been designed to maximise the enjoyment of the river landmarks, with the bridges providing distinct views along the river corridor and acting as orienting features.

The construction works will change the visual amenity of the landscape / townscape character in certain sections of the site. Although construction impacts will be temporary they are likely to be disruptive in nature. Mitigation measures will be implemented to reduce the potential annoyance to residents and commercial properties.

The aim of this section is to identify mitigation measures that will reduce the impact of the works on the site which runs through the City Centre of Inverness.

9.2 Anticipated Risks

Aspects of the scheme that may impact on local landscape / townscape character types during the construction period, without mitigation measures include:

- Introduction of hard engineered urban elements into the riverside locations
- Presence of plant and equipment
- Weekend and evening working in residential/hotel areas
- Loss of riverside trees
- Presence of temporary compounds

9.3 Requirements

9.3.1 FAS Design and Streetscaping

The detailed design of the FAS is required by The Highland Council to tie in to and enhance the streetscaping. Mott MacDonald as design consultant has been commissioned to undertake streetscaping for Phase 1 (Ness Bridge to Friar's Bridge) including Bank Street and Douglas Row for the right hand bank and Huntly Street and Friars Place on the left hand bank. This will include paving finishes, indicative surface water drainage, street furniture and soft landscape elements.

9.3.2 Trees

An Aboriculturalist has been appointed by The Highland Council to work with the design team and the Contractor. The Contractor will employ construction techniques to minimise the damage to the roots within the RPZ (root protection zone). This will include pile beam footings or similar techniques and adopting the NJUG (National Joint Utilities Group) guidelines for working near trees 'Volume 4 - Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (Issue 2) – Operatives Handbook, 2007)'.

Crown reduction/pollarding of riverside trees will be carried out where appropriate to reduce the overall tree canopy to compensate for the loss of tree roots. Tree surgery will only be carried out as directed by an Aboriculturalist in a sympathetic manner to retain the overall shape of the canopy.

New street trees will be planted in selected locations to replace lost trees, create new tree avenues and define car parking spaces. Trees will be semi-mature specimens, 20-25cm girth with an overall height of approximately 5 metres. The species to be planted will be selected by consulting with an Aboriculturalist and also be in keeping with the Riverside Trees, Management Plan, 2004. Specimens are to be guyed underground with a tree grill at pavement level.

9.3.3 Construction Compounds

Construction compounds will be temporary but have the potential to be disruptive. Mitigation measures will be implemented to reduce the potential annoyance to residents and commercial properties. These will include:

- Haul routes will be defined in the Traffic Management Plan (see section 4) and chosen to minimise disturbance to residential and commercial properties.
- Light pollution from flood lighting will be controlled and shielded where required, especially where adjacent to residential and commercial properties.
- Depots will be well screened and tidy.

9.4 Responsibilities

The Design Consultant shall be responsible for producing the detailed design and streetscaping of the FAS. The design will be approved by The Highland Council.

The Contractor will be responsible for maintaining and general housekeeping of work compounds. This will be monitored through spot checks undertaken by the ECoW.

Method statements for working near trees shall be developed by the Contractor and approved by the Aboriculturalist. The Contractor will be responsible for ensuring works do not impinge on the RPZs. The ECoW will monitor works for compliance with this method statement.

10. Noise Emissions

10.1 Purpose

Construction activities have the potential to generate noise and vibration and while impacts will be temporary they will be disruptive in nature. The primary sources of noise during construction are likely to be large plant such as piling rigs, excavators, cranes, and dump trucks.

10.2 Anticipated Risks

Construction vehicles, heavy equipment and machinery all have the potential to produce a lot of noise. If excessive noise is generated it will be disruptive and a nuisance to the local population and wildlife and in some cases may lead to extreme stress. In addition to the anticipated airborne and vibration noise there is also likely to be underwater noise generated due to the majority of works being undertaken on the river bank. This may adversely impact on fish and marine mammals.

10.3 Requirements

10.3.1 Best Practice

Construction activities will be undertaken in accordance with good practice as set out in the British and International Standards BS5228. Noise monitoring will be carried out at representative intervals.

Phase 1 and Phase 2 may require measures to control noise within contract. The ECoW will confirm with SNH and SEPA to implement noise control measures to allow for the works on both sides of the bank to be acceptable during certain periods provided the water is below the MHWS.

Phase 2 construction works may be limited to a single river bank at any given time to allow the movement of fish and mammals.

