

Shimna River Roughing Grill

Environmental Impact Assessment (EIA) Screening

Department for Infrastructure (DfI) Rivers

March 2021

Quality information

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About the AECOM Environment Impact Assessment (EIA) Team

AECOM is a global provider of professional technical and management support services. With over 100 Environmental Impact Assessment (EIA) practitioners in the UK, EIA management is provided from 10 offices and makes use of our in-house resource of over 300 environmental specialists from over 22 offices. AECOM's specialists cover the whole spectrum of environmental skills including air quality, ecology, geo-environmental sciences, hydrology, landscape architecture, socio-economics, land use planning and acoustics.

In terms of quality, AECOM is an EIA Quality Mark Registrant, which is a scheme operated by the Institute of Environmental Management & Assessment (IEMA) that allows organisations (both developers and consultancies) that lead the co-ordination of statutory EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed.

EIA Quality Mark registrants must adhere to seven key commitments of this scheme which underpin and maintain its high standards. These are:

- **EIA Management** – commitment to using effective project control and management processes to deliver quality in EIA and the Environmental Impact Assessment Reports (EIAR) produced;
- **EIA Team Capabilities** – commitment to ensuring that all EIA practitioners have the opportunity to undertake regular and relevant continuing professional development;
- **EIA Regulatory Compliance** – commitment to delivering Environmental Statements that meet the requirements established within the appropriate UK EIA Regulations;
- **EIA Context & Influence** – commitment to ensuring that all coordinated EIAs are effectively scoped and that it is transparently indicated how the EIA process, and any consultation undertaken, influenced the development proposed and any alternatives considered;
- **EIA Content** – commitment to undertaking assessments that include: a robust analysis of the relevant baseline; assessment and transparent evaluation of impact significance; and an effective description of measures designed to monitor and manage significant effects;
- **EIA Presentation** – commitment to deliver EIAR's that set out environmental information in a transparent and understandable manner; and
- **Improving EIA practice** – commitment to enhance the profile of good quality EIA by working with IEMA to deliver a mutually agreed set of activities, on an annual basis, and by making appropriate examples of our work available to the wider EIA community.

About the AECOM Ecology Team

AECOM provide a comprehensive spectrum of ecological services for projects that range in size and complexity from small single-species surveys to large infrastructure projects or strategic development plans.

Our experts offer a wealth of experience, knowledge and specialist skill sets. Working from offices across the UK and Republic of Ireland, our team includes national and global leaders in their fields who provide clients with specialist advice on habitat creation, impact assessment, site restoration, enhancement and management, including biodiversity net gain and offsetting. Whether at planning, pre-construction, construction or operational stages – our innovative solutions focus on clients' objectives, while always enabling full legal compliance and environmental sustainability.

Our Core Services include:

- Advice on Avoidance, Mitigation & Compensation;
- Air Quality Ecological Impact Assessment;
- Ancient Woodland Indicator Species Surveys;
- BREEAM Ecology Assessments;
- Biodiversity & Environmental Net Gain;
- Ecological Clerk of Works (ECoW) Services;
- Ecological Impact Assessment (EclA) for Planning;
- Ecosystem Services Assessments;
- Ecological Surveys & Monitoring – Full Range;
- Environmental Impact Assessment (EIA);
- Expert Witness (Planning);
- Habitat Management & Enhancement;
- Habitats Regulations Assessment (HRA);
- In-house Training for Ecological Surveys;
- Invasive Species Advice & Control;
- National Vegetation Classification;
- Phase 1 (Extended) Habitat Surveys;
- Pollution & Incident Response;
- Protected & Target Species Surveys – All UK, EU and International;
- Protected Species Translocation;
- Sites of Special Scientific Interest Condition Assessments & Mitigation; and
- Species Surveys, Mitigation & Licensing.

Competencies and Qualifications

To ensure the completeness and quality of Environmental Statements or Environmental Impact Assessment Reports, projects should ensure that they are prepared by a competent expert(s). Projects should note that there is no comprehensive definition of 'expert' or 'competent expert' within the Directive, however it does indicate that individuals exercising this role must be:

- Qualified; and
- Competent.

Glenn McKay BSc (Hons) MSc MCIWEM C.WEM CEnv CSci is a Principal Environmental Consultant, primarily responsible for undertaking EIA and Environmental Appraisals of major infrastructure projects located throughout Ireland. He has been with AECOM since 2004, affording him the opportunity to work on major projects from inception through to construction. He is competent in applying current environmental assessment and appraisal methods and keeping abreast of current environmental legislation and planning policy; applying this expertise in the compilation and preparation of Water Framework Directive (WFD) Screening and Compliance Reports, Scoping Reports, and EIA Reports.

Glenn is a Chartered Water and Environment Manager with the Chartered Institution of Water and Environmental Management (CIWEM), a Chartered Environmentalist with the Society of the Environment (SocEnv) and a Chartered Scientist with the Science Council. Glenn is also a Member of the Chartered Institution of Water & Environmental Management (MCIWEM).

In response to evolving environmental legislation such as the Water Framework Directive (WFD) 2000/60/EC, Glenn has developed a particular specialism in carrying out WFD Risk Assessments, to determine if specific components or activities, particularly those associated with major infrastructure projects and the like would compromise the attainment of WFD objectives, or result in the deterioration in the ecological status of water bodies (surface waters and groundwater). He utilises these assessments to determine whether to proceed with elements of projects or amend / develop mitigation measures to eliminate adverse effects. He is competent in carrying out such assessments, in line with guidelines set by statutory undertakers and industry standard guidance.

His experience of on-site environmental surveys and active construction sites has also allowed Glenn to develop a practical understanding of the water environment and key issues which result in adverse effects, not only from an operational perspective, but also through construction and on-going maintenance. He has also undertaken numerous water quality monitoring programmes on behalf of private clients, government departments and council bodies, which has included sampling analysis and technical report writing.

Gareth Coughlin BSc (Hons), MPhil, C.WEM, CEnv, CSci, FCIWEM, FIEMA is a Technical Director (Environmental Scientist), and certified Project Manager, responsible for the project management of Environmental Statements, Scoping studies, Strategic Environmental Assessments (SEA) and Habitats Regulations Assessment (HRA). Gareth leads the Environment & Sustainability team in Northern Ireland, and he is the OU service lead for EIA and CEEQUAL. Gareth is also a member of the AECOM UK EIA Board.

He is a Chartered Water & Environmental Manager, Chartered Environmentalist, and Chartered Scientist and has been with the company since 1999, working in the engineering industry for clients in both the public and private sectors. For over 20 years now, he has been responsible for the management of multi-disciplinary environmental teams and assessment of environmental impacts on a range of major and often highly complex infrastructure projects, most notably strategic road schemes.

Project experience includes the A6 North-Western Key Transport Corridor, High Speed 2 (HS2) (Phase One) and the trans-European SouthStream gas pipeline.

Gareth has extensive experience in stakeholder consultation/engagement with both statutory and non-statutory bodies and has organised and staffed numerous road scheme public exhibition/consultation events. He has also acted as expert witness on various strategic road schemes and led the Environmental Statements through Public Inquiry/Oral hearing. Gareth is an accredited CEEQUAL Assessor for civil engineering projects.

He is a past Chairman of the Northern Ireland branch of the Chartered Institution of Water & Environmental Management (CIWEM), a current NI branch Committee Member, and is a regular Professional Reviewer for CIWEM. He is also a panel member, undertaking visits to those universities seeking CIWEM accreditation of their environmental degree programmes.

Dr Paul Lynas BSc (Hons) MRes PhD CEnv MCIEEM (Associate Director) is an experienced ecologist with over 18 years' professional consultancy and conservation experience in carrying out a range of habitat and species surveys. He has carried out numerous flora and fauna assessments for both public and private sector clients, including those for protected species such as birds, badgers, bats and otters. Whilst specialising in biodiversity and farmland bird ecology, Paul brings extensive experience in a variety of monitoring and survey techniques for both species and habitats. Paul has valuable experience working closely with a vast array of environmental organisations, local and central government departments and agencies. He has also completed a vast number of Habitat Regulation Assessments across Northern Ireland for major infrastructure projects, assessing the impact of the various projects on the European sites around the country.

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Drawing SFAS-ACM-XX-XX-DR-CE-02031. Proposed Scheme Layout

1. Introduction

AECOM was commissioned by the Department for Infrastructure (DfI) Rivers (the Department) to provide a range of engineering and environmental design services in relation to works on the Shimna River as a result of persistent flooding related issues. Part of this commission subsequently included investigating the possibility of providing a 'roughing grill' within the Shimna River to prevent debris and sediment accumulating (and subsequently obstructing the river channel) at the New Bridge (Bryansford Road) during high flow events along the Shimna River in Newcastle, County Down.

1.1 Project Description

The project would comprise the construction of a roughing grill (upstream of the Bryansford Road) on the Shimna River to reduce the risk of blockage at the New Bridge (Bryansford Road) during flood events. The location of the Roughing Grill and the proposed layout is shown on **Drawing SFAS-ACM-XX-XX-DR-CE-02031**. An example of a typical roughing grill is provided in **Plate 1.1** below. Site Photographs are included within Appendix A.



Plate 1.1: Roughing Grill Example

The project would include 7 no. piles to be installed as part of the roughing grill directly into the river bed. Each pile would extend 4m above bed level and spaced at 3m centres diagonally across the channel to encourage debris to be deposited at the bank. The height and spacing of the piles have been purposefully designed so that they aim to trap only the type of debris that would result in a blockage at the New Bridge, such as large woody debris (LWD). This is typically branches, large limbs, root boles or entire trees that have fallen into the river. It is not designed to trap smaller branches, twigs and leaf litter, which is typically known as Coarse Woody Debris (CWD), which would more commonly be transported downstream by the river under normal flow conditions.

The existing access from Tipperary Lane would be utilised to facilitate construction and future access for maintenance to the roughing grill, of which the proposed location is readily accessible from this access lane with minimal disturbance to the riparian corridor expected. A temporary piling platform would be placed across the river channel to allow the installation of piles using a piling rig. This platform would be removed following the completion of the works.

Due to the nature of what is proposed, routine maintenance activities will be required to not only remove accumulated debris, but also to ensure that the roughing grill does not become an impediment to the attainment of the relevant Water Framework Directive (WFD) objectives as set out in the relevant River Basin Management Plan and in particular does not become an impediment to the migratory habitat requirements of salmonid species. As a consequence, this aspect has been given specific consideration as reported within the '*Shimna River Roughing Grill: Identification of a preferred location and the assessment of potential impacts on fisheries interests Report*' (November 2020) and is included within Appendix B of this report.

This report was prepared by Paul Johnston Associates Ltd (fisheries consultants) to provide advice on the identification of a preferred location for the installation of a "roughing grill" and to assess the potential impacts from a fisheries perspective. The objective of this exercise was to:

- Identify preferred locations that minimise potential impacts on fisheries habitat within the candidate section under consideration; and
- describe potential impacts of the construction of the roughing grill on fisheries interests and recommend mitigation measures to address such impacts.

1.2 Legislative Context

The requirement to carry out a statutory EIA and publish a formal ES only applies to certain projects that are deemed to exceed certain thresholds and are predicted to have a significant effect on the environment.

The Planning Reform (Northern Ireland) Order 2006 ended the Crown's immunity from planning control. Crown bodies have to apply for planning permission like any other developer, unless a scheme is classified as 'permitted development' as defined by the Planning (General Development) Order (Northern Ireland) 1993 (as amended by the Planning (Application of Subordinate Legislation to the Crown) Order (Northern Ireland) 2006).

Part 24 of the Schedule to the Planning (Application of Subordinate Legislation to the Crown) Order (Northern Ireland) 2006 describes permitted development rights exercisable by the Department for the purposes of drainage works. The proposed scheme qualifies as a Class A 'permitted development' under this schedule, as it would require carrying out drainage works by or on behalf of the Department as per the meaning assigned to it by Schedule 2 of the Drainage (Northern Ireland) Order 1973 [as amended] constituting new construction works within a watercourse.

Under the provisions of the Drainage (Northern Ireland) Order 1973 [as amended], in determination of whether a drainage scheme has significant effects on the environment, the Department shall determine before the date of publication of details of the scheme whether or not it falls within Annex I or Annex II to Directive 2011/92/EU of the European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the European Parliament and of the Council (referred to as the EIA Directive).

The EIA Directive (Directive 85/337/EEC) on "*The assessment of the effects of certain public and private projects on the environment*" came into effect in Europe in July 1988 and initiated a formal approach to environmental assessment throughout the European Community. The Directive requires an environmental assessment to be carried out, prior to a development consent being granted, for certain types of major projects judged likely to have significant impacts on the environment.

The EIA Directive of 1985 has been amended three times; in 1997, in 2003 and in 2009. The initial Directive of 1985 and its three amendments have been codified by Directive 2011/92/EU of 13th December 2011. Directive 2011/92/EU was amended in 2014 by Directive 2014/52/EU which entered into force on 15th May 2014 and transposed in national legislation by The Drainage (Environmental Impact Assessment) Regulations (Northern Ireland) 2017, becoming operational on 16th May 2017.

These Regulations implement, for Northern Ireland, Council Directive 2011/92/EU (as amended by Council Directive 2014/52/EU) on the assessment of the effects of certain public and private projects on the environment, in respect of drainage schemes and drainage works. They also revoke and re-enact, with amendments, the Drainage (Environmental Impact Assessment) Regulations (Northern Ireland) 2006. The Regulations require the Department, in the execution of certain drainage works

and drainage schemes, to produce an Environmental Statement and, on the basis of that statement, to decide whether or not to proceed with the drainage works or drainage schemes in question.

1.2.1 European Union Withdrawal

The Drainage (Environmental Impact Assessment) (Amendment) (Northern Ireland) (EU Exit) Regulations 2019 came into force on the United Kingdom (UK) exit day from the EU and ensure that the legislation relating to drainage projects and associated environmental impact assessment will continue to be operable.

These Regulations are made in exercise of the powers conferred by section 8(1) of, and paragraph 21(a)(i) and (b) and Schedule 7 to, the European Union (Withdrawal) Act 2018 (c. 16) in order to address failures of retained EU law to operate effectively and other deficiencies arising from the withdrawal of the UK from the European Union. The instrument makes no substantive changes to the way the existing legislation operates. All changes make only the technical drafting fixes required to maintain continuity of approach after exit.

These Regulations make amendments to Northern Ireland legislation that implements, in relation to drainage projects, Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

Part 2 of these Regulations makes amendments to the Drainage (Northern Ireland) Order 1973. Part 3 makes amendments to the Drainage (Environmental Impact Assessment) Regulations (Northern Ireland) 2017.

2. Determination

The process for determining whether it is necessary to carry out an EIA and publish an ES is termed Screening. The Screening process establishes:

1. whether the project falls within Annex I or Annex II to the EIA Directive;
2. whether an Annex II project represents a 'relevant project';
3. the 'determination' for the purposes of The Drainage (Environmental Impact Assessment) Regulations (Northern Ireland) 2017 whether the project should be subject to an EIA; and
4. reporting the determination.

Where the Department has to make a determination whether there may be significant effects on the environment, it shall provide the following information on the proposed drainage scheme of the type listed in Annex II to the Directive:

- a. a description of the project, including in particular:
 - i. a description of the physical characteristics of the whole project and, where relevant, of demolition works; and
 - ii. a description of the location of the project, with particular regard to the environmental sensitivity of geographical areas likely to be affected;
- b. a description of the aspects of the environment likely to be significantly affected by the project;
- c. a description of any likely significant effects, to the extent of the information available on such effects, of the project on the environment resulting from:
 - i. the expected residues and emissions and the production of waste, where relevant;
 - ii. the use of natural resources, in particular in soil, land, water and biodiversity.

The criteria of Schedule 2B to the Drainage (Northern Ireland) Order 1973 [as amended] shall be taken into account, where relevant, when compiling the information in accordance with points (a) to (c) above.

2.1 Step 1 – Deciding if the project falls within Annex I or Annex II of the EIA Directive

The first screening decision is identifying whether the project falls within Annex I or Annex II of the EIA Directive. Certain types of projects are listed within Annex I and for these, EIA is mandatory, and no determination is necessary.

Does the project fall within Annex I of the EIA Directive?

Yes

No

If yes, a formal EIA is required. If no, continue to Step 2.

2.1.1 Comments

This project is not of a type listed in Annex I of the EIA Directive considered as having significant effects on the environment and requiring a mandatory EIA. The project would comprise the construction of a roughing grill (upstream of the Bryansford Road) on the Shimna River to reduce the risk of blockage at the New Bridge (Bryansford Road) during flood events. The Proposed Scheme would include 7no. piles to be installed as part of the roughing grill directly into the river bed. Each pile would extend 4m above bed level and spaced at 3m centres diagonally across the channel to encourage debris to be deposited at the bank. The existing access from Tipperary Lane would be utilised to complete the Proposed Scheme. A temporary piling platform would be placed across the river channel to allow the installation of piles using a piling rig. This platform would be removed following the completion of the Proposed Scheme.

2.2 Step 2 – Deciding if an Annex II Project is a ‘Relevant Project’

Projects listed under Annex (or Schedule) II of the EIA Directive may require an EIA if it is concluded that the project will exceed certain limits or thresholds. To determine whether or not Annex II projects are relevant, thresholds of project size and environmental sensitivity exist in the EIA Regulations. Annex II projects will normally require an EIA where any part of the development is likely to be carried out in a sensitive area.

Upon a review of the type of project proposed, it does not directly align with any of those referred to within Annex II of the EIA Directive. The closest project category in which it could be interpreted as aligning with is as follows:

- *Annex II (10) Infrastructure Project (f) Inland-waterway construction not included in Annex I, canalisation and flood-relief works.*

As per European Commission Report ‘*Interpretation of Definitions of Project Categories of Annex I and II of the EIA Directive*’ (2015), canalisation and flood relief works are interpreted as including works for retaining water and preventing floods, however the project would neither:

- retain water; nor
- prevent flooding.

As described previously, the roughing grill would include 7no. piles to be installed directly into the river bed, with each pile extending 4m above bed level and spaced at 3m centres diagonally across the channel. On this basis, it would provide no functionality in terms of retaining water, even at times of excessive flow, where it is expected that the directional spacing of the embedded piles would direct any accumulated debris towards the bankside, thus maintaining conveyance of flow within the main channel. As noted previously, the roughing grill is only expected to accumulate LWD, not CWD.

Furthermore, even if the main channel were to become obstructed by debris, water could still pass through, over and around within its immediate site footprint. Furthermore, a regular routine maintenance regime would also reduce the possibility of material building up that could restrict the flow of water, but again in no instance is it expected that water would be retained.

The roughing grill does not prevent flooding, in fact, it would contribute to an increased risk of localised flooding within its immediate environs at times of excessive flow due to the potential for debris build up within the grill. The proposed location of the roughing grill has been determined on the basis that any contribution made to an increase in localised flooding could be accommodated without unacceptable risk to property or environment. Again, the roughing grill would be subject to routine maintenance activities to remove debris which has accumulated along the roughing grill, which would reduce the risk of out of channel flooding.

The project does however have an indirect flood prevention benefit in that the grill’s fundamental purpose is to reduce the potential for flood related debris and sediment accumulating (and subsequently obstructing the river channel) at the New Bridge (Bryansford Road) during flood events. Based upon the outcome of flood risk modelling and anecdotal evidence of flood related debris being a contributing factor to flooding within the Bryansford Road area, any opportunity to limit the amount of debris that could reach the bridge, would reduce the risk of the flood defences associated with the Shimna River Flood Alleviation Scheme (FAS) being overtopped, or not functioning in the manner intended. Whilst this is deemed to be an indirect benefit of the project, it has been judged precautionary to determine whether the project is relevant, in spite of the ambiguities set out above in categorising it in relation to the projects listed under Annex (or Schedule) II of the EIA Directive.

Regulation 7 of the Drainage (Environmental Impact Assessment) Regulations (Northern Ireland) 2017 states that the Department must provide specified information on proposed drainage works of the type listed in Annex II to the Directive and consider the selection criteria in Schedule 2B to the Drainage Order when deciding if there are any likely effects of the drainage works on the environment. Schedule 2B of the Drainage Order provides the criteria as set out below.

2.2.1 Characteristics of drainage works or drainage schemes “the works”

The characteristics of drainage schemes must be considered having regard, in particular, to:

- the size and design of the whole works;
- their cumulative effects with other existing or approved works;
- the use of natural resources, in particular land, soil, water and biodiversity;
- the production of waste;
- pollution and nuisances;
- the risk of major accidents or disasters which are relevant to the works concerned, including those caused by climate change, in accordance with scientific knowledge, having regard in particular to substances or technologies used; and
- the risks to human health (for example due to water contamination or air pollution).

2.2.2 Location of drainage works or drainage schemes

The environmental sensitivity of geographical areas likely to be affected by the works must be considered, having regard in particular to the:

- existing and approved land use;
- relative abundance, availability, quality and regenerative capacity of natural resources (including soil, land, water and biodiversity) in the area and its underground; and
- absorption capacity of the natural environment, paying particular attention to the following areas:
 - wetlands, riparian areas, river mouths;
 - coastal zones and the marine environment;
 - mountain and forest areas;
 - nature reserves and parks;
 - areas classified or protected under an European Economic Area (EEA) States' legislation, Natura 2000 areas designated by EEA States pursuant to Directive 92/43/EEC and Directive 2009/147/EC (now adopted as part of the UK's National Site Network);
 - areas in which there has already been a failure to meet the environmental quality standards, laid down in retained EU law and relevant to the project, or in which it is considered that there is such a failure;
 - densely populated areas; and
 - landscapes and sites of historical, cultural or archaeological significance.

2.2.3 Type and characteristics of the potential impact

The likely significant effects on the environment must be considered in relation to the criteria set out under Sub-Sections 2.2.1 and 2.2.2 with regard to the impact of the works on the factors specified in paragraph 1 of Schedule 2C, and having regard, in particular, to the:

- magnitude and spatial extent of the impact of the works (for example the geographical area and size of the population likely to be affected);
- nature of the impact;
- transboundary nature of the impact;
- intensity and complexity of the impact;
- probability of the impact;

- expected onset, duration, frequency and reversibility of the impact;
- accumulation of the impact with the impact of other existing and/or approved projects; and
- possibility of effectively reducing the impact.

3. EIA Screening

The Checklist in Table 3.1 below for the Shimna River Roughing Grill has been prepared as per the requirements of Regulation 7 of the Drainage (Environmental Impact Assessment) Regulations (Northern Ireland) 2017 which state that the Department must provide specified information on proposed drainage works of the type listed in Annex II to the EIA Directive and consider the selection criteria in Schedule 2B to the Drainage Order when deciding if there are any likely effects of the drainage works on the environment. As noted previously, it has been deemed that the project is not of the type listed in Annex II, however a precautionary principle has been applied in this instance, particularly in light of the sensitivity of the receiving water environment.

Table 3.1. EIA Screening Checklist in relation to the characteristics of the Scheme

Characteristics of the Scheme	Yes/No	Brief Description	Is the effect likely to be Significant?
(a) Size of the scheme			
Will the development be out of scale with the existing environment?	No	The project will constitute a hydromorphological change across the riverbed profile of the Shimna River, with localised disturbance to accommodate the 7no. piles. Each pile would extend 4m above bed level and spaced at 3m centres diagonally across the channel.	No – the impact would be very localised and contained within a section of the river that is well enclosed by surrounding terrain and mature riparian vegetation. This will limit considerably the potential for adverse landscape or visual impacts beyond the immediate confines of the site. The roughing grill would be located approximately 80m upstream of the existing fish counter / gauging station, so whilst each of the piles would be quite high, they would be within the same reach of the river that has already been locally subject to hydromorphological modification, and thus would not be out of scale and character. The location also used to be a crossing point, so already has the necessary access infrastructure in place to service the piles as part of any routine maintenance and debris clearance regime, whilst minimising the potential for disturbance.
Will it lead to further consequential development or works (e.g. new roads, extraction of aggregate, provision of new water supply, generation or transmission of power, increased housing and sewage disposal)?	No	The existing access from Tipperary Lane would be utilised to facilitate construction and future access for maintenance to the roughing grill, of which the proposed location is readily accessible from this access lane with minimal disturbance to the riparian corridor expected. A temporary piling platform would be placed across the river channel to allow the installation of piles using a piling rig. This platform would be removed following the completion of the works and the bed reinstated.	No – site selection process determined its suitability partly based on available infrastructure already being in place. No further consequential development or works, such as the examples given across can be expected.
(b) Cumulation with other development			
Are there potential cumulative impacts with other existing development or development not yet begun but for which	No	The project would be entirely located within the confines of the Shimna River, therefore no potential for cumulative impacts	No

Characteristics of the Scheme	Yes/No	Brief Description	Is the effect likely to be Significant?
planning permission exists?		with other developments exists.	
Should the application for this development be regarded as an integral part of a more substantial project? If so, can related developments which are subject to separate applications proceed independently?	Yes	The fundamental purpose of the roughing grill is to reduce the potential for flood related debris and sediment accumulating (and subsequently obstructing the river channel) at the New Bridge (Bryansford Road) during flood events. Based upon the outcome of flood risk modelling and anecdotal evidence of flood related debris being a contributing factor to flooding within the Bryansford Road area, any opportunity to limit the amount of debris that could reach the bridge, would reduce the risk of the flood defences associated with the Shimna River Flood Alleviation Scheme (FAS) being overtopped, or not functioning in the manner intended.	No – the Shimna River FAS has received planning approval and is currently subject to procurement. It can proceed independently as the roughing grill is only being provided as a precautionary measure to reduce the potential for flood related debris and sediment accumulating at the New Bridge. The FAS would be constructed whether the grill was implemented or not. If the latter was the case, it is not guaranteed that the flood defences would be overtopped and not function as intended in the absence of the roughing grill.
(c) Use of natural resources			
Will construction or operation of the development use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply? <ul style="list-style-type: none"> land (especially undeveloped or agricultural land)? water? minerals? aggregates? forests and timber? energy including electricity and fuels? any other residues? 	Yes	The use of natural resources would be minimal apart from the constitute elements of manufactured products (e.g. concrete) to form the piles. Energy will be expended during the construction phase due to plant and machinery operation, though there would be no operational phase energy requirements.	No – The requirement for the use of natural resources to facilitate construction, operation and maintenance of the roughing grill would be minimal. The nature of the site chosen would also minimise impacts upon existing land uses. It is envisaged that the contractor appointed to undertake the FAS will undertake the works for the roughing grill concurrently. They shall be required to operate under an accredited Environmental Management System (EMS). It shall be developed to avoid wherever possible environmental accidents and pollution, to encourage reduced consumption of resources, to restrict the production of waste, and to promote good relationships with the relevant authorities / environmental bodies. An Environmental Management Plan (EMP) has also been prepared to manage this process and has been included as part of the works information. the requirements of this document shall also be equally applied to the environmental management requirements of the roughing grill works. A copy of the EMP has been included within Appendix C of this report.
(d) Production of waste			
Will the development produce wastes during construction or operation or decommissioning? <ul style="list-style-type: none"> spoil, overburden or mine wastes? municipal waste (household and/or commercial)? hazardous or toxic wastes (including radioactive)? 	No	Minimal (if any) physical waste would be generated from the project, as it will be procured and managed to ensure it is developed as sustainably as is reasonably practicable.	No - it is envisaged that any disturbed bed material (i.e. gravels) will be retained and reinstated upon completion of the works. As part of the EMP, a Site Waste Management Plan (SWMP) would implement where possible cost-effective methods of good practice waste minimisation during the design of the project and thereafter during construction. The Contractor would be

Characteristics of the Scheme	Yes/No	Brief Description	Is the effect likely to be Significant?
<ul style="list-style-type: none"> • other industrial process wastes? • surplus product? • sewage sludge or other sludges from effluent treatment? • construction or demolition wastes? • redundant machinery or equipment? • contaminated soils or other material? • agricultural wastes? • any other solid wastes? • liquid or solid wastes in suspension? 			<p>required to make every effort to re-use as much of the material as possible within the area of the construction site. Any material to be re-used, which is wet, should be stockpiled to allow it to dry out. Stockpiling should be well away from any sensitive areas of ecological or archaeological interest, or watercourses where pollution could occur.</p>
(e) Pollution and nuisances			
<p>Will the development release pollutants or any hazardous, toxic or noxious substances to air? Emissions from:</p> <ul style="list-style-type: none"> • combustion of fossil fuels from stationary or mobile sources? • production processes? • materials handling including storage or transport? • construction activities including plant & equipment? • dust or odours from handling of materials including construction materials, sewage & waste? • incineration of waste? • burning of waste in open air (e.g. slash material, construction debris)? • any other sources 	Yes	<p>The scheme will not produce any operational phase emissions to air. All emissions from the Project would be limited to the construction or maintenance phases. This would include emissions from vehicles and plant.</p> <p>Dust and air pollution, including odours, can cause disruption to properties and the public adjacent to the construction works and can also have adverse impacts upon other environmental receptors, including watercourses and ecologically designated sites.</p>	<p>No – the vehicle and plant requirements to construct, operate and maintain the roughing grill would be minimal, and largely limited to a piling rig and an excavator / mini digger, if LWD becomes trapped in the grill. These would give rise to minimal emissions and would not be a cause for concern in terms of any potential impact upon environmental receptors.</p> <p>As set out in the EMP for the FAS project, the appointed contractor will be required to implement measures to minimise the amount of dust and emissions (including odour) produced during the construction phase. There will be a Duty of Care on the Contractor to ensure that dust-raising activities are located away from sensitive receptors as much as feasibly possible and duration kept to a minimum when in proximity to a receptor.</p> <p>Mitigation measures would be implemented so that construction works are carried out in such a manner that emissions of dust and other pollutants are limited, and that best practicable means are employed to minimise disruption, risks to human health, and to avoid unnecessary impacts on sensitive ecological habitats.</p>
<p>Is there a potential risk from:</p> <ul style="list-style-type: none"> • leachates? • Escape of wastes or other products/by products that may constitute a contaminant in the environment? 	No	<p>A review of NIEA – Land & Resource Management Unit’s database of sites where, based on their historic land use, there is potential for contamination to be present, would indicate that there is minimal risk of encountering contaminated land during the works.</p> <p>There does however remain a risk of encountering invasive species (e.g. Japanese knotweed), during the works, particularly as this is a riparian environment. The ecology surveys undertaken for the Shimna River identified Japanese knotweed upstream and downstream of the site but</p>	<p>No – the EMP would provide details of environmental control measures to deal with any contaminated land encountered during the site operations and shall be implemented by the appointed contractor.</p> <p>Measures (mechanical or chemical) shall be undertaken to prevent the spread of invasive species during construction or maintenance of the scheme where they are encountered.</p>

Characteristics of the Scheme	Yes/No	Brief Description	Is the effect likely to be Significant?
		did not identify any at the works area. This is reflected in the findings from recent site surveys, which identified cherry laurel on the eastern bank of the river.	
<p>Will the development cause noise and vibration or release of light, heat energy or electromagnetic radiation?</p> <ul style="list-style-type: none"> • from operation of equipment e.g. engines, ventilation plant, crushers? • from industrial or similar processes? • from blasting or piling? • from construction or operational traffic? • from lighting or cooling systems? • from sources of electromagnetic radiation (effects on nearby sensitive equipment as well as people)? • from any other sources? 	Yes	The scheme will not produce any noise and vibration or release of light, heat energy or electromagnetic radiation during the operational phase. The primary impacts would be limited to the construction phase, in particular noise and vibration generated from piling activities.	<p>No – the transient impacts of construction-related noise and vibration would not result in significant effects. Best practicable means of minimising noise on the site must be adopted by the appointed contractor.</p> <p>In light of the type of works proposed, particularly being in river, the greatest concern in this regard would be from a fisheries perspective, and as such this aspect has been given thorough consideration within the Roughing Grill Impact Assessment Report (as included within Appendix B), with a suite of mitigation measures proposed that address piling requirements and timing of works. There are also a range of aquatic biodiversity mitigation requirements set out within the EMP. As such, no significant adverse effects are anticipated.</p>
(f) Risk of accidents, having regard in particular to substances or technologies used			
<p>Will there be a risk of accidents during construction or operation of the development which could have effects on people or the environment?</p> <ul style="list-style-type: none"> • from explosions, spillages, fires etc. from storage, handling, use or production of hazardous or toxic substances? • from events beyond the limits of normal environmental protection e.g. failure of pollution control systems? • from any other causes? • could the development be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslip, etc.)? 	Yes	There is a risk of construction accidents if there is poor management and implementation of control systems such as injury or fatality due to construction traffic, or release of pollutants into the Shimna River for example. Working near or within a watercourse also poses risks to humans and the water environment itself, particularly in light of the extent to which the public (including vulnerable users) utilise this area recreationally and the ecological sensitivity of the watercourse itself.	No - the EMP includes site-specific method statements for all operations where there is a risk of environmental damage. These show how the proposed methods of construction shall restrict impacts on the environment, and how contingency plans and emergency procedures shall limit damage caused by accidents, spillage or any other unforeseen events. The method statements shall include notification procedures to the relevant authorities/environmental bodies. The Contractor shall liaise with the local community during the Contract and the Council to facilitate ongoing usage of the area as much as is practicably possible during construction.
<p>Will the development involve use, storage, transport, handling or production of substances or materials which could be harmful to people or the environment (flora, fauna, water supplies)?</p> <ul style="list-style-type: none"> • use of hazardous or toxic substances? • potential changes in occurrence of disease or effect on disease carriers (e.g. insect or water borne diseases)? • effect on welfare of people (e.g. change of living conditions) • effects on vulnerable groups (e.g. the elderly)? 	Yes	<p>The mobilisation of suspended sediments (SS) due to site works in general is the greatest pollution risk during construction. Pollution of the Shimna River by mobilised SS can have significant adverse ecological (flora & fauna) impacts. Salmonids are particularly sensitive to reductions in water quality, and habitats can be damaged by siltation from settlement of SS.</p> <p>Any construction activities carried out within or close to the Shimna River involve a risk of pollution due to accidental spillage. While liquids such as oils, lubricants, paints, bituminous coatings, preservatives and weed killers present the greatest risk, other materials such as cement can also have serious environmental effects. The refuelling of general</p>	No – the appointed contractor shall be required to undertake due care and attention when working in the vicinity of the Shimna River and associated tributaries and where necessary, a wide range of prescriptive mitigation measures shall be implemented to ensure protection of the water environment. Being in a very sensitive water environment, it will be necessary for the Contractor to undertake all works in a precautionary manner, specifically targeted to avoid pollution of the water environment. On this basis, the Contractor shall be required to prepare a Pollution Control and Contingency Plan (incorporating a Silt Management Plan) to appropriately manage the works.

Characteristics of the Scheme	Yes/No	Brief Description	Is the effect likely to be Significant?
		construction plant also poses a significant risk of pollution, depending on how and where it is carried out.	
<p>Other characteristics: potential physical changes (topography, land use, changes in water bodies etc.) from construction, operation or decommissioning of the development:</p> <ul style="list-style-type: none"> • permanent or temporary change in land use, land cover or topography including increases in intensity of land use? • clearance of existing land, vegetation & buildings? • Peat land disturbance and/ or degradation leading to; carbon release, damage to habitats, affecting land stability or hydrology? • creation of new land uses? • pre-construction investigations e.g. boreholes, soil testing? • construction or demolition works? • temporary sites or housing for construction workers? • above ground buildings, structures or earthworks including linear structures, cut & fill or excavations? • facilities for storage of goods or materials? • facilities for treatment or disposal of solid wastes or liquid effluents? • impounding, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers? • stream crossings? • changes in water bodies or the land surface affecting drainage or run-off? • transport of personnel or materials for construction, operation or decommissioning? long term dismantling or decommissioning or restoration works? • introduction of alien species? • loss of native species or genetic diversity? any other changes? 	Yes	<p>The project would include 7no. piles to be installed as part of the roughing grill directly into the river bed. Each pile would extend 4m above bed level and spaced at 3m centres diagonally across the channel to encourage debris to be deposited at the bank. The height and spacing of the piles have been purposefully designed so that they aim to trap only the type of debris that would result in a blockage at the New Bridge, such as large woody debris (LWD). This is typically branches, large limbs, root boles or entire trees that have fallen into the river. It is not designed to trap smaller branches, twigs and leaf litter, which is typically known as Coarse Woody Debris (CWD), which would more commonly be transported downstream by the river under normal flow conditions.</p> <p>The existing access from Tipperary Lane would be utilised to facilitate construction and future access for maintenance to the roughing grill, of which the proposed location is readily accessible from this access lane with minimal disturbance to the riparian corridor expected. A temporary piling platform would be placed across the river channel to allow the installation of piles using a piling rig. This platform would be removed following the completion of the works.</p>	<p>No – Whilst the project would result in a hydromorphological modification of the Shimna River, the effect of this change is not deemed to be significant, as whilst the impact will be localised, it is not anticipated that it would result in a change to the physical habitat and/or the water bodies' natural functioning. As such, it is not envisaged that it would compromise the attainment of any WFD objectives and status. This aspect has also been considered within the Roughing Grill Impact Assessment Report (as included within Appendix B). The EMP also sets out procedures, standards, work practices and management responsibilities for the implementation of specified mitigation measures developed to address environmental impacts. It shall:</p> <ul style="list-style-type: none"> • act as a continuous link and main reference document for environmental issues between the design, construction, maintenance and operation stages of the project; • demonstrate how construction activities and supporting design shall properly integrate the requirements of environmental legislation, policy, good practice, and those of the regulatory authorities and third parties; • record environmental risks and identify how they will be managed during construction; • record the objectives, commitments and mitigation measures to be implemented together with programme and date of achievement; • identify key staff structures and responsibilities associated with the delivery of the project and environmental control and communication and training requirements as necessary; • describe the Contractor's proposals for ensuring that the requirements of the environmental design are achieved, or are in the process of being achieved, during the Contract Period; • act as a vehicle for transferring key environmental information at handover; and • provide a review, monitoring and audit mechanism to determine effectiveness of, and compliance with, environmental control measures and how any necessary corrective action shall take place.

Table 3.2. EIA Screening Checklist in relation the location of the Scheme

Location of the Scheme	Yes/No	Brief Description	Is the effect likely to be Significant?
(a) Existing Land Use			
Are there existing land uses on or around the location which could be affected by the development, e.g. homes, gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, water catchments, functional floodplains, mining or quarrying?	No	As outlined previously, the works would be contained entirely within the confines of the Shimna River riparian corridor. Whilst the site is located close to the urban fringe of Newcastle, no existing land uses on or around the location are anticipated to be affected by the development (directly or indirectly).	No – The roughing grill does not prevent flooding, in fact, it would contribute to an increased risk of localised flooding within its immediate environs at times of excessive flow due to the potential for debris build up within the grill. The proposed location of the roughing grill has been determined on the basis that any contribution made to an increase in localised flooding could be accommodated without unacceptable risk to property or environment. Again, the roughing grill would be subject to routine maintenance activities to remove debris which has accumulated along the roughing grill, which would reduce the risk of out of channel flooding.
Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected?	No	The project does have an indirect flood prevention benefit in that the grill's fundamental purpose is to reduce the potential for flood related debris and sediment accumulating (and subsequently obstructing the river channel) at the New Bridge (Bryansford Road) during flood events. Based upon the outcome of flood risk modelling and anecdotal evidence of flood related debris being a contributing factor to flooding within the Bryansford Road area, any opportunity to limit the amount of debris that could reach the bridge, would reduce the risk of the flood defences associated with the Shimna River FAS being overtopped, or not functioning in the manner intended.	No – the proper functioning of the roughing grill would contribute to improved functionality and performance of the Shimna River FAS. The indirect benefit of this is that it would give rise to the protection of sensitive land uses within the wider Newcastle area, that have historically been subject to inundation as a result of major flood events.
Is the development located in a previously undeveloped area where there will be loss of greenfield land?	No	As outlined previously, the works would be contained entirely within the confines of the Shimna River riparian corridor.	No – see comments above.
(b) Relative abundance, quality and regenerative capacity of natural resources in the area			
Are there any areas on or around the location which contain important, high quality or scarce resources which could be affected by the development? <ul style="list-style-type: none"> • groundwater resources • surface waters • forestry • agriculture • fisheries 	Yes	The Shimna River is an important river for salmonids and other species and forms an effective wildlife corridor. The river is in a highly natural state due to limited human interference. It is of particular note for the naturalness of the river channel, which exhibits all the physical attributes of in-channel features, flow and riverbed types, typical of unaltered upland rivers. It has been designated as an Area of Special Scientific Interest (ASSI) as detailed below. The Shimna River provides excellent habitat for spawning salmonids, with populations of Atlantic Salmon, Brown Trout and Sea Trout	No – in light of the sensitivities of this environment, a fisheries assessment was undertaken and reported within the Roughing Grill Impact Assessment Report (included within Appendix B). Whilst the project would result in a hydromorphological modification of the Shimna River, the effect of this change is not deemed to be significant, as whilst the impact will be localised, it is not anticipated that it would result in a change to the physical habitat and/or the water bodies' natural

Location of the Scheme	Yes/No	Brief Description	Is the effect likely to be Significant?
<ul style="list-style-type: none"> • tourism • minerals 		<p>present.</p> <p>Marginal semi-natural vegetation along the Shimna River is limited, except at its headwater, and is generally confined to a narrow belt of woodland. This woodland is mainly confined to the riverbank and adjacent slopes.</p> <p>The walking routes along the river are a valuable tourism asset within the Newcastle area, which forms a hub point for services and hospitality on a range of rambling and walking routes through the Mourne Mountains, a significant number of which pass directly through the scheme area.</p>	<p>functioning. As such, it is not envisaged that it would compromise the attainment of any WFD objectives and status.</p> <p>The site selection process determined its suitability partly based on available infrastructure already being in place. The impact would be very localised and contained within a section of the river that is well enclosed by surrounding terrain and mature riparian vegetation.</p> <p>Access to the river will not require any vegetation clearance, though on the east bank, there may be the need to cut back some Cherry Laurel, which is an invasive species. Potential for impact to habitats (i.e. protected species, breeding birds) is considerable minimised on this basis.</p> <p>The EMP (included within Appendix C) sets out a broad range of mitigation and monitoring requirements for terrestrial and aquatic biodiversity including pre-construction surveys.</p> <p>Being in a very sensitive water environment, it will be necessary for the Contractor to undertake all works in a precautionary manner, specifically targeted to avoid pollution of the water environment. On this basis, the Contractor shall be required to prepare a Pollution Control and Contingency Plan (incorporating a Silt Management Plan) to appropriately manage the works.</p> <p>Specific method statements will be produced for each site works area, detailing the work to be undertaken, the risk to the environment (whether ecological or water etc.) and detail the pollution control measures to be implemented.</p> <p>Whilst walking/rambling routes will be affected in the short-term, it is envisaged that in the long-term continued through access along the river would not be hindered, nor would it negate the potential for establishing extension or improved linkages within this area.</p>
<p>(c) Absorption capacity of the natural environment</p>			
<p>Are there any areas on or around the location which are protected under international or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the development?</p>	<p>Yes</p>	<p>The works would have a direct impact upon Shimna River ASSI, which has been designated for the physical features of the river and associated riverine flora and fauna.</p> <p>The works proposed may constitute operations and activities which</p>	<p>No – note comments above</p> <p>Given the sensitivity of the receiving water environment, particularly the selection features of the ASSI, an enhanced system of ecological</p>