10.3.2 Working Hours

General hours of working should be restricted to avoid sensitive periods of the day. Working hours are restricted to:-

- **Mondays – Fridays 07.00 to 18.00;**
- **Saturdays between 0900 – 1300;**
- **Outwith public holidays (24/25 Dec, 1/2 Jan, Easter and May Weekends)**

Any work outside normal working hours will only occur with prior written approval of the Council. Neighbouring properties likely to be affected by construction works should be advised of construction timescales together with a contact name and number to whom all concerns and complaints be directed..

Construction will be carried out during hours when the movement of potentially affected species is at it lowest rate whenever possible.

10.3.3 Plant and Equipment

Plant with directional noise features will be positioned to minimise the potential for noise disturbance.

All equipment will be maintained in good working order and fitted with appropriate noise control at all times (for example, silencers, mufflers and acoustic hoods).

Rubber tyres, buffer blocks and reduced hammer drop heights will be used to reduce potential effects.

Temporary site compounds and partly-static equipment will be located as far as practically possible from neighbouring residential properties. Material stockpiles will be used to screen work locations and maximise the distance between work activities and receptors.

Vehicles will obey the appropriate speed limit around site and have their engines switched off when stationary.

10.3.4 Piling

Appropriate piling method will be used for the proposed scheme, to minimise noise levels at source.

Piling rigs and similar equipment will be screened from receptors, where necessary and practicable, and throttled down to a minimum when not in use.

Where practical, piling will be avoided when dolphins and seals are calving in summer, as mother and calf are likely to be particularly vulnerable. ***Refer to Section 8.3.5.***

10.3.5 Vibration

Vibration monitoring will be carried out where piling or other percussive activities are likely to occur in close proximity to sensitive receptors (i.e. within 15m). Where recommended limits are exceeded, work methods will be reviewed and altered.

10.4 Responsibilities

All site employees should be advised of the noise sensitive nature of the area and be informed to adopt the quietest work practices.

Nearby receptors should be informed in advance of activities likely to generate particularly high levels of noise. A site contact number for local residents should be provided.

The Contractor will be responsible for providing and maintaining appropriate plant throughout the construction period.

The Construction Site Manager will be responsible for displaying information boards with grievance procedures clearly displayed. The Construction Site Manager will be the first point of contact if any member of the public makes a complaint with regards to noise.

The ECoW will monitor complaints and track how complaints are dealt with by the Contractor.

11. Water Quality, Hydrology and Drainage

11.1 Purpose

Both surface and groundwater are important and valuable resources and a vital source of economic activities such as agriculture, industry, fisheries, amenity and recreation. Additionally, many surface and groundwater features also support habitats and species of national and international importance.

11.2 Anticipated Risk

During the construction phase a flood prevention wall will be erected along the top of the river bank with foundations and piling within the banks. In certain areas a flood embankment will be constructed instead of a wall. Sections of the bank and bank top are at risk of damage during the construction phase.

Construction activities may destabilise the banks causing erosion and result in increased turbidity and sediment deposition both in the local area and further downstream. Water pollution could also arise from cement or concrete washings, hydrocarbons, contaminated and nutrient rich soil and waste. The significance of these impacts will be exacerbated during periods of low tide.

Due to the nature of the works there is a high risk of surface water and/ or groundwater becoming polluted.

The main risks associated with the works are:

- Change in quality from chemical/ organic/ microbial pollution;
- Increase in sediment and suspended solids runoff to the river channel;
- Release of contaminated soil and consequently contamination of the surface and groundwater bodies;
- Solid waste from the construction site polluting surface water;
- Uncontrolled sediment erosion;
- Increase in the build-up of sediment deposit further downstream;
- Interception of existing drainage pathways along the channel; and
- River bank erosion.
- Change in flow and/or direction, change in water table level.
- The risk of releasing pollutants (chemical, organic, microbial) into the groundwater reservoirs, possibility of saline water intrusion due to temporary pumping.
- Interruption of the surface runoff patterns
- Physical impact of the foundation work on the drainage system network

11.3 Requirements

11.3.1 Best Practice

The identified risks of pollution of watercourses and groundwater during the construction phase cannot be totally eliminated. However, the risks can be significantly reduced through the incorporation of suitable protective measures following SEPA guidance and CIRIA technical on control of water pollution from linear construction project.