Location of the Scheme	Yes/No	Brief Description	Is the effect likely to be Significant?
		<p>would appear to DAERA likely to damage the flora, fauna and physiographical features of the area.</p> <p>The Shimna River is also zoned as a Site of Local Nature Conservation Importance (SLNCI) for similar reasons as to those described above.</p> <p>Although not directly affected by the works, a hydrological pathway could be established to Murlough Special Area of Conservation (SAC)/ASSI as it is located approximately 800m downstream of the site.</p>	<p>supervision shall be implemented during installation of mitigation measures and monitoring provision.</p> <p>The Contractor shall consult and comply with the requirements of DAERA with respect to the site or species protected by law, which are likely to be affected by the construction, establishment and maintenance of the site.</p> <p>Specific method statements will be produced for each site works area, detailing the work to be undertaken, the risk to the environment (whether ecological or water etc.) and detail the pollution control measures to be implemented.</p>
<p>Are there any areas on or around the location which are protected under international or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the development?</p>	<p>Yes</p>	<p>The works would have a direct impact upon Local Landscape Policy Area (LLPA) 2 Bryansford Road – Enniskeen Hotel and large houses and Shimna River Corridor, as designated within the Ards and Down Area Plan 2015. Within the study area, it is designated for:</p> <ul style="list-style-type: none"> • areas of woodland and important tree groups - substantially wooded corridor of high environmental quality and visual amenity provides a good visual entrance feature into town; • original character defined by low density housing and areas of fine wooded landscape; • river significant for salmon fishing and breeding and local nature conservation interest - river and trees support a range of habitats and species; • public access along river alongside Tipperary Wood linking to Tipperary Lane with potential for extension and linkage with Tollymore Forest Park; and landform backdrop to river emphasises visual significance of the area. <p>The Northern Ireland Landscape Character Assessment describes the town's dramatic mountain setting and the strong contrasts between the mountains, the flat dune landscape at the shore, and the series of river valleys which radiate inland from the town. It refers to areas of locally distinctive landscape within the town, including the Shimna valley, Tipperary Wood and Donard Park and the river corridors associated with the Glen, the Tullybrannigan and the Burren rivers.</p> <p>The area is also located within the Mourne Area of Outstanding Natural Beauty (AONB). It is not located within a Marine Conservation Zone (MCZ).</p>	<p>No – the impact would be very localised and contained within a section of the river that is well enclosed by surrounding terrain and mature riparian vegetation. This will limit considerably the potential for adverse landscape or visual impacts beyond the immediate confines of the site.</p> <p>The roughing grill would be located approximately 80m upstream of the existing fish counter / gauging station, so whilst each of the piles would be quite high, they would be within the same reach of the river that has already been locally subject to hydromorphological modification, and thus would not be out of scale and character.</p> <p>The location also used to be a crossing point, so already has the necessary access infrastructure in place to service the piles as part of any routine maintenance and debris clearance regime.</p>
<p>Are there any other areas on or around the location which are important or sensitive for reasons of their ecology?</p>	<p>No</p>	<p>The main aspects of ecological importance and sensitivity have been addressed above.</p>	<p>See comments made above.</p>

Location of the Scheme	Yes/No	Brief Description	Is the effect likely to be Significant?
<ul style="list-style-type: none"> wetlands, watercourses or other water bodies; the coastal zone; mountains, forests or woodlands; nature reserves and parks. 			
Are there any areas on or around the location in which species and habitats of Local Biodiversity Action Plan importance are present?	Yes	The Newry, Mourne and Down Local Biodiversity Action Plan (LBAP) 2017-2022 identifies the importance of fish species and the risks associated with physical degradation of habitats, with the Department identified as a key body to improve habitats where appropriate. It also identifies the importance of woodland, in particular mixed ashwoods, as found in the Newcastle Valleys. Key threats include habitat loss and/or fragmentation, and local action includes increasing the woodland cover and new woodland planting schemes on publicly accessible land.	No – note previous comments.
Are there any areas on or around the location which are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected?	Yes	A broad suite of ecological surveys were undertaken as part of the Shimna River FAS, these included Phase 1 Habitat, Otter, Badger, Bat, Red squirrel and Breeding Bird surveys.	No – Section 5.6 of the EMP (included within Appendix C) prescribes the mitigation measures necessary for the Contractor to implement in order to prevent or reduce adverse impacts upon ecological receptors, especially where the predicted impacts of the Project may result in a significant effect. It also takes into account the legal requirements associated with statutory protected sites and species. These will equally be applicable to the roughing grill project.
Are there any inland, coastal, marine or underground waters on or around the location which could be affected?	Yes	Note previous comments.	No – note previous comments.
Are there any groundwater source protection zones or areas that contribute to the recharge of groundwater resources?	No	N/A	N/A
Are there any areas or features of high landscape or scenic value on or around the location which could be affected?	Yes	The works would have a direct impact upon Local Landscape Policy Area (LLPA) 2 Bryansford Road – Enniskeen Hotel and large houses and Shimna River Corridor, as designated within the Ards and Down Area Plan 2015. It is also located within the Mourne AONB.	No – note previous comments.
Are there any routes or facilities on or around the location which are used by the public for access to recreation or other facilities, which could be affected?	Yes	A multitude of walking/rambling routes pass along the river corridor and through the works area, including the Ulster Way, Mourne Way and Newcastle Way.	No – whilst walking/rambling routes will be affected in the short-term, it is envisaged that in the long-term continued through access along the river would not be hindered, nor would it negate the potential for establishing extension or improved linkages within this area.
Are there any transport routes on or around the location which are susceptible to congestion or which cause environmental problems, which could be affected?	No	N/A	N/A

Location of the Scheme	Yes/No	Brief Description	Is the effect likely to be Significant?
Is the development in a location where it is likely to be highly visible to many people?	No	The extent of existing mature woodland that bounds the Shimna River and the terrain would screen the roughing grill from the majority of visual receptors.	No - those worst affected by the scheme would be transient users who are either passing through the area or utilising Island Park, and this may in fact become a feature of interest.
Are there any areas or features of historic or cultural importance on or around the location which could be affected?	No	The closest archaeological site is the Scheduled St Cillian's Fort fronting onto Bryansford Road, approximately 208m north-west of the site. There is no other known area or feature of historic or cultural importance on or around the location which could be affected.	No – The appointed contractor must properly assess and plan for the archaeological implications of the project where development may affect land with archaeological significance or potential. The Contractor shall ensure that the destruction of archaeological remains will be avoided wherever possible and should never take place without prior archaeological excavation and recording.
Are there any areas on or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected?	No	N/A	N/A
Is the location of the development susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the development to present environmental problems?	No	The area is susceptible to flooding but the scheme will alleviate this.	N/A
(d) Transboundary nature of the impact			
Is there potential for transboundary impact?	No	N/A	N/A

4. Consideration whether proposed drainage works have significant effects on the environment

4.1 EIA Screening Conclusions

As per the requirements of Regulation 7 of the Drainage (Environmental Impact Assessment) Regulations (Northern Ireland) 2017, the specified information on proposed drainage works of the type listed in Annex II to the Directive, and the selection criteria in Schedule 2B to the Drainage Order, have been screened within Tables 3.1 and 3.2.

In consideration of this, it is concluded that the likelihood of significant environmental effects can be ruled out in light of the physical characteristics of the whole project and the environmental sensitivity of the geographical area likely to be affected. This reasoned conclusion has been reached on the basis that whilst the roughing grill would be located within sensitive sites such as Shimna River ASSI and Mourne AONB, in consideration of its nature, size, scale and location, it would not give rise to environmental impacts that would result in significant environmental effects within the designated area. This conclusion also is fundamentally based upon the principle that the roughing grill shall be developed in accordance with the requirements of:

- *'Shimna River Roughing Grill: Identification of a preferred location and the assessment of potential impacts on fisheries interests'* (November 2020); and
- *'Shimna River Flood Alleviation Scheme EMP'* (February 2021).

It is again worth noting that it has been deemed that the project is not of the type listed in Annex II, a precautionary principle was applied in this instance in light of the sensitivity of the receiving water environment. Subsequent to this, it is confidently concluded that the roughing grill would not give rise to potential significant effects that would justify undertaking an Environmental Impact Assessment (EIA).

4.2 Notice of Determination

Pursuant to Regulation 7 of the Drainage (Environmental Impact Assessment) Regulations (Northern Ireland) 2017, the Department having taken into account, so far as relevant, the criteria set out in Schedule 2B to the Drainage Order (as detailed above) and the available results of other environmental assessments required under Union legislation (other than legislation implementing the requirements of the Directive), shall determine that the proposed drainage works are not likely to have significant effects on the environment.

In light of this, the Department shall by general and local advertisement:

- a) state that it proposes to carry out the drainage works in question;
- b) describe briefly the nature, size and location of the proposed drainage works;
- c) state that it does not propose to prepare an environmental statement in respect of the drainage works, and the main reasons why with reference to the relevant criteria in Schedule 2B to the Drainage Order;
- d) state any features of the project and/or measures envisaged to avoid or prevent any significant adverse effects on the environment;
- e) state that any person may make representations to the Department in writing in relation to the likely environmental effects of the proposed drainage works at an address specified in the notice within 30 days of the date of the publication of the notice in the Belfast Gazette; and
- f) describe what other information relating to the environmental effects of the proposed drainage works is available and give details of where it can be obtained.

Where the Department publishes an advertisement (as set out above), it shall, on or before the date of the publication of the notice in the Belfast Gazette, send a copy of that notice to each of the consultation bodies.

The Department shall make available to the public concerned any additional information which is relevant to a case to which this regulation applies but which only becomes available after the publication of the advertisements.

Appendix A : Site Photos











Appendix B : Shimna River Roughing Grill: Identification of a preferred location and the assessment of potential impacts on fisheries interests (November 2020)

Shimna River Roughing Grill:

Identification of a preferred location and the assessment of potential impacts on fisheries interests

November 2020



1. Introduction

Paul Johnston Associates Ltd has been asked by AECOM to provide advice on the identification of a preferred location for the installation of a “roughing grill” for the Shimna Flood Alleviation Scheme and to assess the potential impacts. A draft specification of the roughing grill design and construction method statement (CMS) has been provided verbally by AECOM. The method will involve installation of 4 to 5 steel sleeved columns (possibly filled with concrete) into the bed of the Shimna River and arranged across the channel at a 45-degree angle from bank to bank. A candidate section of channel approximately 250m long, located from upstream of the existing gauging station/ fish counter to the boundary of the scout camp area, was identified by AECOM as potentially suitable for installation of the roughing grill (Figure 1); this section is hereafter called “the study area”.

This report has two key objectives;

- Identify preferred locations that minimise potential impacts on fisheries habitat within the candidate section under consideration.
- Describe potential impacts of the construction of the roughing grill on fisheries interests and recommend mitigations to address such impacts

2. Methodology

2.1 Field assessment

In October 2020, an initial site visit was made with AECOM engineers to the Shimna River to assess the study area under consideration. During the visit, the limits of the study area were explained by the on-site engineer while preferred locations of the roughing grill were indicated. In order to assess potentially sensitive salmonid habitat, a survey of the study area was undertaken based on the Life Cycle Unit method developed by Kennedy (1984) and currently used by DAERA Inland Fisheries Division to classify and grade habitat quality.

The procedure involved mapping of the river channel to detail spawning, nursery and holding water, with quality scores assigned to each type of habitat. Habitat type was recorded as:

- Nursery (shallow rock/cobble riffle areas for juvenile fish - fry/parr).
- Holding (deeper pools/runs for adult fish).
- Spawning (shallow gravel areas for fish spawning).
- Unclassified (unsuitable for fish – shallow bedrock areas or heavily modified sections of channel).

Each stretch of a habitat type is also graded 1 to 4, based on a series of criteria as set out in Annex 1 of the DANI advisory leaflet. In essence, grades 1-3 are of fisheries interest (Nursery, Holding and Spawning) whereas grade 4 is marginal / of non-fisheries interest (unclassified) which generally describes a substrate of fine silt, or extensive bridge invert, or engineered channel with solid bed and possibly constrained banks. The data were collated and ArcGis 10.7 was used to digitise salmonid habitat grades and quality in the study area.

This information was then used to identify areas more suitable for the installation of the steel columns. For example, it was considered that the least sensitive habitat would not contain spawning gravels or nursery habitat but could include lower quality shallow pools (Grade P3).

2.2 Assessment of Impacts

The assessment of site sensitivity and the significance of potential effects used the same approach based on DMRB guidelines as outlined in Chapter 15 of the Shimna FAS Environmental Statement (AECOM, 2018). However, the DMRB guidance has been updated in the interim as Road Drainage and the Water Environment, Volume 11, Section 3, Part 10 LA 113 (DMRB, 2019).

2.3 Baseline Conditions

Salmonid Habitat

An outline of salmonid habitat quality within the study area is shown in Figure 2. Approximately 240m of river habitat was mapped with several areas of the lower section comprising sensitive moderate to good quality nursery habitat (N2 and N3) and good quality spawning gravels (S2). The middle section also had a long area of good quality nursery (N2) and moderate spawning gravels (S3). Two key locations were identified as potentially suitable for the installation of the roughing grill. Both locations were within grade 3 pools (P3), with the grading reflecting water depth that is sub-optimal to that normally required in resting pools for adult salmon and trout.

Candidate location 1

Candidate location 1 was situated downstream of an area of good quality nursery habitat (Grade N2) and just below the location of the track to an old disused crossing ford (Figure 2; Plate 1). The habitat in this area is consistent with moderately deep glide/ pool. Advice received by AECOM indicates that the installation of roughing grill columns at this location would have the added benefit of ease of access for Rivers Agency staff (via the track) to conduct maintenance of the structure in the event that large trees and debris collect there during a future flood event.

Plate 1. Candidate location 1 – view downstream of Grade 3 holding pool.



Candidate location 2

Candidate location 2 was situated just below the scout camp green, presumably used for activities and placement of tents, and downstream of a deep resting pool (grade P1); habitat in this location also was grade 3 pool (P3) reflecting the shallower nature at the tail of the large deep pool (Figure 2; Plate 2). This location is likely to be less preferred due to the more difficult access and its proximity to the scout camping area where it could be considered less pleasing aesthetically.

Plate 2. Candidate location 2 – view upstream to Grade 3 holding pool.



2.3.1 Site sensitivity

As indicated for the Shimna River in Chapter 15 (AECOM, 2018), the study area within the Shimna River assessed here also of Very High sensitivity due to the presence of Atlantic salmon, listed on Annex II of the Habitats Directive, and its occurrence within the wider section of river within the Shimna River ASSI designation.

Habitat within the study area where the roughing grill is proposed is of high sensitivity owing to the presence of good quality salmonid nursery habitat and spawning gravels that would support juvenile salmon and trout, and including eggs and alevins post-spawning. The two locations under consideration for placement of the roughing grill are of lower sensitivity in terms of fisheries habitat because they encompass sub-optimal glide/pools that would be less preferred as resting pools for adult fish. Nonetheless, these suboptimal glide/ pools may support lower abundance of juvenile fish.

2.4 Predicted Impacts

2.4.1 Construction

In order to facilitate pile installation, the contractor will construct a piling platform in the river using granular material such as crusher run. A series of steel sleeved piles, potentially projecting to over 3m above the river bed, will be driven into the bed from the platform using an impact hammer. Preliminary geotechnical assessment will determine the need for pre-boring in order to obtain the required level of embedment. Depending on the pile size, there may be a requirement for the pouring of concrete into each pile sleeve subsequent to the required embedment level being achieved. An alternative to the above method is the use of pre-cast concrete units forming the foundation of the piles.

These construction activities have the potential to cause the following impacts;

- sediment release and entrainment;
- the release of other pollutants;

- noise and vibration;
- temporary obstruction of fish passage
- temporary loss of habitat

2.4.1.1 Sediment release and entrainment

The effects of fine sediment on fisheries and the aquatic environment were outlined in some detail in the original Shimna FAS Environmental Statement (AECOM, 2018). Briefly, fine sediment can cause impacts on fish both through suspension in the water column and deposition on the river bed.

Suspension of fine sediment has the potential to impact on visual feeding by altering prey capture efficiency, and on respiration by impairing oxygen exchange at the gill and water interface (Kemp et al., 2011). Salmonids such as trout and salmon, the likely dominant fish species within the study area, are considered most sensitive to sediment release. While adult salmonids also are prone to gill-clogging and visual impairment, they are more mobile than sessile egg or juvenile stages, and thus more capable of avoiding locally poor conditions.

Sediment deposition and embedment in spawning gravels can in-fill interstitial gravel spaces and reduce oxygen exchange for incubating eggs. Deposited sediment also can reduce the complexity of habitat for newly emerged salmonid fry, resulting in reduced territory size, optimal habitat area and lower carrying capacity (Newcombe and Jensen, 1996).

The requirement for in-channel works and proximity of plant would indicate a high potential for entrainment of fine sediment. Given the good quality nursery and spawning habitat, acute or persistent sediment run-off at this location could cause local egg mortality and loss or a reduction in the carrying capacity of juvenile fish in the nearby nursery areas resulting in an impact of **Moderate magnitude**.

2.4.1.2 Release of other pollutants

As already indicated for the proposed FAS Environmental Impacts in Chapter 15, construction works on the river banks and within the channel (pile driving) would pose a risk of significant risk of spillage of diesel, petrol, oils and lubricants involved with plant use and liquid storage. The potential use of concrete to fill the steel pile sleeves would pose an additional risk to fish and aquatic species. Depending on the severity of any release, hydrocarbons and concrete are highly toxic to fish and aquatic life and can persist in the environment for many years (Mason, 1997). Any chemical spill could therefore cause impacts of **Major magnitude** in the Shimna in the vicinity and downstream of the candidate roughing grill locations largely due to toxicity and potential persistence.

2.4.1.3 Noise and vibration

This potential impact is specific to activity associated with the installation of the piles. Vibration and noise associated with percussive activities such as vibratory or impact hammers have the potential to disrupt migratory behaviour or cause injury to sensitive fish species such as salmon, trout, and eels, all of which are present in the Shimna River (see AECOM, 2018).

When a pile driving hammer strikes a pile, the sound propagates both in air and along the length of the pile, into the water and around the substrate at the pile base (Hastings and Popper, 2005). Vibration and noise have the potential to impact on migratory behaviour and injure sensitive life-stages of species such as salmon, trout, and eels migrating past the works area in the river. In a review of the potential effects of underwater noise and vibration cause by drilling operations in the River Wye, Parvin et al. (2007) predicted an impact of Neutral to Negligible magnitude; this low magnitude of impact was associated with behavioural avoidance in a few individuals of a population of a sensitive species with specialist hearing abilities, such as Shad (*Alosa spp.*) to a low likelihood of disturbance for a hearing generalist such as Atlantic salmon.

However, methods that employ percussive blows are likely to have a greater impact than rotational methods such as drilling if the works coincide with peak migration periods in the Shimna of species such as adult salmon and sea trout (September to December; Chapter 15 Shimna FAS ES) or

downstream migrating smolts (April/ May); effects are likely to be sub-lethal and would be expected to cause local impacts through delay of the return of adult fish and interference with spawning, which are consistent with at worst **Moderate magnitude** if works coincide with a run of fish.

Given the presence of good quality spawning gravels within the study area, impacts on other fish life stages are possible. For example, mechanical shock has been documented as a key factor of mortality in incubating eggs of salmon and trout (see Crisp, 1993). Drilling methods that use rotation, have the potential to cause minimal vibration as compared to methods that cause mechanical shock by percussive blows. Given the localised nature of the proposed works, the potential impact on incubating salmonid eggs would be of **Moderate magnitude**.

2.4.1.4 Temporary Obstruction of Fish Passage

The temporary piling platform has the potential to obstruct the channel unless flows are appropriately managed. Channel blocking could impair fish movement during periods of upstream migration prior to spawning or downstream migration of smolts. Any reduction in juvenile salmonid production could impact on the population and would depend on the duration of blockage (if any) and timing. Localised effects could be caused by short duration works (e.g. few days) resulting in impacts of **Minor magnitude**. Obstructions caused during peak migrations could inhibit spawning or impair downstream movement of smolts increasing their susceptibility to predation; where channel obstruction occurs for several weeks, the impact could be of **Moderate magnitude**.

2.4.1.5 Temporary Loss of Habitat and associated fish mortality

The temporary piling platform will be 5-6m wide crossing the channel and will result in some covering of the natural riverbed and compaction of underlying substrate and potentially juvenile fish. However, the main sensitive habitats are good quality nursery and spawning areas that are present within the two candidate locations under consideration for installation of the roughing grill. Both candidate areas have sub-optimal glide/ pool habitat that would offer low potential as resting pools for migrating adult fish. While the placement of the granular material will cause localised compaction and crushing of *in-situ* fish, the temporary nature, and lack of sensitive fish habitat indicates that such works would have an impact on fish habitat at worst of **Minor magnitude**.

2.4.2 Operation

The potential for any impacts would be significantly reduced during the operational phase of the scheme with the construction of the roughing grill complete. Any compaction caused by the temporary platform would have reverted to the original riverbed type over time due to the restructuring effects of natural river flows. There will be minimal impact on angling as both candidate locations for the roughing grill are situated distantly from areas where anglers would fish for adult salmon and sea-trout, such as the large pool and its tail in the middle of the study area (see Figure 2). Additionally, while Candidate Location 1 occurs in glide habitat downstream of an existing access track, the overhanging vegetation and trees on the opposite bank (true left side) make it difficult to fly-fish here.

However, the roughing grill will require maintenance during and after flood events that will involve clearing of captured debris including branches and trees using chainsaws and possibly heavy plant. There is the potential for some disturbance to the riverbed to gain access to the grill and thus the following potential impacts;

- sediment release and entrainment;
- the release of other pollutants;
- Permanent loss of habitat

2.4.2.1 Sediment and the release of other pollutants

The nature of the requirement to access the grill and prevent flooding means that any maintenance works will be of short-duration (1-day). It is anticipated that most blockages can be tackled by chainsaw and personnel within the channel rather than plant. However, should plant be required to

remove larger obstacles, there is some potential for compaction of substrate, sediment release and release of other pollutants such as petrol and oils. Such activities would be on a smaller scale than the construction works and so temporary loss of habitat and sediment release are expected to be of **Negligible magnitude**. However, with a remaining risk of the spillage of oil and petrol (chainsaws and plant) effects could be at worst of **Moderate magnitude** depending on the scale of any inputs (e.g. worst case spillage of fuel from in-channel excavator).

2.4.2.2 Permanent loss of habitat

Up to 5 piles will be installed in the bed of the Shimna River to create the roughing grill. The installation will result in a very small loss of available habitat area. The small area, coupled with the low sensitivity sub-optimal pool means that any loss of riverbed habitat will be of **Negligible magnitude**.

2.5 Mitigation Measures

2.5.1 Construction

2.5.1.1 Sediment release and entrainment

The Construction Environmental Management Plan (CEMP) will state the various mitigations to reduce the risk of sediment release during bankside and in-channel works associated with the platform construction and piling activity. The CEMP will emphasise the need for the contractor to adhere to relevant pollution prevention guidelines such as;

- PPG1: Understanding your environmental responsibilities – good environmental practices
- GPP5: Works and maintenance in or near waters.
- PPG6: Working at construction and demolition sites

The following additional mitigations are essential for managing the risk of sediment entrainment;

- Works should be scheduled as far as possible during seasons/ periods of when rainfall is lower to minimise the risk of increased sediment mobility and run-off
- Silt-laden water in excavations should be pumped to settlement tanks or silt socks and allowed to settle before discharge to an approved receptor. Pumps should be regularly monitored to prevent uptake of sludges from settlement areas.
- Spoil areas should be located distant from the watercourse with bunding to prevent sediment run-off, particularly during heavy rainfall events.
- Plant access to the channel will be via the piling platform only so as to minimise disturbance of the bank and riverbed, thereby reducing sediment release

2.5.1.2 Release of other pollutants

As per the CEMP, the following relevant pollution prevention guidelines should be adhered to;

- PPG1: Understanding your environmental responsibilities – good environmental practices
- GPP2: Above ground oil storage tanks
- GPP5: Works and maintenance in or near waters.
- PPG6: Working at construction and demolition sites
- GPP8: Safe storage and disposal of used oils
- GPP21 Pollution incident response planning
- GPP22 Dealing with spills
- GPP26 Safe storage – drums and intermediate bulk containers

The following additional measures should be undertaken to minimise the risk of spillage of oils and fuel and concrete slurries;

- drip trays to be used for standing plant – e.g. bank-side generators
- storage of fuels / oils in designated bunded areas (110% capacity of stored volume) with impervious base
- refuelling points at least 10m distant from the watercourse and any connected drain
- oil absorbers and grab packs available on all plant
- Any use of concrete should be conducted by managing washout of concrete plant in designated areas at least 10m from the watercourse of any surface drains and into lined skips/ pits to prevent egress to the watercourse. In particular, if concrete is used as an option to fill steel-sleeved pile columns, it is recommended that an area around the base of the intended pile location within the river channel is isolated to prevent egress to the water. This could be in the form of an isolation collar or driven sheet bunding.
- An Emergency Response Plan shall be prepared by the appointed contractor and included in the CEMP.
- All workers should undergo training using an Enviro-Toolbox talk that provides an overview specifically of the sensitivity of the Shimna River.

2.5.1.3 Noise and Vibration

Piling

It is preferable that piling is conducted using non-percussive methods such as vibro-piling or rotational augering to reduce the risk of mechanical shock and vibration on the various fish life stages potentially present such as incubating eggs and juvenile fish. Should percussive methods be the preferred option, it is recommended that a minimum 25m distance be maintained between the piling platform and the nearest sensitive spawning habitat. For example, there are two main areas with spawning potential in the study area (S2 and S3; Figure 2); both candidate locations are expected to be a minimum of 25m from these habitats.

While recognising the 25m buffer indicated above, piling works should be avoided when sensitive life-stages are present such as incubating eggs and emerging fry. Overlap across life-stages and migration periods precludes a period when there is no risk. DAERA require that in-stream works are conducted between 01st May and 30th September to avoid the more critical salmonid spawning season and egg incubation phases, 01 October – 30 April (DAERA, 2011). This would also largely avoid the peak period of adult salmon and sea trout runs in the Shimna, typically September to December.

2.5.1.4 Temporary Obstruction of Fish Passage and Loss of Habitat

Mitigation by design

The mapping of salmonid habitat has informed the identification of candidate locations that will minimise impacts on the most sensitive nursery and spawning habitats within the study area.

Timing of works

Construction of the piling platform should be avoided when sensitive life-stages are present (incubating eggs/ fry). Overlap across life-stage and species migration periods precludes a period when there is a zero risk. However, DAERA require that in-stream works are conducted between 01st May and 30th September to avoid the more critical salmonid spawning season and egg incubation phases, 01 October – 30 April (DAERA, 2011). *It is advised that an area of the river channel remains open to permit natural in-stream movement of fish during works.*

Fish rescue

A fish rescue and re-location exercise would be required in the area where the platform is intended so that any *in-situ* fish can be removed to prevent mortality due to compaction. The fish rescue operation would be carried by an approved contractor using electric fishing techniques; the fish would be re-located a sufficient distance upstream of the works reach. This operation would require Section 14 authorisation under the Fisheries Act, 1966, which would be issued by DAERA Inland Fisheries.

2.5.2 Operation

2.5.2.1 Sediment release and the release of other pollutants

The main impact here was considered as the risk of spillage of hydrocarbons from plant including chainsaw operation within the channel during clearance of blockages. The same mitigations outline under Section 2.5.1.2 shall be implemented here.

2.6 Residual Impacts

Potential impacts of the proposed roughing grill and piling platform on fisheries were assessed against proposed mitigation measures, as a means of assessing the residual impacts associated with the scheme. The residual impacts of these options for the scheme most accurately reflect the overall predicted impacts on fisheries during the construction and operation phases.

2.6.1 Construction

2.6.1.1 Sediment release and entrainment

Following implementation of the full range of recommended mitigations, the potential for impacts of sediment entrainment in the Shimna River would be reduced from Moderate to **Negligible** magnitude and **Neutral Significance**.

2.6.1.2 Release of other pollutants

Following implementation of the full range of recommended mitigations, the potential for impacts of other pollutants in the Shimna River would be reduced from **Major** to **Negligible** magnitude and **Neutral Significance**.

2.6.1.3 Noise and vibration

Following implementation of the full range of recommended mitigations, the potential for impacts of noise and vibration in the Shimna River would be reduced from **Moderate** to **Negligible** magnitude and **Neutral Significance**.

2.6.1.4 Temporary obstruction of fish passage

Following implementation of the full range of recommended mitigations, the potential for temporary obstruction of fish passage in the Shimna River would be reduced from **Moderate** to **Negligible** magnitude and **Neutral Significance**.

2.6.1.5 Sediment release and entrainment

Following implementation of the full range of recommended mitigations, together with careful adherence to pollution prevention guidelines, the potential for sediment release and entrainment during maintenance operations in the Shimna River would be reduced from **Minor** to **Negligible** magnitude and **Neutral Significance**.

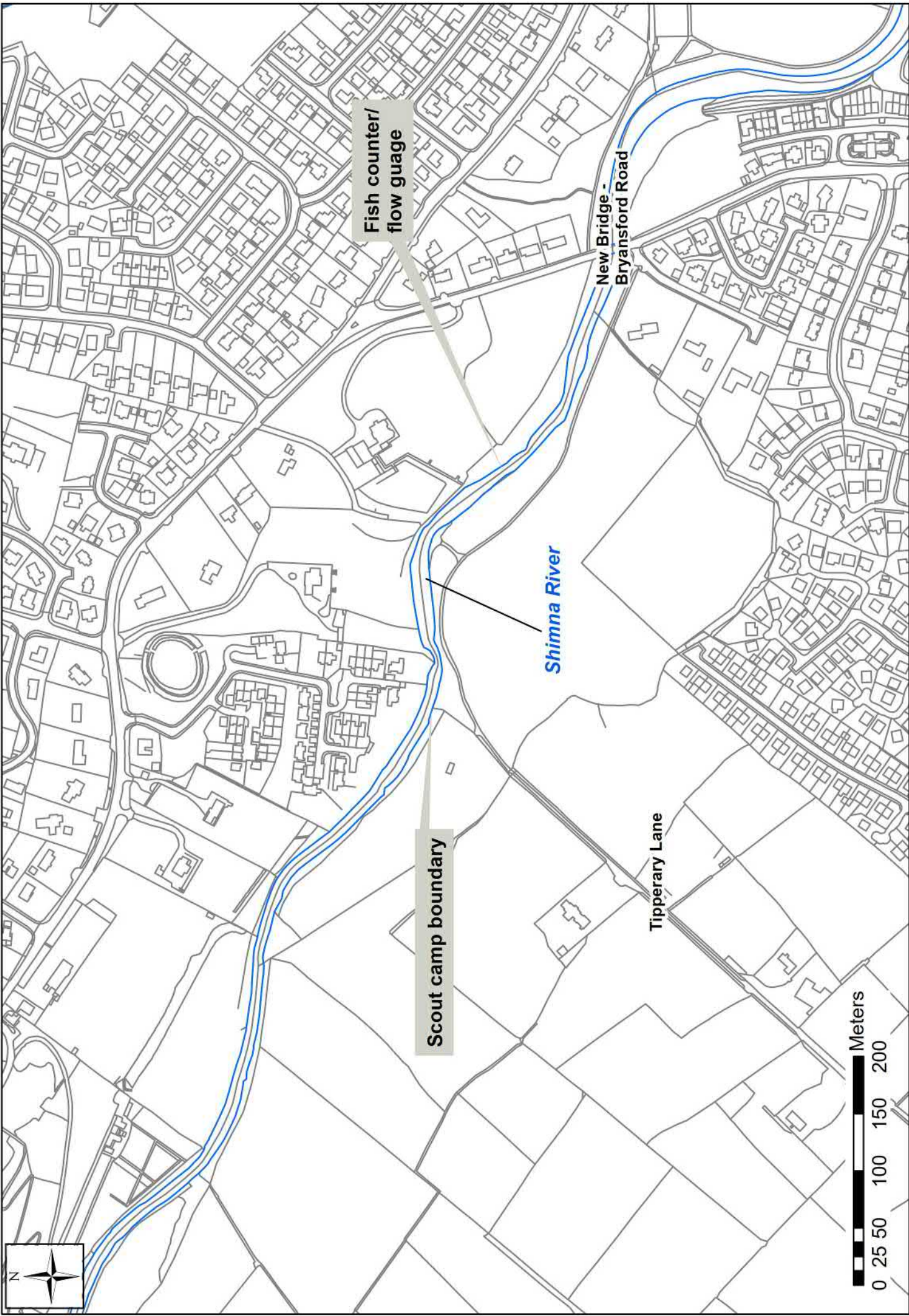
2.6.2 Operation

2.6.2.1 Sediment release and entrainment and the release of other pollutants

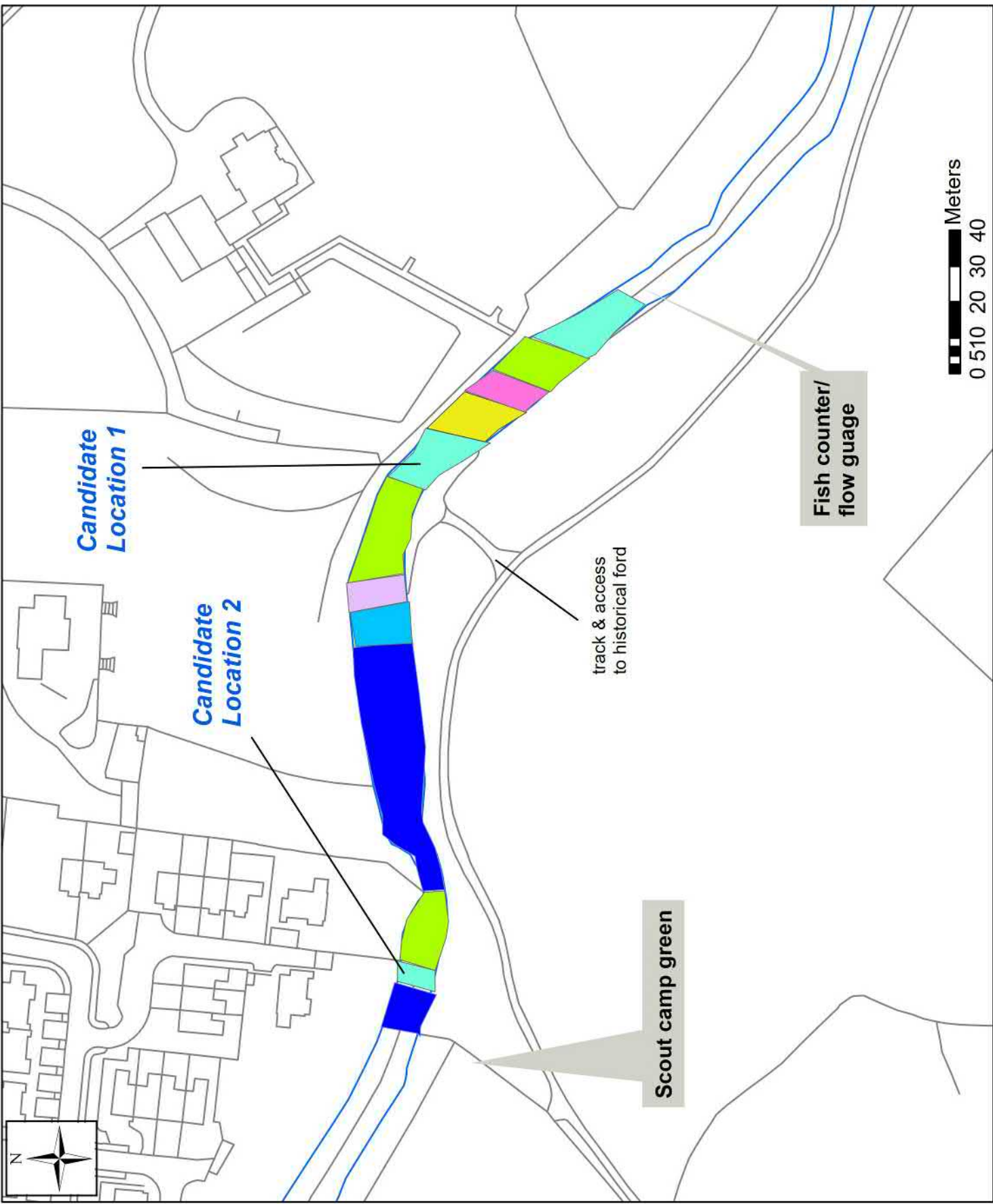
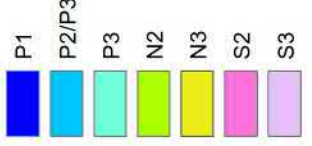
Following implementation of the full range of recommended mitigations, the potential for the release of sediment and other pollutants in the Shimna River would be reduced from **Moderate** to **Negligible** magnitude and **Neutral Significance**.

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Salmonid habitat quality



Appendix C : Shimna River Flood Alleviation Scheme EMP (February 2021)

Shimna River Flood Alleviation Scheme

Environmental Management Plan

Department for Infrastructure (DfI) Rivers

February 2021

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AECOM Limited ("AECOM") has prepared this plan for the sole use of the Department for Infrastructure - Rivers ("Client") in accordance with the terms and conditions of appointment. This plan shall be used to inform the appointed contractor for the Shimna River Flood Alleviation Scheme of their environmental obligations and requirements to be enacted during the construction phase of the project, and beyond as necessary.

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1. Introduction

1.1 Background

This Environmental Management Plan (EMP) and relevant supporting information sets out the procedures, standards, work practices and management responsibilities for the implementation of specified mitigation measures developed to address environmental impacts arising from construction of the Shimna River Flood Alleviation Scheme (FAS) - hereafter referred to as 'the Project'. This shall primarily be achieved through implementation of the Register of Environmental Actions and Commitments (REAC) by the appointed contractor as set out within Section 5 of this EMP.

The EMP provides a framework for which the specified mitigation measures required by the range of conditions can be realised. It outlines the approach to environmental management throughout the construction of the project and beyond, with the primary aim of reducing any adverse impacts from construction upon the environment.

This EMP shall be adopted and expanded by the appointed Contractor into a Construction Environmental Management Plan (CEMP) as more information becomes available and there is more certainty in terms of the layout, construction methods, programme and the likely environmental effects.

The Contractor's CEMP itself will be subject to ongoing review throughout the construction phase, through regular environmental auditing and site inspections, and would be agreed in writing with the Employer's Project Manager. This will confirm the efficacy and implementation of all relevant mitigation measures and commitments identified throughout this EMP, and in particular the REAC.

Towards the end of the construction phase, the CEMP shall be further refined by the Contractor as necessary into a Handover Environmental Management Plan (HEMP) which shall contain essential environmental information needed by those responsible for the future maintenance and operation of the Project. This would also be subject to review and agreed in writing with the Employer's Project Manager.

With this purpose in mind, it therefore follows that this EMP and subsequent CEMP shall be treated as 'live' documents, until one is superseded by the other, and so on throughout the project lifecycle. This process therefore requires regular review and update as necessary, subject to the agreed acceptance procedures.

1.2 Environmental Management Plan

The preparation of an EMP is widely considered to be best practice to manage construction related environmental impacts of projects and to demonstrate compliance with environmental legislation. It provides the framework for recording environmental risks, commitments and other environmental constraints, and clearly identifies the structures and processes that will be used to manage and control these aspects.

The EMP also ensures compliance with relevant environmental legislation, government policy objectives and project-specific environmental objectives. It also provides the mechanism for monitoring, reviewing and auditing environmental performance and compliance.

The EMP (and subsequent iterations) set out the control of environmental effects through all lifecycle stages from the design stage in accordance with Table 1.1.

Table 1.1: Delivery schedule and updates of the EMP

Project stage	EMP Iteration	Produced / Refined
Design	First iteration of EMP produced during the design stage for the Project.	Produced
Construction (refined for the consented project)	Second iteration of EMP (the CEMP) prepared in advance and then subsequently refined during the construction stage for the Project.	Refined
End of construction	Third iteration of EMP (the HEMP) building on the CEMP refined at the end of the construction stage to support future management and operation of the asset.	Refined

The EMP (and subsequent iterations) shall be refined and updated when additional information comes to light to

capture any necessary alterations to the proposed mitigation and management of environmental effects. Such additional information or alterations can include:

- new or updated survey data;
- changes in the physical characteristics of the project;
- changes in the design and mitigation assumptions;
- changes in the level of understanding of the current state of the environment and the potential effects of the development (e.g. due to greater data availability);
- changes in legislation, policy and guidance/advice relating to any environmental topic; and
- changes in response to stakeholder consultation.

1.2.1 Environmental Management Plan Objectives

The objectives of this EMP and subsequent iterations are therefore to:

- act as a continuous link and main reference document for environmental issues between the design, construction, maintenance and operation stages of the project;
- demonstrate how construction activities and supporting design shall properly integrate the requirements of environmental legislation, policy, good practice, and those of the environmental regulatory authorities and third parties;
- record environmental risks and identify how they will be managed during the construction period;
- record the objectives, commitments and mitigation measures to be implemented together with programme and date of achievement;
- identify the key staff structures and responsibilities associated with the delivery of the project and environmental control and communication and training requirements as necessary;
- describe the Contractor's proposals for ensuring that the requirements of the environmental design are achieved, or are in the process of being achieved, during the Contract Period;
- act as a vehicle for transferring key environmental information at handover to the body responsible for operational management. This shall include details of the asset, short and long-term management requirements, and any monitoring or other environmental commitments; and
- provide a review, monitoring and audit mechanism to determine effectiveness of, and compliance with, environmental control measures and how any necessary corrective action shall take place.