The following measures will be taken to manage the risk of water pollution:

- The following SEPA guidance will be adhered to: Planning Policy Guidance (PPG) 1 General Guide to the prevention of pollution, PPG5 Works and Maintenance in or near water and PPG 6

Working at construction and demolition sites, PPG 13 Vehicle washing and cleaning and PPG 21 Pollution incident planning.

- The Contractor must take particular care and implement measures to ensure that surface or groundwater from excavations or other working areas are not pumped or allowed to run directly into watercourses. Such water shall be suitably treated to remove silt before being discharged. Measures could include settling ponds, filters or any other suitable means. Flow attenuation may be necessary under some circumstances. Temporary equipment shall be regularly inspected, emptied and maintained as necessary

- Runoff and water from dust suppression shall be prevented from exiting the site. Proposed drainage schemes and discharges from equipment (including any concrete and asphalt batching plants) required for construction will be developed in advance of construction with support from appropriate environmental specialists as required. Effluent from site facilities which is not suitable for discharge shall be treated on site or tankered off site for treatment.

- The storage facilities for fuel and oil shall comply with SEPAs guidelines for Above Ground Oil Storage Tanks – PPG2 to ensure that any leaks do not result in environmental damage or pollution.

- Discharge or abstraction consents must be in place where required, prior to discharges to controlled waters. Where consent is not required, the General Binding Rules of the Controlled Activities Regulations must be followed.

- Any tanks or drums of non oil based chemicals shall be stored in accordance with the Control of Substances Hazardous to Health Regulations 2002 (as amended) (COSHH). Storage facilities shall consist of secure containers or compounds and will be kept locked when not in use.

11.3.2 Reducing Surface Water Runoff

The most significant adverse impacts during construction are likely to be caused by surface run-off. Surface water will be minimised at source through the following measures:

- Construction activities will be scheduled so that the area and duration of soil exposure are minimised

- Where possible, undertaking construction in phases, so that the sections are restored before progressing to the next section / phase

- Reducing the movement of construction plant and equipment on site

- Locating stockpiled material away from existing watercourses

- The containment of run-off prior to treatment and disposal

11.4 Responsibilities

A surface water management plan for construction shall be developed by the Contractor and approved by The Highland Council, in consultation with SEPA if required, and the surface water plan will thereafter be implemented. The ECoW will be responsible for undertaking spot checks to ensure that the plan is being adhered to throughout the construction programme.

The Contractor must work in accordance with any required discharge or abstraction licences, which will be obtained by The Highland Council.

The surface water design for the completed scheme shall be developed by the Design Consultant and approved by the Planning Authority in consultation with SEPA.

The Contractor shall document monitoring proposals, contingency and emergency plans as required in Section 6b of the Planning Permission (December 2009).

The Contractor must maintain and update the Site Waste Management Plan.

The Contractor shall be responsible for monitoring pollution prevention measures daily.

The ECoW will be responsible for checking that the pollution prevention measures are being implemented.

12. Emergency Response Procedures

12.1 Procedures

To be established with Contractor once appointed.

Incidents that have had or that could have had an environmental impact should **be immediately** reported to SEPA using the hotline number 0800 80 70 60.

Incidents include spillages (oils and chemicals), contaminated run-off, flooding, riverbed disturbance, damage to underground services, damage to habitats, poor waste disposal and storage. **If in doubt report it.**

ECoW will give talks to all staff members working on site to ensure they understand the emergency procedures.

The ECoW may not always be present on site and if an emergency occurs SEPA must be notified immediately as per the emergency plan. Procedure guidance and information shall be displayed in work compounds.

12.2 Key Contacts

Table 12.1: Key Contact Information

Project Contact	Contact Name	Contact Details	Topic Category
Project Manager	TBC		
Construction Delivery Manager	TBC		
Construction Site Manager	TBC		
ECoW	TBC		
Marine Scotland	TBC		
SNH Area Officer	Anne Murray	01463 725223 Anne.Murray@snh.gov.uk	Ecology and nature conservation
SEPA Flood Protection Area Manager	Carol Chapman	**01349 862021**	Environmental incidents Flood protection Licensing Water quality Hydrology and drainage
SEPA Licence Contact	Andrew Steel	**01349 862021**	
Historic Scotland	Alasdair Young	**0131 668 8728** alasdair.young@scotland.gsi.gov.uk	Archaeology and cultural heritage

Appendices