1.2.2 Environmental Management Plan Preparation, Structure and Content

The EMP shall:

- provide a clear audit trail outlining the modifications made from any previous iteration;
- identify roles and responsibilities;
- identify risks, their associated control measures, compliance and corrective actions; and
- establish procedures for communication, monitoring, audit mechanisms and reporting of control measures.

The scope of this EMP (and any iterations of it thereafter) covers the design, construction and completion of the project. The spatial scope of the works will cover:

- the boundaries of the site made available by the Employer for the works;
- any areas where the works have an impact beyond the site boundary (i.e. emissions, discharges, travel & transport);
- any additional working areas; and
- access to and egress from the site.

Based upon the published information to date for this scheme, and the relevant information gathered through the consultation process, this EMP provides a sufficient and proportionate level of detail on the measures to mitigate and manage the environmental effects and shall be developed further by the appointed contractor as necessary.

This is further supported by the inclusion of the Register of Environmental Actions and Commitments (REAC) including:

- clear and specific description of the action;
- the objective of the action;
- how the action is to be implemented/achieved;
- the source of the action, including references for source documentation e.g. environmental statement;
- naming of the person responsible for the action;
- achievement criteria and reporting requirements;
- the project stage, date of implementation and achievement; and
- details of any monitoring required and corrective action.

This EMP considers the following subject areas as appropriate for mitigating likely significant environmental effects:

- Environmental Management;
- General Site Management;
- Air Quality;
- Cultural Heritage;
- Biodiversity – Terrestrial Ecology & Aquatic Ecology;
- Landscape and Visual;
- Population and Human Health;
- Noise and Vibration;
- Drainage & the Water Environment
- Geology & Soils (including waste); and
- Community Consultation;

The EMP also includes details of induction, training and briefings, which again shall be developed further by the appointed contractor. The contractor shall also be required to include:

- a description of the main difficulties encountered in delivery of measures to mitigate and manage the environmental effects; and
- the main uncertainties involved in the forecasting of measures to mitigate and manage the environmental effects.

Specific requirements for the Project are detailed for each of these subject areas in Sections 4 and 5 of this EMP. Accordingly, the appointed contractor shall be required to develop the scope of his CEMP in light of these to:

- include all construction elements of the Project;
- implement and manage proposed environmental controls and mitigation measures during each phase of the site; and
- ensure measures identified through the planning phase of the Project will be effectively applied.

2. Regulatory & Policy Framework

2.1 Introduction

Throughout the lifecycle of any construction project, environmental management is regarded as an invaluable approach to ensure that all appropriate legislation, policy and construction best practice is complied with, and the environmental impact of a development is minimised within best practicable means.

The environmental legislation, policy and best practice guidance contained within this EMP are of relevance at the time of writing. However, it is acknowledged that these can be subject to change. As such, the Contractor will be responsible for complying with current legal, policy and best practice guidance requirements applicable to their scope of works to design and during construction of the project.

Through effective implementation of the CEMP, the Contractor will demonstrate how construction activities and supporting design will properly integrate the requirements of environmental legislation, policy, good practice, and those of the environmental regulatory authorities and third parties.

2.2 Legislation

NetRegs is a partnership between the Northern Ireland Environment Agency (NIEA) and the Scottish Environment Protection Agency (SEPA) which provides free environmental guidance for small and medium-sized businesses throughout Northern Ireland and Scotland. As part of this service, they provide:

- lists of key current environmental legislation for Scotland and Northern Ireland. In most cases links are provided to full versions of the legislation on the Office for Public Sector Information (OPSI) website; and
- information on key forthcoming environmental legislation, and consultations from the UK Government, Northern Ireland Assembly and Scottish Government.

Although care has been taken to ensure that the contents of this service are accurate, under no circumstances will responsibility be accepted by the Employer (or the authors) for errors, omissions or damage arising as a result of its use. The Contractor will be responsible for ensuring that any developments or changes to regulation and environmental legislation are complied with, even if they are not noted within this EMP.

Whilst the appointed contractor shall be aware that the United Kingdom's (UK) exit from the European Union (EU) has altered environmental legislation in Northern Ireland implemented to transpose number of EU environmental related directives, the alterations have only been minor and do not fundamentally alter the objectives and protections that the corresponding national regulations aim to achieve.

2.3 Policy & Guidance

This EMP makes reference to various industry standard best practice guidance and policy documents which will be used to address significant environmental risks. The adoption of good practice on site by the Contractor could have a significant effect on construction activities and the ability to meet their legislative and contractual obligations to protect the environment.

NetRegs also provides a range of guidance on topics relevant to managing construction related environmental impacts. These include:

- Air Pollution;
- Carbon Reduction and Efficiency;
- Case Study Information;
- Checklists;
- Emergency Response Procedures;
- Environmental Management;
- Land;
- Materials, Fuels and Equipment;
- Nuisances;

- Permits, Licences and Exemptions;
- Guidance for Pollution Prevention documents;
- Transport;
- Waste; and
- Water.

Guidance is also outlined within, for example, Construction Industry Research and Information Association (CIRIA) best practice guidance and the Environment Agency (EA), SEPA and NIEA's Pollution Prevention Guidelines (PPGs) and Guidance for Pollution Prevention (GPPs), which are to be complied with during the construction phase.

In particular, the fourth edition of CIRIA's '*Environmental good practice on site guide*' (C741) provides practical guidance about managing construction sites to control environmental impacts and how to deliver sustainable construction on site by effectively managing a range of environmental issues. At a minimum, the Contractor will adhere to this guidance and show demonstratable evidence of its application onsite.

It will be the Contractor's responsibility to conform with the latest relevant guidance and policy in the event that any new / updated guidance is published before construction on site commences or during the works.

DAERA also provide guidance on the information required in this EMP (also commonly referred to as an Outline Construction Environmental Management Plan). In addition to the information as set out above, measures should be incorporated in Method Statements which should identify the perceived risks to the aquatic environment, identify potential pollution pathways, and the mitigation measures to be employed which will negate the risk to any aquatic environment. For example;

- details of all proposed excavations and construction;
- details of all areas to be used for the storage of substrate/spoil including a suitable buffer between location for storage of excavated spoil and construction materials and any watercourses or surface drain present on site or adjacent to site;
- details of the pollution prevention measures to be employed during construction and operation;
- detailed drawing plans, demonstrating a suitable buffer between location of refuelling, storage of oil/fuel, concrete mixing and washing areas and any watercourses or surface drain present on site or adjacent to site (at least 10m);
- a proposed storm drainage plan designed to the principles of Sustainable Drainage Systems (SuDS) in order to minimise the polluting effects of storm water on waterways. Construction of SuDS should comply with the design and construction standards as set out in The SuDS Manual - CIRIA Report C753 (2015);
- regular inspections of machinery onsite;
- emergency spill procedures in place; and

This list is not exhaustive but should be merely used as a starting point for considerations to be made as how to effectively manage the environmental performance of the site.

3. Project Description

3.1 Introduction

Section 3 of the original ES (Scheme Description) provided a description of the physical characteristics of the whole works, including where relevant, requisite demolition works and the land-use requirements during the construction and operational phases.

Whilst it was noted that the information provided was of sufficient detail to allow for a fit-for-purpose and proportionate assessment to predict the environmental effects that the Project would likely have, it was based upon an outline design which may still be subject to refinement by the appointed contractor.

A review of the initial outline design has been undertaken by the Project Engineers responsible for the project and it has been confirmed that there have been no significant changes to it since original publication of the ES.

It is recognised as part of the detailed design process, that the appointed contractor may enact changes to the project during procurement and advancement into construction and develop method statements, which may need to be reviewed in terms of any measures that would be necessary to manage, mitigate and monitor potential adverse construction related environmental impacts.

3.2 Project Overview

The project will require construction of flood alleviation measures to reduce the risk of flooding from the Shimna River to protect existing properties in the town. The works will extend both upstream (into Tipperary Wood) and downstream (into Islands Park) from New Bridge on the Bryansford Road, as indicated on **Drawing SFAS-ACM-XX-XX-DR-CE-01031_37.T2.Proposed Layout**. At time of assessment, the planned works included:

- demolition of a number of property boundary walls and fences;
- felling of a number of mature trees;
- relocation of one drainage ditch;
- 1430m of brick/concrete clad sheet piles or sheet pile core embankments;
- construction of a new pathway;
- realignment of existing pathways; and
- erection of one floodgate.

As described in the original ES, the road bridge on the Bryansford Road (New Bridge) is the hub point of the project. The project will provide four separate flood defences, each starting at the bridge (A basic layout is shown on **Plate 3.1**). On the north bank of the Shimna River, there will be construction of a flood defence from Bryansford Road Bridge (New Bridge), running parallel to the Bryansford Road for approximately 115m, then turning and running perpendicular to the road, for approximately 70m. Also on the north bank of the Shimna River, there will be construction of a flood defence from New Bridge, running downstream and parallel to the Shimna River within Islands Park over approximately 250m. On the south bank of the Shimna River, there will be construction of a flood defence from New Bridge, running downstream and parallel to Shimna River over approximately 645m across to Beers Bridge. Also, on the south bank of the Shimna River, there will be construction of a flood defence from New Bridge, running upstream, parallel, then perpendicular to the Shimna River for approximately 290m.

The details provided above were correct at the time of the original Environmental Impact Assessment and should not necessarily be relied upon by the appointed contractor to inform his detailed design. For design information reference shall instead be made specifically to the contract documentation and works information.

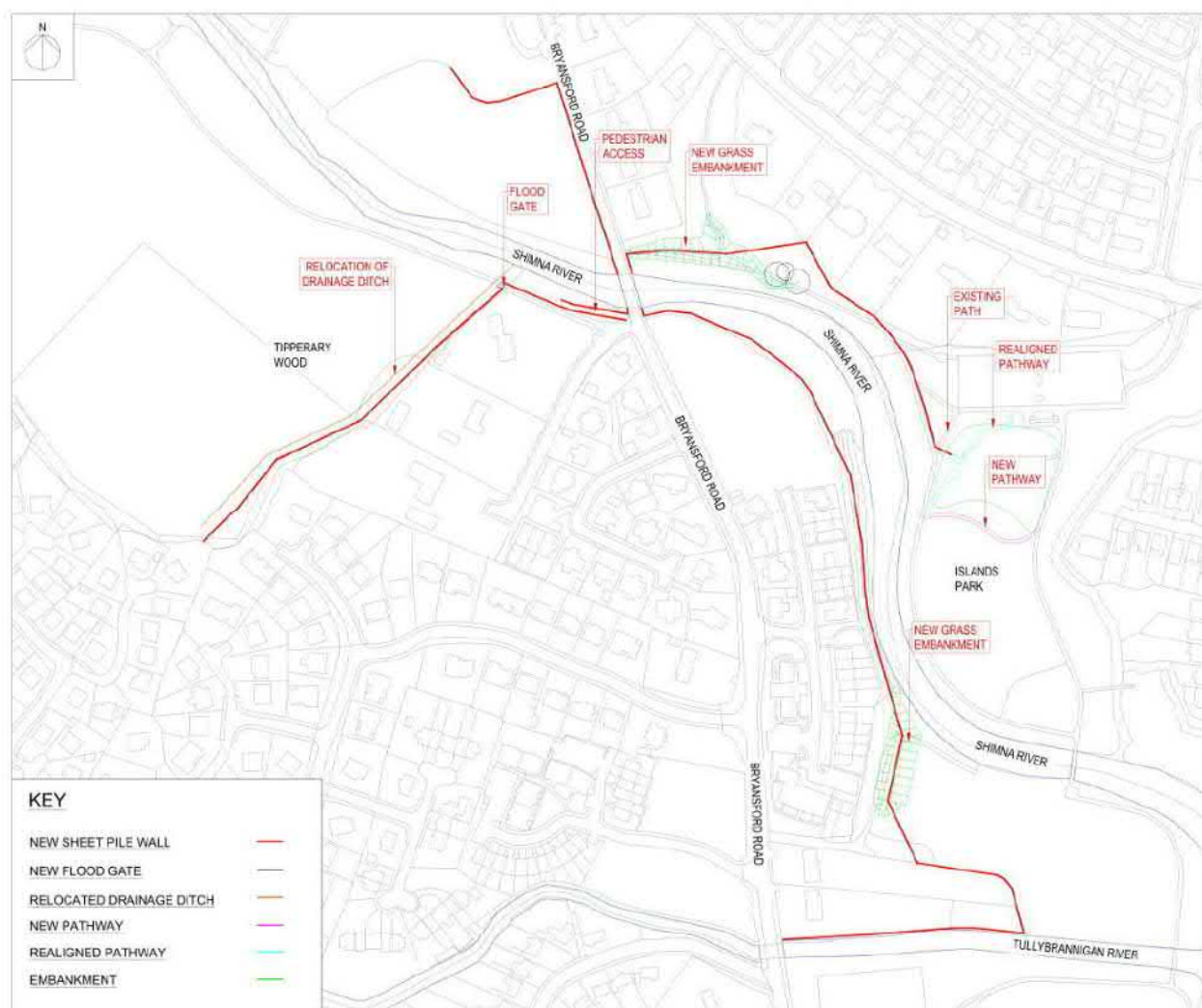


Plate 3.1: Project Layout (as assessed in the original EIA)

*Note – for detailed and up-to-date information on the project layout, please refer to the contract documentation and works information.

3.3 Operational Phase

As noted previously, the details provided regarding the project were correct at the time of the original EIA and should not necessarily be relied upon by the appointed contractor to inform the detailed design. For design information, reference shall instead be made specifically to the contract documentation and works information, which shall then accurately inform the preparation of the contractor's CEMP.

3.3.1 Construction of new flood walls

The flood walls for the Project will be steel sheet piles. The sheet piles would vary in length depending on the location, due to differing required heights above ground and underground soil conditions. It is expected the sheet piles would vary between 4 - 8m in length. Sheet piles are planned in locations where embankments are not feasible; in general, the wall follows existing boundaries, to not create dead land areas. The wall will vary in height from 2.5m down to 0.8m. Since publication of the ES, landowner liaison has continued with agreements in place in relation to their accommodation works, which should be detailed within the contract documentation and works information, noting the requirements of **Drawing SFAS-ACM-XX-XX-DR-CE-01091_97.T2.Land Agreements**.

The finish to the wall varies throughout the Project. Where the walls tie into the 'New' Bridge, a stone clad will be utilised to match the existing bridge stone. On the wall upstream of the bridge, heading north along Bryansford Road, it is planned to have a random rubble stone finish similar to the existing wall. Within the Island Parks area, a slate clad will be used, with resemblance to the Burren River Flood Alleviation Scheme; this will be capped with an anti-climb concrete coping. Along the track into Tipperary Wood, the wall will be clad, rendered and painted,

with an anti-climb concrete coping. The sheet pile wall within Tipperary wood will be bare sheet pile painted with an anti-climb concrete coping; the colour will be selected to integrate with the surrounding environment.

3.3.2 Construction of new flood embankments

The project shall include a number of earth embankments, utilising existing earth embankments and construction of new earth embankments. The existing earth embankments will have a steel sheet pile driven along its centreline/top to provide a core. The sheet pile shall project circa 600 to 1000mm on the landward side. This "exposed" section of pile will be cladded and finished with a precast concrete coping.

In order to tie into existing ground level, the sheet piles will be covered with earth. This will be seeded out and have the visual appearance of a grassed earth bank. The banks will vary in height from 1.7m to 2.2m. The amount of earth fill will vary as the existing park is naturally undulating in level. It is planned that the areas shown in **Drawing SFAS-ACM-XX-XX-DR-CE-01031_37.T2.Proposed Layout** are the maximum footprint for the embankment.

The embankment will serve two key design concepts. Firstly, the embankment will cover the steel sheet pile so that the pile is not visible. The second is to provide access over the sheet piles in the form of pathways along the grass embankments. The embankments are designed to allow grass cutting vehicles to pass over the sheet piles and not impede grass cutting.

3.3.3 Vegetation & Tree Removal

Tree removal and vegetation clearance has been taken into account during the design. The flood walls have been pulled back from the Shimna River banks so as to maintain existing floodplain (where possible) and also to protect the riparian vegetation. All trees with a Tree Preservation Order have been identified and no such trees are planned to be removed as part of the works. The contractor would be given a specific working corridor in which he will have to remove trees to complete the construction of the flood defence; this has been constrained where possible.

An extensive tree felling operation has already taken place within the site, with the vast majority of trees reduced down to stump levels. The appointed contractor shall be required to clear stumps and roots systems as necessary, and any other vegetation that is required to facilitate the works that remains to be upstanding (whilst considering any constraints associated with this, in particular nesting birds and any other protected wildlife) as set out in the contract documentation and works information, in particular **Drawing SFAS-ACM-XX-XX-DR-CE-01031_37.T2.Proposed Layout**.

3.3.4 Drainage Design

Any local drainage discharging to the Shimna River will be fitted with a flap valve to prevent back water flooding. The discharge points or locations will not be altered as part of the Project .

To the rear of the sheet pile wall, a small (150mm) perforated pipe will be installed for groundwater drainage. This will be taken to a single location and discharge to the Shimna River via a flapped outfall pipe.

Reference should be made to **Drawing SFAS-ACM-XX-XX-DR-CE-01201.T1.Drainage** as contained within the contract documentation and works information in relation to the layout for the above.

3.3.5 Landscape Planting

As indicated on **Drawing SFAS-ACM-XX-XX-DR-CE-01031_37.T2.Proposed Layout** (which is contained within the contract documentation and works information), where possible compensatory planting will be carried out in response to the loss of established trees. This drawing shows the softworks design layout (including planting) for the project, which has been informed by a suitably qualified landscape architect.

The sheet pile wall facing the park areas will be clad and have some low-level planting to prevent antisocial behaviour. The selection of trees in privately owned lands have been agreed within the Land Agreements (**Drawing SFAS-ACM-XX-XX-DR-CE-01091_97.T2.Land Agreements**). Again information regarding these aspects have been included in the contract documentation and works information and should be relied upon for information.

3.3.6 Amenities and Services

The Project will include installation of picnic tables at Islands Park Carpark. The project will also include two new re-graded paths over the grass mound at Islands Park Carpark. These new paths have been incorporated into the Park to maintain public access similar to the current situation. All pathways have been designed taking into account the Disability Discrimination Act and guidance from the Sensory Trust. Similarly, the pathway incorporated to maintain pedestrian access into Tipperary Wood, will meet the same requirements. No permanent lighting would be installed as part of the works.

Reference should be made to **Drawing SFAS-ACM-XX-XX-DR-CE-01031_37.T2.Proposed Layout** and **Drawing SFAS-ACM-XX-XX-DR-CE-01071.T0.Furniture** as contained within the contract documentation and works information in relation to the layout for the above.

3.3.7 Inspection and Maintenance

The Project once constructed, will require yearly visual inspection by a Chartered Civil Engineer. The inspection will involve an engineer walking the length of the defences. Due to the embankment being in areas of open space with grass, the embankment will have a visual inspection with no need for excessive vegetation clearance. The maintenance of the project will be largely limited to checking the flap valves and the flood gate. The remainder of the project is envisaged to entail very little yearly maintenance. Any issues regarding inspection and maintenance will need to be addressed within the contractor's HEMP and any other aspects to address the management of the assets in the future.

3.4 Construction Phase

The current planned working area is shown on **Figure 3.2Drawing SFAS-ACM-XX-XX-DR-CE-01004.T1.TM&WR** as contained within the contract documentation and works information. Once appointed, the Contractor shall prepare a site layout map which is to be included within the CEMP, subject to approval by the Employer/Project Manager. This will outline the following site-specific components of the work area:

- location of site compound, including temporary offices and welfare facilities;
- location of contractor's parking area;
- location of plant storage area;
- location of materials storage areas;
- location of proposed services to the site and lighting cable locations;
- location of proposed entrances and exits from the site during the construction process;
- the working area required to construct the development, marked clearly on a plan; and
- details and location of both tree protection fencing, and site fencing to ensure that there is minimal impact outside the development site. This is particularly important considering the active community usage of the site and it will be necessary that the site be secured so that it is left in a safe manner at all times.

Whilst the detailed construction sequence would be a matter for the Contractor to determine, certain guiding principles and conditions have been established through the planning process which may require further engagement with statutory and non-statutory consultees to fulfil acceptance and permission procedures. These have been set out within this EMP.

The Contractor shall be required to provide an outline of construction activities associated with the project and sequence within their CEMP (though not exhaustive, an outline of reasonably expected activities is given below). These would then be further supported by the Contractor through development of Method Statements (and the like) which will address specific work elements and packages.

It must be noted however that AECOM are not able to foresee, and detail all expected construction activities, some of which in themselves will require Method Statements to be consulted upon and conform with additional permitting and consenting procedures. This may then give rise to requests for further supporting information from consultees which may not have been presented as part of the original EIA. It will not be AECOM's or the Employer's responsibility to provide this information.

Whilst the EIA has determined that the Contractor's method of working would be based on a range of measures being implemented to mitigate the risk of adverse impact occurring, it is the Contractor's responsibility to

demonstrate that his proposed working methods align with the findings of the EIA to the satisfaction of the relevant consultees and Employer as necessary.

3.4.1 Construction Programme

It is envisaged that the construction programme would last approximately 12 months, the appointed Contractor shall however give an indication as to whether this is likely to change and communicate this accordingly with the Employer, Project Manager and local stakeholders (i.e. landowners, local community, etc.) who might be adversely affected by any prolongment to the works. Consideration will also need to be given to environmental mitigation measures and timing of works for example, which may be constrained by seasonality, with the appropriate engagement being undertaken with the relevant consultee(s) to advise of any delays which may put at risk existing environmental constraints.

3.4.2 Phasing of Works

The phasing of the works is subject to permissions from a number of statutory consultees, including Forest Service, NMDDC Council Parks and DfI-Roads. Following the recent flood event in August 2020, it is intended to accelerate the programme wherever possible. Some of these permissions may be attained over the course of the procurement process and should be set out within the contract documentation, however it is likely that the appointed Contractor may still be required to seek permission for certain works (i.e. from local landowners, the Council, DfI – Roads, etc.). AECOM and the employer have reached an agreement in principal with landowners. Various restrictions on access have been included within the contract. It is the responsibility of the contractor, once appointed to develop a programme to agree access with each landowner. Please refer to the Works Restrictions Drawing **SFAS-ACM-XX-XX-DR-CE-01004.T1.TM&WR** as contained within the contract documentation and works information.

The works will largely involve the site in question being secured, the remaining vegetation removed (including stumps and roots) and the protection of any structures, services or trees as required. It is expected that the Contractor will then set out the line of the sheet pile flood wall using a GPS system. A piling rig will be used to drive the sheet pile to the required depth. The piles will then be cut to the required height above ground. The sheet piles will be covered in earth to form an embankment or clad with stone to form a flood protection wall. Both these operations will involve small dumpers moving materials. Where cladding is selected to cover the pile, this is built in front of the sheet pile (much the same as a blockwork wall) and infilled to the rear with concrete. This operation will therefore require concrete lorries transporting and delivering concrete to site. It remains that method statements will be required and subject to approval and permissions for these works. These may determine the acceptability of certain plant and working methods such as those required to appropriately manage noise and vibration levels in proximity to sensitive receptors for example.

In general, it is envisaged that construction work would take place during normal working hours (7.00am to 7.00pm Monday to Friday, 7.00am to 2.00pm on Saturdays). However, the Contractor may need to work outside these hours, particularly for setting-up traffic management arrangements.

3.4.3 Preliminary Works

Preliminary works will primarily involve community consultation and liaison, establishing the site (i.e. materials/plant compounds), site clearance works, erection of fencing, installation of pollution control/pre-earthworks drainage, and setting-up of traffic management measures.

3.4.4 Community Consultation and Liaison

The Contractor will be required to establish and maintain effective liaison with the local community throughout the construction phase. This will include information about ongoing activities and provision of contact details to report incidents or for further information. The strategy for interacting with the local community is detailed within Section 4 of this EMP.

3.4.5 Site Compounds, Materials & Plant

Careful planning when considering suitable locations for site offices, stores, workshops, stockpiles of materials and plant yards will help minimise adverse effects of construction activities. Factors affecting the decision will include the noise, traffic and visual intrusion impacts on adjacent properties and they will not be located in areas of ecological value, within 50m of a surface watercourse (where practically possible), or where a loss of amenity is perceived. Proximity to the watercourse is a challenge with this scheme in regards to compounds, so the set up

within will be a key aspect for the appointed Contractor to consider, particularly with regards to hazardous materials and sources of mobilised sediment.

All of the aforementioned are aspects which will affect the Contractor's decision making in this regard, and as such should be done sensitively in light of these. Whilst the location of site compound(s) is normally a matter for the Contractor to consider, two indicative locations have been shown Works Restrictions Drawing **SFAS-ACM-XX-XX-DR-CE-01004.T1.TM&WR** as contained within the contract documentation and works information, that would minimise the risk to the environment and facilitate access to the works area from either side of the bank.

Temporary construction compounds will have an impact primarily where they are located. This is likely to include loss of amenity land (including existing vegetation), additional traffic at the locality, localised construction noise due to vehicle and plant movements, surface water runoff and leaching from fuel stores, and possibly litter and other nuisances. There could be moderate to severe adverse impacts if a site is badly chosen and not operated and managed in a sympathetic manner in accordance with best practice.

The access to the two indicative site compound locations shown on Works Restrictions Drawing **SFAS-ACM-XX-XX-DR-CE-01004.T1.TM&WR** as contained within the contract documentation and works information, would be from the Bryansford Avenue to the north compound and from Bryansford Road to the south compound respectively. The appointed contractor will need to be conscious of the user and access requirements in the vicinity of the tie-in locations to both of these roads. In the case of the north compound, there is a potential for the access to conflict with the amenity of users of Islands Park, which includes vulnerable groups. In the case of the south compound, the indicative access point shown **on Figure 3.2**, may be constrained in terms of sightlines and overall geometry of the road. The temporary management of traffic and non-motorised users will need to be given appropriate consideration and subject to the necessary approvals as set out above.

The appointed contractor shall be required to detail within his CEMP, the number and type of construction vehicles/plant that are likely to use the access points and internal haul routes to the compound and working areas.

Primarily, the land required to construct the works shall be acquired on a temporary basis as the majority of the flood wall is being constructed along existing land boundaries. The location of the wall and working areas have been agreed with landowners with land agreements in place. The works do not change land boundaries or ownership. If the Contractor chooses to use additional areas of land outwith the land made available, he will need to make all necessary arrangements, including obtaining permissions and licences as appropriate, including consultation and agreement with the relevant authorities. Accordingly, the location and operation of site compounds would be subject to consultation with and the approval of various statutory bodies.

In general, the following compound requirements shall apply:

- avoid where possible sensitive receptors, in particular the Autism Initiatives Day Service on Bryansford Road. However, as the compound would be in close proximity to this facility, consider a layout and operation that would bring least disturbance and detriment;
- be located in areas that will minimise the visual impact;
- be located in close proximity to the construction area to minimise construction traffic on public roads.
- not be located in areas of unresolved archaeological potential and/or any site of ecological importance.
- any storage of hydrocarbons or any liquid chemicals within the compounds will not be within 50m of a watercourse. All fuel storage areas shall be bunded to 110% of capacity to contain the effects of any spills.
- have an appropriate level of security to minimise the risk of damage, such as chemical spills caused by vandalism.
- area shall be cleared and re-instated as appropriate or pre-determined as per the contract documentation.

In general, the appointed contractor shall ensure that all areas of land which have been occupied to provide the site or carry out accommodation works are reinstated to the satisfaction of the affected landowner, occupier and the Employer.

Working areas will need to be clearly defined to prevent access to the river channel and riverbank vegetation (unless it has been identified as essential to accommodate the works). The site should be fenced and access for plant, vehicles and workers to banks outside the site should be prohibited. Following construction, any disturbed bankside vegetation outside the crossing footprint should be restored. A "no access" buffer shall be implemented along the Shimna River, to prevent damage to banks and to prevent disturbance of riparian habitats.

In terms of materials, it is expected that use of natural resources will be minimal apart from the constituent elements of manufactured products (e.g. concrete, steel sheet piles, stone cladding, etc.) to facilitate construction of the flood walls. Different grades of aggregate will likely be required for foundations and drainage. Appropriately classed fill material would be required for formation of flood embankments (in particular clay), which may be sourced locally. Timber will be used for formwork during the construction phase. It would be the minimum expectation that the appointed contractor conform with the Departmental sustainable construction guidance notes (construction, demolition and excavation waste materials) aims to ensure legal compliance with waste related legislation and to promote best practice. These are included in the Contract documentation and works information. An important part of this guidance concerns the use of Site Waste Management Plans (SWMPs) - these are an important tool for construction companies and their clients, of all sizes, to improve their environmental performance, meet regulatory controls and reduce rising costs of disposing of waste. This is detailed further within Section 4 of this EMP.

There will be land take from public areas (i.e. parkland, forestry, public amenity space) and private gardens of residences which back onto the river corridor to accommodate the flood walls and embankments.

Energy will be expended during the construction phase due to plant and machinery operation, though there would be no operational phase energy requirements. The appointed contractor shall be required to operate under an accredited Environmental Management System (EMS). It shall be developed to avoid wherever possible environmental accidents and pollution, to encourage reduced consumption of resources, to restrict the production of waste, and to promote good relationships with the relevant authorities / environmental bodies. An Environmental Management Plan (EMP) shall be prepared to manage this process.

3.4.6 Pre-earthworks Drainage

As detailed in CIRIA guidance document C532 (Control of Water Pollution from Construction Sites), the proposed site layout and design shall ensure that stockpiling areas, storage areas, fuel stores, waste disposal points, and refuelling areas for example, are located where they are least likely to affect surface waters. Pollution prevention measures will be implemented to minimise the risk of contamination to surface watercourses with the appropriate statutory body consulted to ensure they are fit-for-purpose. Haul routes where required within the site shall be set up in such a way as to avoid pollution to water and lengths minimised, possibly with bunded ditches and silt fencing on either side to prevent runoff of silt and oil. Appropriately located wheel washes with dedicated drainage and pollution collection sumps and interceptors would be installed and all licences and discharge consents will need to be in place before starting work as necessary.

Sufficient land will be made available on the landside of the Shimna River to enable the appointed contractor to better manage runoff from the site during construction and reduce risk. The appointed contractor shall be required to undertake due care and attention when working in the vicinity of the Shimna River and associated tributaries and where necessary, a wide range of prescriptive mitigation measures shall be implemented to ensure protection of the water environment. Being in a very sensitive water environment, it will be necessary for the Contractor to undertake all works in a precautionary manner, specifically targeted to avoid pollution of the water environment. On this basis, the Contractor shall be required to prepare a Pollution Control and Contingency Plan (incorporating a Silt Management Plan) to appropriately manage the works in light of the particular site sensitivities.

3.4.7 Site Clearance

As noted previously, a vegetation clearance exercise has already taken place, with trees taken down to stump level. This shall minimise the extent of work required by the contractor to clear the site once appointed. It is not expected that the contractor will need to fell any additional trees, nevertheless, there will be a requirement placed upon the appointed contractor to minimise tree loss within the works area.

No retained tree shall be cut down, uprooted or destroyed, or have its roots damaged within the crown spread, nor shall arboricultural work or tree surgery take place on any retained tree be topped or lopped other than in accordance with the approved plans and particulars without the written approval of the Employer/Project Manager. Any arboricultural work or tree surgery approved shall be carried out in accordance with British Standard 3998 2010 Recommendations for Tree Work.

The project will impact boundaries of a number of private properties. The current boundary wall will be replaced with a steel sheet pile wall and clad on the private boundary with a finish agreed with the respective landowner. Please refer to the contract documentation and works information for direction in respect of these aspects, in particular Drawing SFAS-ACM-XX-XX-DR-CE-01091_97.T2.Land Agreements.

3.4.8 Fencing

Temporary site boundary fencing will be installed on the boundary of the works area to contain the site and restrict access (i.e. animals, general public). As deemed appropriate by the contractor, other forms of fencing (i.e. palisade) would be installed where necessary to provide increased levels of security (i.e. at site compounds).

The erection of fencing for the protection of any retained tree shall be undertaken in accordance with the approved plans and particulars before any equipment machinery or materials are brought on to the site for the purposes of the project and shall be maintained until all equipment machinery and surplus materials have been removed from the site. Nothing shall be stored or placed in any area fenced in accordance with this condition and the ground levels within those areas shall not be altered, nor shall any excavation be made or any other works carried out or fires lit without the written consent of the Employer.

3.4.9 Traffic Management

Construction traffic shall utilise the existing road network, the majority of which is two-way semi-urban single carriageway with adjacent footpaths. The park site will be accessed using existing access points and entrances. The Contractor will also be required to prepare a Traffic Management Plan, and in particular a Green Travel Plan.

3.4.10 Construction Site Management

Minimal physical waste is expected to be generated from the project, as it will be procured and managed to ensure it is developed as sustainably as is reasonably practicable. Typical project waste will include sheet pile off cuts for recycling (possible re-use), emissions from plant and machinery (e.g. cranes, piling rigs, excavators, lorries, etc.). Unsuitable fill material encountered on-site will be re-used (e.g. for landscaping purpose) where possible.

The appointed contractor will manage the site on a day-to-day basis and will be required to develop a Site Waste Management Plan. This will implement where possible cost-effective methods of good practice waste minimisation during the design of the project and thereafter during construction.

The main works will primarily involve continued community consultation and liaison, topsoil stripping and earthworks, further drainage and utilities/services works, flood wall and embankment construction, accommodation works, site reinstatement and landscape planting. The earthworks for the project will follow the topsoil strip. Construction will involve activities which will result in the requirement for fill (primarily sourced from site), excavations and generation of soils and rock which if not utilised on-site, will require off-site disposal. Every effort shall be made to re-use excavated material within structural embankments. This may involve a degree of treatment to render some material suitable for re-use.

The Contractor will be required to make every effort to re-use as much of the material as possible within the area of the construction site. Any material to be re-used, which is wet, should be stockpiled to allow it to dry out. Stockpiling should be well away from any sensitive areas of ecological or archaeological interest, or watercourses where pollution could occur. Disposal of unsuitable material off-site would incur haulage costs as well as landfill tax and gate fees.

4. Environmental Management

4.1 Environmental Management System

The Contractor shall operate an accredited Environmental Management System (EMS) certified by a third party throughout the duration of the construction contract period. Current certificates of registration/accreditation will be included as an appendix within the Contractor's CEMP. The Project Manager will approve and accept third party certification of an EMS provided that:

- it is based on a recognised standard - for example, ISO 14001 or equivalent;
- it is construction-focused, incorporating site inspections; and
- the third-party certification body is accredited or recognised.

The EMS third-party certification:

- will be obtained/renewed within three years of the main contract award date (where appropriate); and,
- will include an annual verification audit undertaken in the intervening years.

The Contractor will initiate and maintain an EMS during the works, which will define the responsibilities, practices and procedures provided for environmental management. It will be developed to avoid wherever possible environmental accidents and pollution, to encourage reduced consumption of resources, to restrict the production of waste, and to promote good relationships with the relevant authorities/environmental bodies. Commitments made regarding mitigation, their implementation and subsequent monitoring will be recorded. Notwithstanding any other requirements of the Contract, the EMS shall:

- include site-specific Method Statements for all operations where there is a risk of environmental damage. These will show how the proposed methods of construction will minimise impacts on the environment and how contingency plans and emergency procedures will limit damage caused by accidents, spillage or any other unforeseen events. The Method Statements will include notification procedures to the relevant authorities/environmental bodies where necessary;
- ensure that the Contractor submits to the Project Manager details of the EMS and Method Statements for approval in advance of undertaking the Works. The Works will not be commenced without such approval having been obtained in writing; and
- the Contractor will liaise with the local community during the Contract as necessary. This will include providing information about activities likely to give rise to nuisance, and a telephone number for complaints to be registered. A log of all complaints and follow-up actions will be kept and made available for inspection by the Project Manager.

The procedure/methodology for internal and external auditing of the environmental performance of the Works will also be documented by the Contractor within the CEMP.

4.2 Communication and Community Relations Strategy

Developing an effective communication and consultation strategy with the local community is important to minimise the likelihood of causing a nuisance (i.e. noise, dust, waste). During the works, if the community is aware of what is happening, it is likely that complaints will be reduced. The Contractor will therefore be prepared to explain the Project and to answer questions.

Public consultation is particularly important when operations that cause disturbance are being carried out for a significant period of time. The Contractor will explain the efforts that are being made to limit the impact of operations by phasing activities and other control measures, as necessary.

As outlined in the fourth edition of CIRIA's '*Environmental good practice on site guide*' (C741), when considering how to liaise with the local community, the following steps shall be broadly adhered to:

- identify and keep informed key local community representatives, such as Councillors and residents' representatives;
- visit occupants of sensitive buildings and keep them informed of progress. This will be a particularly important aspect in relation to the works in close proximity to the Autism Day Service Initiatives facility on

Bryansford Road, and shall require early engagement to ensure nuisance and inconvenience to services are minimised and maintain the good relations that have already been established through consultation;

- prepare a leaflet and distribute it to nearby residents or occupiers. Provide updates or regular contributions to existing community newsletters;
- engage with the local community by working with schools, including visits and charities;
- write articles about the progress on site for the local media;
- display a 'contact board' at various locations along the site perimeter so that the public know who to contact if they have a complaint or a comment. Use this board to display information on project phasing and other relevant matters;
- join the Considerate Constructors Scheme (CCS);
- establish a complaint line and call it to ensure that it works;
- deal quickly with any complaints that arise and in accordance with a defined complaints procedure. Create a log of complaints. Make sure all complaints are properly followed-up and resolved, and the responses to them are recorded;
- issue site-based staff with contact cards to give to the public if approached to ensure complaints/queries are dealt with effectively; and
- install observatory panels in the site hoardings (where necessary).

4.3 Considerate Constructors Scheme

The Contractor will register the project with the Considerate Constructors Scheme (CCS) and comply with the scheme's Code of Considerate Practice. The Scheme's expectations include:

- Care about the appearance of the site;
- Respect the community around the site;
- Protect the environment;
- Secure everyone's safety; and
- Value their workforce.

The minimum compliance level of the Contractor will be '*Exceptional*', which is at the forefront of industry best practice demonstrating the very highest level of achievement far above the minimum standards required by the Scheme's Code, addressing all applicable areas of the Checklist to the very highest standards. When 'compliance' is demonstrated in a section and all of the applicable non-bolded areas have also been addressed to the very highest of standards, the level of performance against that section will be considered to be exceptional. The differentiator between 8 points and 9 points is the standard to which the items are addressed.

4.4 Civil Engineering Environmental Quality Assessment and Awards Scheme (CEEQUAL)

The Employer is committed to sustainable development and is aware of the economic, environmental and social impacts of its decisions. Construction projects are to be designed within the context of value for money and functionality, to maximise the efficiency of energy, water and waste management, minimise and where possible avoid negative impacts but enhance positive impacts on biodiversity and take account of the likely impact on staff, transport systems and local communities.

The specification and design of construction projects undertaken for Central Government Departments and their agencies shall take due account of the contribution this project can make to achieving the Departmental Targets and Framework Strategies.

The project is to be registered for a CEEQUAL Whole Project. The Contractor shall nominate a CEEQUAL Coordinator, responsible for liaison with the CEEQUAL Assessor, and collation of evidence throughout the detailed design and construction stage, required to fulfil the requirements of the CEEQUAL Whole Project Award. The CEEQUAL Assessor's contact details will be provided following award.

The Contractor shall be required to achieve a minimum CEEQUAL score of "Excellent or Very Good" for the Whole Project Award, with a target of maintaining or bettering the score achieved at Interim Award. Details of the CEEQUAL process can be downloaded from <http://www.ceequal.com>.

4.5 Construction Environmental Management Plan (CEMP)

As detailed previously, this EMP shall be adopted and expanded by the appointed Contractor into a CEMP as more information becomes available and there is more certainty in terms of the layout, construction methods, programme and the likely environmental effects. The CEMP would be subject to periodic review and agreed in writing with the Project Manager.

The Contractor's CEMP itself will be subject to ongoing review throughout the construction phase, through regular environmental auditing and site inspections, and would be agreed in writing with the Employer's Project Manager. This will confirm the efficacy and implementation of all relevant mitigation measures and commitments identified throughout this EMP, and in particular the REAC.

The CEMP will be prepared in sufficient detail to describe the detailed proposals of the Contractor's management, control and mitigation strategy for each environmental aspect. The CEMP will include (where required) Method Statements for specific works (e.g. working in or near watercourses).

The Contractor's CEMP itself will be subject to ongoing review throughout the construction phase, through regular environmental auditing and site inspections, and would be agreed in writing with the Employer's Project Manager. This will confirm the efficacy and implementation of all relevant mitigation measures and commitments.

4.5.1 Roles & Responsibilities

The Contractor will appoint a suitably experienced and qualified Construction Environmental Management Plan Co-ordinator (CEMPC) to undertake co-ordination of monitoring of the works' impacts and implementation of the Contractor's proposals, in respect of all environmental requirements. This shall include not only those requirements stated in this EMP, but also any requirements related to any environmental sub-plans such as:

- Handover Environmental Management Plan;
- Air Quality Management Plan
- Site Waste Management Plan;
- Water Management Plan;
- Landscape and Ecology Aftercare Plan;
- Invasive Species Management Plan; and
- Construction Traffic Management Plan.

The CEMPC or an Environmental Site Representative (ESR) will be present on-site whenever work is in progress and will be the point of contact for dealing with environmental issues for the Employer's Project Manager, the Contractor's employees, Sub-contractors, relevant authorities/environmental bodies, and members of the public. They will also be 'on call', available 24 hours per day and will be aware at all times of activities being undertaken on site. They will maintain a daily log, recording all environmental issues, events and dealings with third parties. An emergency crew and an environmental emergency crew shall be made available 24hrs a day at all times during period of the works and shall include experienced and named personnel.

The CEMPC will prepare, implement, manage, review and revise the CEMP within the parameters set by the EMP with the purpose of ensuring that the environment is safeguarded at all times from anticipated or unexpected adverse impacts during construction. The CEMPC/ESR will notify the Employer's Project Manager of any transgressions in respect of the CEMP so that necessary sanctions can be imposed. The duties of the ESR are:

- implementation of the CEMP procedures;
- routine environmental monitoring, recording and reporting;
- maintaining and auditing the CEMP and documents which underpin it;
- environmental training, including daily toolbox talks to site staff and design staff;

- liaison with the Employer's environmental advisors as required; and
- assist the Employer in liaison with the relevant authorities/environmental bodies and local community.

Details of the proposed CEMPC/ESR will be included within the CEMP. Should the Contractor wish to appoint an alternative member of staff to the role, details will be submitted to the Project Manager for approval at least 28 days prior to the proposed date for the change in personnel and included within the CEMP.

As listed in Table 4.1, the CEMP will place the following environmental responsibilities on the indicative key roles. In light of the scale, size and requirements of this Project, it is accepted that not all roles may be required or that some roles and responsibilities may be amalgamated or assigned to a lesser number of individuals. In preparation of the CEMP, the Contractor will provide the details of the environmental management structure for all staff with environmental responsibilities. This will describe the name of each team member, their role and their responsibility.

Table 4.1: Key Contractor Team Roles and Responsibilities (indicative)

Role	Responsibilities
Contractor's Project Director	<ul style="list-style-type: none"> • Assign specific environmental duties to competent members of the Contractor's Team. • Identify the environmental training needs of personnel under their control and arrange appropriate training programmes and ensure records are being maintained. • Ensure that significant environmental aspects identified for the project in the ES and the REAC are managed. • Promote the continual improvement of environmental performance.
Environmental Site Representative	<ul style="list-style-type: none"> • Develop, maintain and audit the CEMP (and supporting documents/plans) to ensure all aspects, impacts and statutory requirements are reflected in the Plan. • Develop and implement a programme of regular project environmental inspections, monitoring, recording and reporting in accordance with procedures set out in the CEMP. • Ensure that the works are constructed in line with the CEMP, in liaison as necessary with the Employer's Project Manager, Site Manager and the Employer's Environmental Advisors (where relevant). • Attend construction meetings to ensure environmental issues are discussed and addressed by the Contractor's Team. • Liaise with the Employer's Environmental Advisors, relevant authorities/environmental bodies and the local community as required. • Comply with duties under relevant legislation and company procedures in relation to environmental incident investigation and reporting. • Provide support and training to the workforce with regard to understanding environmental aspects, impacts, regulatory requirements, best practice, constraints and methods of working. • Appoint environmental specialists as required. • Ensure identified environmental specialists are in attendance on-site as required by the CEMP. • Review non-conformance reports from the Employer's Project Manager/Employer's Environmental Advisors to identify any underlying issues or patterns. • Provide an on-call 24hr resource as a first point of contact for environmental issues/incidents. • Provide advice corrective action to be taken by the Site Manager in response to identified non-conformances. • Maintain daily records of environmental issues, events and consultations with third parties. • Ensure identified environmental specialists are in attendance on-site as required by the CEMP. • Maintain records of environmental awareness training/inductions delivered to site staff. • Report all identified non-conformances to the Project Manager.
Site Manager	<ul style="list-style-type: none"> • Ensure that all personnel undergo suitable and sufficient environmental induction before starting work on the project, and periodic refresher environmental awareness training throughout the construction phase of the project. • Ensure staff attend the appropriate environmental courses that are organised by the ESR. • Ensure the ESR is maintaining records of training delivered to site staff. • Monitor the performance of personnel and activities under their control and ensure arrangements (as outlined in Section 5 of this EMP) are in place so that all personnel will work in a manner which minimises risks to them and to the environment. • Undertake a programme of weekly project environmental inspections in liaison with the ESR(s). • Complete any corrective actions identified by the ESR(s) and provide status reports as required to the Employer's Project Manager. • Assist and support the ESR and statutory bodies in the investigation of any incidents. • Notify the ESR(s) of all environmental issues or incidents arising over the course of operations.

- Environmental Specialists – if required (i.e. Ecological Clerk of Works (ECoW))
- Attend site as required to monitor the protection of the asset in accordance with the requirements of relevant legislation, the construction contract and the CEMP.
 - Identify potential risks from construction activities to wildlife and develop suitable control measures outlined within this EMP.
 - Provide status reports and updates to the ESR(s) in the completion of their activities.
 - Liaise with the ESR(s) as required to provide specific training to site staff.

4.6 Handover Environmental Management Plan (HEMP)

The Contractor shall prepare a Handover Environmental Management Plan (HEMP) setting out a proposed strategy for the future maintenance and management of all areas in which environmental works and assets are located for a 20-year period commencing at the issue of the Defects date. The Employer will implement the HEMP for this period, subsequent to the issue of the Defects Certificate for Planting and modify the Contractor's HEMP as appropriate during this period.

The HEMP shall include, but not be limited to the following:

- post-construction monitoring in order to comply with CEEQUAL requirements;
- describe how the environmental management proposals within the areas in which environmental works are located will be achieved, within the 20-year period of the HEMP;
- a record of the previous maintenance operations and management systems undertaken during the three-year period following the Defects date, together with any problems encountered and recommendations for remediation;
- strategies for the regular maintenance of all areas in which environmental works are located;
- a timetable for the implementation of each regular maintenance operation during a typical 12-month period, together with an overall 20-year timetable showing any variation to the regular maintenance tasks during the period of the HEMP;
- a timetable showing the anticipated date at which the Environmental Function attributed to each area/areas in which landscape and ecology works are located will be achieved during the 20-year period of the HEMP;
- a timetable showing the regular monitoring requirements for each area/areas in which landscape and ecology works are located, including those in relation to protected species and/or water quality, as agreed with the relevant statutory and non-statutory bodies; and
- any supporting information as considered appropriate by the Contractor including details of agreements made with third parties.

The HEMP shall form part of a package of information that will be transferred to the Employer. This shall include, but not be limited to the following:

- CEMP (or relevant sections); and
- Baseline studies as appropriate.

4.7 Air Quality Management Plan (AQMP)

The Contractor will be required to implement measures to minimise the amount of dust produced during the construction phase. This is particularly important due to the close proximity of residential and community properties adjacent to the works area and the active community usage within and through the site. There will be a Duty of Care on the Contractor to ensure that dust-raising activities are located away from sensitive receptors as much as feasibly possible and duration kept to a minimum when in proximity to a receptor.

The Contractor will prepare an AQMP and incorporate the relevant mitigation measures within (such as those outlined in Section 5); reflecting the requirements of best practicable means and level of risk, such as those included in the *Guidance on the assessment of dust from demolition and construction* (February 2014) and the relevant CIRIA documentation. This will be included as part of the CEMP.

The most important aspect of the DMP is:

- the assignment of responsibility for dust management to an individual member of the Contractor's staff (i.e. Environmental Site Representative);

- training staff to understand the importance of the issue;
- implementing the relevant mitigation measures where required; and
- communicating with the local community.

Weekly site inspections will be undertaken by the Contractor's ESR to monitor compliance with the AQMP, record inspection results, and make an inspection log available to and the Employer's Project Manager when requested.

4.8 Site Waste Management Plan (SWMP)

The Contractor will prepare a SWMP to implement where possible cost-effective methods of good practice waste minimisation during the design of the project and thereafter during construction (such as those outlined in Section 5). This will be included as part of the CEMP. As a minimum, the Contractor must:

- identify methods of waste minimisation as outlined in *Achieving Good Practice Waste Minimisation and Management* (WRAP, n.d.) in design before detailed design commences and report to the Project Manager on the economic and practical implications of adopting these methods, during the development of the design;
- agree with the Project Manager which methods of waste minimisation to implement at the appropriate design stage and demonstrate how the methods have been incorporated into the design;
- include a list of measures within the SWMP to minimise waste from on-site operations (for example, damage, theft etc.) and demonstrate how these measures have been implemented;
- implement the SWMP in all construction site activities in line with good practice published by Waste & Resources Action Programme (WRAP). The Plan is required to set a target for waste reduction and recovery. It is expected that this target will be set to better the current waste benchmark for the project type, as published in: <http://www.smartwaste.co.uk> unless otherwise agreed.

Include soil and stockpile management from Department for Environment, Food and Rural Affairs' *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites* (September 2009) and Northern Ireland Environment Agency's *Guidance on the Regulation of Greenfield Excavation Materials in Construction and Development* (October 2016).

The Contractor is also required to meet specified minimum waste recovery rates. Specifically, the Contractor's responsibility (in association with his trade sub-contractors and waste management contractors where appropriate) shall be to:

- identify, and continually review as the pre-construction design develops, the waste streams with the largest potential and estimate likely recovery rates to be adopted for the project;
- agree with the Employer's Project Manager before the commencement of construction those waste streams that will provide the most significant opportunities for cost-effective recovery (to be known as 'selected Quick Wins') and the minimum recovery rates to be adopted for the project;
- meet the agreed minimum recovery rates for the selected Quick Wins unless otherwise agreed in writing by the Employer;
- measure waste arising during the site and compare with the minimum recovery rates set for the project and then report these findings to the Project Manager (in a form to be agreed) every four weeks at project meetings, including the measures to be implemented to meet the minimum recovery rates if actual recovery is below target; and
- appoint trade sub-contractors and waste management contractors with the same liability as under the Contract Documentation and Works Information to meet minimum recovery rates (where applicable) and to support the Contractor to measure, monitor and report actual waste during the site.

4.9 Water Management Plan (WMP)

The Contractor shall inform all his site staff of the acute importance of the Shimna River Area of Special Scientific Interest (ASSI) and its tributaries (Tullybrannigan River). It is designated because of the physical features of the river and its associated riverine flora and fauna. The Shimna River provides excellent habitat for spawning salmonids, with populations of Atlantic salmon, brown trout and sea trout present. Other species inhabiting the

system include minnow, stone loach, 3-spined stickleback and eel. On this basis, water quality is particularly important to avoid adverse impact upon spawning and migrating species.

Due care and attention shall be undertaken by the Contractor when working in the vicinity of these rivers and their associated tributaries and where necessary, a wide range of prescriptive mitigation measures to ensure protection of the water environment should be applied where there is any risk of adverse impact associated with the site. Being in a very sensitive water environment, it will be necessary for the Contractor to undertake all works in a precautionary manner, specifically targeted to avoid pollution of the water environment.

The Contractor will prepare a Water Management Plan (WMP) and include it as part of the CEMP. The first aim of this plan will be to minimise erosion by reducing disturbance and stabilising exposed materials. The plan will then consider control measures to minimise the release of mobilised sediment. Measures to prevent erosion are more effective than controlling sediment once mobilised. The WMP will also include methods of handling and storing chemicals and fuels, followed by an Emergency Response Plan to be implemented in the event of a spill or leak. The tributaries and drains in the site are a potential pathway of silt and contaminants to ecological receptors which will be identified and addressed in the plan.

The plan will include, without limitation, the following:

- Identification and categorisation of surface waters and storm water drains (within a Site Drainage Plan in line with *GPP 21: Pollution Incident Response Planning*) vulnerable to site works and an assessment as to whether the site area is likely to give rise to sediment-laden run-off, the routes this is likely to take, and the methods to prevent sediment entering any watercourses (the Source-Pathway-Receptor model);
- Working areas being clearly defined, that prevent access to waterways and riverbank vegetation, including details of crossing points of the minor drains;
- Site compounds will be located 50m from watercourses and 20m from minor drains. If the compounds include re-fuelling areas/oil/fuel/chemical storage areas, these will be impermeable to eliminate a pathway to storm drainage from these areas;
- On-site storage of chemical, fuel or construction materials will be limited to those needed for immediate works and comply with the Control of Pollution (Oil Storage) Regulations (NI) 2010. All surplus materials will be removed from the site as soon as their immediate purpose has been concluded. Any fuel or chemical stores will be secure from vandalism and appropriately banded to at least 110% capacity. These stores will be kept at a safe distance (refer to relevant guidance at time of construction) away from surface waters;
- All potentially polluting liquids and solids associated with vehicles, equipment and machinery need to be identified to site staff so that spillages and wash waters will be prevented from entering watercourses;
- Stockpiles of earth will not be kept within 10m of watercourse channels. Where possible, earth stockpiles will be covered to prevent run-off of sediment-laden water into watercourses, with a silt curtain placed at the toe;
- Pollution contingency plans (i.e. incident notification procedures) to be developed and agreed. These will include designated members of staff to deal with emergencies if they arise. The Water Pollution Hotline number (0800 80 70 60) will be identified and the site undertaken in respect of the requirements of GPP 21;
- Procedures for investigating environmental incidents and devising ideas to improve environmental performance;
- Procedures for notifying local residents of works which may cause a nuisance;
- Performance standards for site run-off;
- Materials and equipment to implement the pollution spill contingency plans will be available adjacent to all watercourses (e.g. spill kits, booms). These will be in clearly marked response points, which can be accessed by all staff. They will be checked on a daily basis to ensure that all required materials are in place. All staff on site will be aware of these items and be trained on procedures to implement in the case of a spill;
- How mud and dust will be controlled including dust suppression requirements for all weather conditions; note the use of road cleaning sweepers will be considered as a last resort with prevention being the main objective;
- How any water supply boreholes and wells will be protected (if identified within the area);

- The Contractor will not wash tools and equipment in any watercourse. Wash water will not be discharged into any watercourse or into road drains or disposed of in any way that could result in a discharge to controlled water; and
- The measures to be taken to protect watercourses and associated wildlife from, for example, chemical spillages or the introduction of sediment-laden run-off.

4.10 Landscape and Ecology Aftercare Plan (LEAP)

The Contractor shall prepare a LEAP to be implemented by the Contractor for 2 years after completion of the site, whichever is the longer. The plan shall be included as part of the CEMP and shall include, without limitation, the following:

- tree surgery;
- protection, management and maintenance of existing retained vegetation; and
- protection, management and maintenance of new planting, seeding and habitat creation areas.

4.11 Invasive Species Management Plan (ISMP)

Invasive non-native plants are those which have been introduced to Northern Ireland by accident, or as a consequence of trade or deliberate collection. Invasive non-native plant species tend to share characteristics that make them successful. These include fast growth rates, high capacity for spreading and reproducing, persistence and therefore their resistance to control.

Japanese knotweed and Himalayan knotweed and Giant knotweed has been identified at various locations along the scheme, particularly in the vicinity of watercourses. Japanese knotweed and Himalayan knotweed and Giant knotweed are listed in Part II of Schedule 9 to The Wildlife (Northern Ireland) Order 1985 [as amended] as an invasive species, which makes it an offence to plant or otherwise cause to grow in the wild. As a result, measures must be taken to prevent it from being spread during construction or maintenance of the scheme.

The Contractor shall prepare an ISMP and include procedures for the removal of any soils within 7m of any invasive species which may be encountered over the course of the site. The Contractor shall provide a method statement for working in proximity and dealing with these invasive species. This management plan must be submitted to the Project Manager and DAERA - NIEA for approval.

Measures must be taken to prevent the spread of invasive species during construction or maintenance of the scheme where they are encountered. As new plants can generate from seeds, live tissue and root fragments, it therefore makes it an offence to move contaminated plant or soil material to new sites.

The Wildlife (Northern Ireland) Order 1985 [as amended] places a legal duty on the Contractor to carefully manage any invasive species and to prevent the spread of invasive species. Failure to do so can (and has) led to prosecutions.

Responsibility for dealing with invasive plant species rests with the Contractor. Control efforts can help reduce the spread of invasive non-native species and are most successful if carried out as a wider co-ordinated strategy with collaboration of all relevant parties / landowners / managers. Control often needs to be repeated year-after-year.

The Contractor is responsible for identifying and dealing with all areas of invasive species present (those already identified and any new locations) within the works area. Any updated invasive species survey report in relation to the scheme will be provided to the Contractor, but this must be supplemented by his own survey.

The Contractor is responsible for identifying and dealing with all areas of invasive species present (those already identified and any new locations) within the site by survey prior to the construction works

4.12 Construction Traffic Management Plan

Due to the site being located within and adjacent an existing road network (including access points from Bryansford Avenue and Bryansford Road), the Contractor will prepare a CTMP which will set out objectives and targets for minimising journeys to and from the site by the workforce, sub-contractors, suppliers and anyone else who is likely to visit the site regularly. This will improve the safety of staff and motorised / non-motorised road users, limit congestion and reduce the carbon footprint of the staff where possible. It will obviously need to be

prepared in light of any government restrictions on movements associated with COVID-19 (or any other pandemic). The CTMP will be included as part of the CEMP and its objectives will be to:

- reduce journeys of all kinds to and from the site;
- ensure safety of journeys to and from the site and plan on-site routes, one-way systems and turning circles;
- use speed limits;
- be aware of road restrictions either through road works, narrow roads and bridges with height and/or weight restrictions;
- use of sustainable modes of transport (i.e. use of public transport, encouraging cycling);
- offer alternative modes of transport for workers to get to site (i.e. use of minibuses, car sharing or bicycles). Current pandemic (i.e. Covid-19) related restrictions will obviously need to be considered in relation to how safe this might be in its implementation;
- travel incentives;
- the health and wellbeing of the workforce;
- identify suitable locations for parking facilities for private cars and plant, and minimise the amount of car parking required;
- identify sensitive areas (e.g. schools, homes, existing usage requirements within Islands Park during the works);
- measures aimed at avoiding disruption and inconvenience to local residents, businesses and transient users of the area;
- safety of vulnerable users (i.e. children, the elderly);
- take into account other developments whose activities could affect the project;
- prepare on-site roads to prevent dust and choose suitable materials for use on access roads - to avoid transferring mud and dust;
- ensure there are designated walkways on and around site;
- ensure there are designated vehicular routes on-site with speed restrictions with access clearly signposted;
- only designated access points and access roads will be used by site vehicles;
- locate site entrance and exit so they are not off minor roads (where feasible);
- gain permission for road closure(s) from the Employer and the relevant statutory body (i.e. DfI Roads), and ensure road closures are carried out by a competent person;
- develop a map showing delivery drivers' routes to site from trunk roads;
- schedule site deliveries outside times of peak traffic volume;
- have designated workers on-site to receive deliveries, direct vehicles on and off site, and act as banksmen;
- project vehicles will have badges on their windscreens displaying contact details for the project if they are found to be parked inappropriately;
- monitor vehicle movements to reduce the likelihood of queuing or causing congestion in and around the local area; and
- minimise the need for reversing vehicles (i.e. one-way systems) and potential nuisance issues from reversing alarms.

The plan will be implemented from the date of the start of the site works and will be monitored on a weekly basis to ensure that it is being adhered to and targets are being met. Advice on the preparation of Green Travel Plans can be found in *'The Essential Guide to Travel Planning'* published by DfT. Advice on the preparation of Traffic Management Plans can be found in the fourth edition of CIRIA's *'Environmental good practice on site guide'* (C741). This plan will prevent any traffic congestion on local roads and maintain safety around the local road network associated with site traffic.

5. Register of Environmental Actions & Commitments

The design and works associated with the Project shall comply with the mitigation and monitoring measures set out in this section, and any updated or new supplementary environmental reports/information made available to the Contractor over the course of the procurement process.

As mentioned previously, the REAC provides a collective summary of the amended procedures, standards, work practices and management responsibilities for the implementation of specified mitigation measures developed to address environmental impacts arising from construction of the project. It is important to note that the REAC does not supersede the mitigation and monitoring requirements contained within the Environmental Statement (ES). It instead provides a complete schedule of mitigation and monitoring, taking into account the submissions from the consultees, post publication of the ES and clarification regarding monitoring requirements raised by Shared Environmental Services (SES) over the course of the notice period for advertisement of the ES and any additional client requirements.

5.1 Background

As described throughout each of the technical chapters within the Shimna Flood Alleviation Scheme ES (August 2018), there are instances where the environmental effects associated with the Project may be of such a magnitude as to warrant mitigation measures and monitoring requirements. These are deemed necessary to minimise environmental impacts during the operation, construction and/or maintenance phases of the Project.

This REAC provides a collective summary of the proposed mitigation measures and monitoring requirements to ensure compliance during and beyond the construction contract period. As a prescriptive part of the construction and maintenance contract requirements, the REAC sets out responsibilities to ensure that measures are not only applied but monitored and inspected to ensure effective implementation on site, and that all measures are correctly adhered to. Specifically, the following have been tabulated:

- Mitigation measure item number;
- Approximate location of mitigation measure;
- Mitigation objective and commitment;
- Mitigation Measure;
- Timing of the mitigation measure;
- Monitoring Requirements; and
- Potential additional consultation proposed.

As described in the REAC, there may be a requirement for additional consultation to be carried out during the contract period (i.e. with statutory bodies and other interested parties). Consequently, there would be potential for revision to the proposed mitigation measures described and throughout each of the technical chapters of the ES as the design proceeds; however, these would be in agreement between the Employer, the Contractor and the interested/affected party, and would be accordingly reflected within the Contract Documentation.

The identification of Environmental Actions and population of a REAC is critical to the success of an EMP and subsequently the environmental performance of the project. Depending on the scale of the project, there may be many sources of information from which Environmental Actions must be identified, such as an ES or Environmental Assessment Report, Ecological Surveys, Heritage or Tree Reports, Contaminated Land or Flood Risk Assessments, Public Inquiry Commitments, or standard requirements such as Statutory Authority consents. The REAC allows for:

- clear and specific description of the Action;
- the objective of the Action;
- how the Action is to be implemented/achieved;
- the source of the Action, including references for source documentation;
- naming of the person responsible for the Action i.e. Principal Contractor or Environmental Manager;
- achievement criteria and reporting requirements;
- the project stage or date of implementation and/or achievement;
- details of any monitoring required, what should be monitored and how results should be used to effect necessary action; and
- date and signature for completion of Action.

Where it is required that an Action must be monitored to determine success, the details of monitoring, success criteria, reporting requirements and trigger level for remedial works should be clearly defined.

5.2 Working Hours/Periods

The working day will vary between seasons, with potential extensions to take advantage of more daylight hours during the period from April to October. Typically, these hours are 07.00hrs to 19.00hrs in the summer months, and 07.30am to 17.30hrs in the winter. No works or operations which are audible at the site boundary will be permitted outside these hours unless justified to Newry, Mourne and Down District Council (NMDDC). These works should be kept to a minimum and should occur only as an absolute necessity or on Health & Safety grounds.

When circumstances may require work to be undertaken outside of normal hours, work will be undertaken in the following order of preference:

- evening periods;
- during the daytime over the weekend; and
- night working, which will be considered as a last resort or where the need is driven by other constraints.

The Contractor will notify NMDDC when unforeseen circumstances result in works over-running and extend beyond normal hours, regarding the nature, time, location and reasons for the over-run as soon as possible. Records will be kept of such events by the Contractor. Works that do not result in significant disturbance at nearby receptors may be considered to be undertaken during extended working hours, subject to agreement with the Council. Locations of works that are anticipated to be outside normal working hours will be defined and confirmed.

There is also a range of restrictions on working periods described throughout the rest of this section to facilitate environmental protection of a range of interests, including fisheries, nesting birds, etc. which the Contractor must adhere to.

5.3 Site Housekeeping

Good housekeeping is an important part of good environmental practice and helps to maintain a more efficient and safer site. The site should be tidy, secure, and have clear access routes that are well signposted. The appearance of a tidy, well-managed site can reduce the likelihood of theft, vandalism or complaints.

As outlined in the fourth edition of CIRIA's 'Environmental good practice on site guide' (C741), when considering good housekeeping, the following steps should be adhered to:

- adequately plan the site with designated areas of materials and waste storage;
- segregate different types of waste as it is produced and arrange frequent removal;
- keep the site tidy and clean - remember a tidy site is a safe site;
- ensure that no wind-blown litter or debris leaves the site, use covered skips to prevent wind-blown litter;
- ensure that material and plant storage areas are properly managed. Cover lightweight materials with sheeting if necessary;
- keep hoardings tidy - repair and repaint when necessary, removing any fly posting or graffiti;
- frequently brush-clean wheel washing facilities;
- keep haul routes clean;
- keep roads free from mud by using a road sweeper; and
- ensure site is secure.

5.4 Air Quality

Negative air quality impacts can come from many sources during construction, and as such there are a number of ways in which air quality effects can be minimised by the Contractor to avoid creating nuisance. Works should be planned to take into account the location of sensitive receptors, local topography, wind direction, and any potential sources of pollution.

Mitigation measures (as described below) would be required so that construction works are carried out in such a manner that emissions of dust and other pollutants are limited, and that best practicable means are employed to minimise disruption, risks to human health, and to avoid unnecessary impacts on sensitive ecological habitats. These shall be reflected within the Contractor's AQMP.

The Contractor shall comply with the summarised mitigation measures set out in Table 5.2, the Contract Documentation and Works Information and any updated or new supplementary environmental reports made available to the Contractor as necessary. Works shall be planned to take into account the location of sensitive receptors, local topography, wind direction, and any potential sources of pollution.

5.4.1 Vehicle and Plant Emissions

Emissions to the atmosphere, in terms of gaseous and particulate pollutants from vehicles and plant used on-site, shall be controlled and limited, as far as reasonably practicable by the Contractor, using measures and appropriate control techniques as listed below:

- The engines of all vehicles and plant on-site should not be left running unnecessarily (i.e. idling) to prevent exhaust emissions (and noise);
- Vehicles and plant should be low emission, and fitted with catalysts, diesel particulate filters or similar devices. Ultra-low sulphur fuels should be used in plant and vehicles;
- Plant, equipment and emission control apparatus shall be selected to minimise the engine exhaust emissions, taking into consideration economic constraints and practicability;
- Vehicles and plant should be well maintained, with servicing completed in line with manufacturer's recommendations. Records of servicing should be maintained, and visual checks carried out to ensure that black smoke is not emitted at times other than at ignition;
- All project vehicles should hold current MOT certificates or equivalent (as required subject to age), to ensure compliance with relevant exhaust emission regulations;
- Haul routes and plant should be situated and operated away from potential receptors;
- Locate construction plant away from site boundaries, which are close to sensitive receptors and designated ecological sites where reasonable and practicable
- The use of diesel or petrol-powered generators should be minimised where possible, with mains electricity or battery powered equipment used as an alternative (where feasible);
- Movement of vehicles and plant should be minimised around the site;
- Vehicle / plant exhausts should be directed away from the ground and position at a height to facilitate appropriate dispersal of exhaust emissions and minimise risk of re-suspension of ground dust, where reasonably practicable;
- Reasonably minimise the movement of construction traffic around the site and limit the use of public roads to essential movements only;
- Construction site traffic should be managed on the public road network, so as to prevent queuing or parking of vehicles outside of the site compounds;
- Movements of traffic in and out of site should be noted within a log book;
- Maximise energy efficiency, which may include using alternative modes of transport, maximising vehicle utilisation by ensuring full loading and efficient routing;
- The Contractor shall prepare a Construction Traffic Management Plan, as outlined in Section 4 of this EMP which should address traffic movements.
- Excavation of any contaminated materials with the potential to release odour shall be subject to specific measures to minimise odour release. Odour nuisance shall be managed with odour-causing waste being removed from site on a regular basis to avoid excessive accumulation; and
- The above mitigation measures shall need to be rigorously applied, particularly in the vicinity of adjacent to dust sensitive receptors (i.e. housing, community facilities) and designated ecological sites (i.e. Shimna River Area of Special Scientific Interest (ASSI)).

5.4.2 Control of Dust

5.4.2.1 Generation of Dust

Dust is generated in many ways during a construction project. The Contractor shall take all necessary measures to minimise disturbance caused by dust, during both construction and demolition works. Excavation and earthworks can be a potential source of dust if they are not properly controlled, especially in dry and windy weather. If possible, such activities should be avoided during exceptionally dry or windy periods.

- Activities which have the potential to generate dust should be subject to a risk assessment, taking into account their proximity to sensitive receptors and duration. This allows appropriate mitigation and management techniques to be implemented;
- Visual inspections should be undertaken regularly when dust-raising activities are occurring. Inspections should take into account prevailing meteorological conditions, and results shall be recorded and maintained. These inspections should take place at least daily, and should determine the effectiveness of the applied mitigation and management techniques; and
- It is recommended that activities should be temporarily suspended if unacceptable levels of dust cannot be avoided.

Mitigation measures should be incorporated into the AQMP reflecting the requirements of best practicable means. Measures to minimise the amount of dust produced might include for example, dampening haul roads and stockpiles, keeping roads clean, and using covers to minimise dust blow from lorries. Conversely, wet weather creates potential for mud being carried onto the public road network by vehicles entering or exiting the site. To control this, site traffic would be required to use a small number of access points from the public road, thus increasing control over the washing of mud from construction vehicles. Wheel washing facilities to deal with such problems may be required during the construction stage. Appropriate measures should reflect the nature of the construction activity (type, dust source points, construction operation periods and time of year) as well as ameliorating conditions (such as prevailing wind directions and speeds, typical precipitation and the dampening effect of retained soil moisture). Methods of reducing and controlling dust emissions during construction are listed in Table 5.1 and detailed further in the sub-sections below.

Table 5.1. Dust Control Measures

Activity	Dust Control Methods
Soil handling and storage	<ul style="list-style-type: none"> • Restrict the duration of the activity. Seal and seed storage mound surfaces as soon as is practicable. • Protect surfaces from winds until disturbed areas are sealed and stable.
Overburden handling	<ul style="list-style-type: none"> • Protect exposed material from wind (by keeping material within voids or protecting them by topographical features). • Spray exposed surfaces of mounds regularly to maintain surface moisture unless mound surface has formed a crust after rainfall or is grassed. • Minimise handling.
Demolition Works	<ul style="list-style-type: none"> • Use hoarding especially in vulnerable areas.
Drilling and blasting	<ul style="list-style-type: none"> • Use dust-extraction equipment such as filters, on exhaust air emissions from drill rigs. • Remove the dusty material collected from the area of blast prior to detonation.
Laying granular materials	<ul style="list-style-type: none"> • Use water sprays.
Loading/unloading	<ul style="list-style-type: none"> • Reduce drop heights wherever practicable. • Protect activities from wind.

Activity	Dust Control Methods
Minerals processing	<ul style="list-style-type: none"> Varies depending on type of equipment used but generally complete enclosure is best with use of air extraction and filter equipment as appropriate. Use water sprays.
Material Storage	<ul style="list-style-type: none"> Dampen material. Protect from wind and store under cover. Screen material to remove dusty fractions prior to external storage.
Transport by conveyor within site	<ul style="list-style-type: none"> Protect by use of wind and roof boards. Shelter transfer points from wind. Use scrapers to clean belts, with collection of scrapings for disposal. Minimise drop heights and protect from wind. Use water sprays.
Transport by vehicle within and offsite	<ul style="list-style-type: none"> Restrict vehicle speed. Water unsurfaced roads and paved roads. Wheel or body wash at an appropriate distance from site entrance. This should always be within the site and the roadway from the washing facility to the highway should be hard-surfaced. Load and unload in areas protected from wind. Minimise drop heights. Sheet or cover loaded vehicles. Use water sprays/spray curtains to moisten material. Sweep/wash paved roads. Use paved roads where practicable. Demolition and construction vehicles conform to at least Euro III standards.

Source: Adapted from Minerals Policy Statement 2: 'Controlling and mitigating the environmental effects of mineral extraction in England Annex 1: Dust'

5.4.2.2 Vehicle and Plant Dust

- Impose speed limits of 15mph in pedestrian areas and adjacent to public areas within the site boundaries to avoid excessive dust emissions;
- Care shall be taken to ensure that machinery or dust-causing activities should be sited away from sensitive receptors;
- The production of dust should be taken into account when selecting plant and equipment, with apparatus with emission controls being chosen, as far as economically practical;
- Vehicles shall not be overloaded, and all loads entering and leaving the construction site and carrying waste and other dusty materials shall be adequately sheeted to prevent the spillage of material during transport;
- Any cutting and grinding operations to be carried out should use equipment and techniques which incorporate dust suppression measures and reduce emissions; and
- Facilities for vehicle washing/wheel washing should be provided at all site exits, as well as procedures for effective cleaning and inspection of vehicles, to keep dust and mud off the public road network.

5.4.2.3 Earthwork Dust

- Exposed earthworks should be kept damp at all times, to prevent airborne dust emissions. Should this not be possible, windbreaks should be used to minimise the potential for dust generated by wind erosion;
- Dust generation should be minimised from earthworks by sealing or seeding of surfaces to stabilise them as soon as possible.

5.4.2.4 Site Fires

- No site fires are permitted.

5.4.2.5 Dust arising from Materials Handling and Storage

- Materials stockpiles on site should be avoided where possible, however, if unavoidable, the stockpiles should be designed so as to minimise dust generation by wind erosion (i.e. no steep-sided stockpiles or mounds or those that have sharp changes in shape), covered securely, or damped down or suitably treated to prevent the emission of dust.
- Stockpiles and mounds shall be created away from the site boundary, sensitive receptors, watercourses and surface drains and sited to take into account the predominant wind direction.
- Stockpiles shall be maintained at suitable heights as agreed with the Employer's Project Manager.
- Double handling of material should be avoided wherever reasonably practicable.
- Drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment should be minimised, with fine water sprays used on such equipment wherever appropriate.
- Fences of similar height and size to stockpiles shall be erected by the Contractor to act as wind barriers and these shall be kept clean using wet methods. Porous fences or hedges often make the most suitable shelter.
- Where drop heights are greater than 2m, suitable dust suppression measures shall be utilised to control dust emissions.
- Stockpiled materials which are likely to remain undisturbed for a significant duration shall be sprayed with an appropriate chemical dust suppressant, or vegetated. In the case of long-term stockpiles, they can be seeded, re-vegetated or turfed to stabilise surfaces. Alternatively, surface-binding agents, approved by DAERA - NIEA, can be used.
- Any construction materials that are stored within the site should be located away from the site boundary and downwind of sensitive receptors unless used for the purposes of screening.
- Fine or powdery material (under 3mm in diameter) shall be stored inside buildings or enclosures.
- The site should be regularly inspected by the Contractor's CEMPC/Environmental Site Representatives for spillages of dusty or potentially dusty materials and shall have procedures in place for prompt clearance of any such spillage.
- The frequency of site inspections should be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

5.4.2.6 Concrete Work

- Mixing of concrete shall be carried out in enclosed/shielded areas where necessary to prevent the escape of dust.
- Before concrete pours, the pour structure shall be cleaned and fine non-ferrous debris should be sucked out from the pour area.

Table 5.2. Air Quality Register of Environmental Actions & Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Potential additional Consultation Required
AQ1	Within footprint & beyond proposed works	To minimise the amount of dust and emissions (including odour) produced during the construction works.	<p>The Contractor shall prepare an Air Quality Management Plan (AQMP) and incorporate the relevant mitigation measures within; reflecting the requirements of best practicable means and level of risk. This shall be included as part of the CEMP and shall be submitted to NMDCC – Environmental Health for review and acceptance.</p> <p>The scope and content of this plan has been determined by this EMP and the Works Contract which places a Duty of Care on the Contractor to ensure that dust-raising activities are located away from sensitive receptors as much as feasibly possible and duration/exposure kept to a minimum when in proximity to a receptor. This shall be submitted to NMDCC – Environmental Health for review and acceptance as part of the preparation of contract documentation.</p>	Concurrent with construction	<p>Regular site inspections shall be undertaken by the Contractor's CEMP-C/Environmental Site Representative to monitor compliance with the AQMP; record inspections results and make an inspection log available to NMDCC – Environmental Health and the Employer's Project Manager when requested.</p> <p>Visual inspections shall be undertaken not just when dust raising activities are occurring but always during works on site.</p>	NMDCC – Environmental Health to be given the opportunity to review all environmental documentation associated with project construction and liaise as necessary with the appointed contractor in advance of and during the works.
AQ2	Within footprint & beyond proposed works	Reduce risk of deposition of dust on foliage of associated riverine habitats,	See above.	Concurrent with construction	See above - monitoring of works to ensure compliance with requirements	NMDCC – Environmental Health
AQ3	Within footprint of the proposed works	No burning of waste produced (e.g. bushes, tree) to ensure air pollution does not occur.	Site fires will not be permitted on the site and the contractor shall be contractually obliged to conform to this requirement and adopt within his CEMP.	Concurrent with construction	Monitoring of works to ensure compliance with requirements	NMDCC – Environmental Health

5.5 Cultural Heritage

The Contractor shall comply with the summarised mitigation measures set out in Table 5.3, the Contract Documentation and Works Information and any updated or new supplementary environmental reports made available to the Contractor as necessary.

5.5.1 General Measures

- The Contractor must properly assess and plan for the archaeological implications of the project where development may affect any land with archaeological significance or potential. The Contractor shall ensure that the destruction of archaeological remains will be avoided wherever possible and should never take place without prior archaeological excavation and record.
- The Contractor will not choose land for temporary works where there are known archaeological sites or monuments (including scheduled monuments, listed buildings, industrial heritage or defence heritage sites, or registered parks, gardens or demesnes of historical interest). None are known to exist within the site area, other than New Bridge on Bryansford Road.
- An Archaeological Contractor (if required) shall be responsible for obtaining a licence from HED to carry out and oversee any required archaeological works. A copy of the licence shall be provided to the Project Manager before any of the archaeological investigations commence. "Archaeological Contractor" means the individual(s) appointed by the Contractor to the Contractor's team for the contract (if required), of appropriate skill with regard to any fossils, coins, antiquities, monuments or other items of value or of archaeological or geological interest or human remains including investigations or discoveries on or adjacent to the Site and carrying out of any required archaeological excavations required during the execution of the site. The Archaeological Contractor will be appropriately experienced and qualified (having previously held archaeological licences in Northern Ireland and completed these to the satisfaction of the DfC – HED and with a minimum of 5 years archaeological experience within a commercial/contractor environment) such that they can obtain a licence from DfC –HED.
- The Contractor shall programme and undertake any required archaeological works, in accordance with the requirements set out in the licence issued by HED, in such a way as to allow sufficient time and resource to deal with the archaeology discovered.
- If any object or feature of archaeological interest is discovered during the course of the investigative works, the Archaeological Contractor shall agree with HED any additional works or testing which may need to be carried out. It is the responsibility of the Contractor and their appointed Archaeological Contractor to undertake any such works and include for this within their price.
- All archaeological excavations shall be undertaken in accordance with the guidelines published by HED '*Excavation Standards Manual [Built Heritage, DoE(NI) 2004]*' and by the Chartered Institute for Archaeologists '*Standard and guidance. Archaeological Excavation (2014)*'; and '*Standard and guidance. Field evaluation (2014)*' and the ClfA Code of Conduct (2014).
- For cultural heritage resources which are remaining in-situ, vibration limits should be calculated from condition surveys to protect from damage by vibration as a result of construction works as necessary. As noted above, the only known site of cultural heritage importance is New Bridge, and accordingly, the contractor will be required to avoid any damage to this structure when tying in the flood walls. As detailed within Table 5.3 below, the contractor is required to appoint an Archaeological Contractor to undertake a photographic survey of the New Bridge ahead of any alterations.

5.5.2 Monitoring and Reporting

- Where unexpected archaeological remains are found during construction, work should cease until advice is sought from the Contractor's Archaeological Contractor and the Employer's Project Manager. Further archaeological works or design measures may be required to mitigate the impact of development on those remains. Procedures will be put in place by the Contractor to protect and preserve archaeological remains encountered unexpectedly during such works.
- In the event of a significant archaeological find, a Programme of Archaeological Works (PAW) will be agreed for the further investigation/excavation of the relevant area of the site, including where appropriate the completion of a licenced excavation and recording of remains before construction works proceed.
- Archaeological finds must be reported to DfC - HED, with details provided of when, where and how the object was found. The archive of finds and records from the excavation and analysis would be accessioned into a suitable museum or approved archive store.
- The archaeological fieldwork will be subject to regular monitoring visits by the Employer's Project Archaeologist, who will have unrestricted access to the site, site records or any other information. The work will be inspected to ensure that it is being carried out to the required standards and that it will achieve the stated objectives.

Table 5.3. Cultural Heritage Register of Environmental Actions & Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Potential additional Consultation Required
CH1	New Bridge, Bryansford Road	Minimise the permanent physical impact and impact to setting at New Bridge	A photographic survey of the New Bridge ahead of any alterations is to be undertaken.	Before Construction	Monitoring of works to ensure compliance with requirements and standards	DfC - HED
CH2	In the vicinity of the proposed works	Minimise the permanent physical impact and impact to setting at New Bridge	Clad sheet piles would match existing stonework of bridge while existing vegetation along river bank would be retained screening the flood walls.	During construction	Monitoring of works to ensure compliance with requirements and standards	DfC - HED
CH3	Within footprint of the proposed works	Minimise the impact if unknown/unrecorded archaeological heritage is unearthed.	If unexpected archaeological remains or artefacts are discovered during construction work, work in that area would cease and the area would be protected. An unexpected finds procedure would be included in the over-arching Method Statement for archaeology. The Archaeological Consultant and DfC HED would be notified, and the unexpected find protocol would be implemented.	During construction	Monitoring of works to ensure compliance with requirements and standards	DfC - HED

5.6 Biodiversity – Terrestrial Ecology

The Contractor shall comply with the summarised mitigation measures set out in Table 5.4, the Contract Documentation and Works Information and any updated or new supplementary environmental reports made available to the Contractor as necessary. This prescribes the mitigation measures necessary for the Contractor to implement in order to prevent or reduce adverse impacts upon ecological receptors, especially where the predicted impacts of the Project may result in a significant effect. It also takes into account the legal requirements associated with statutory protected sites and species.

5.6.1 General Measures

- The Contractor shall consult and comply with the requirements of DAERA – NIEA with respect to any sites or species protected by law, which are likely to be affected by the construction, establishment and maintenance of the site (i.e. Shimna ASSI).
- The Contractor shall comply with and implement any mitigation measures which may be determined as a result of any updated and/or ongoing ecological surveys. This information shall be provided once available and may result in additional mitigation measures, or render redundant mitigation measures planned as part of the specimen design.
- The Contractor shall comply with requirements of The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 [as amended], The Wildlife (Northern Ireland) Order 1985 [as amended] and The Wildlife and Natural Environment Act (Northern Ireland) 2011 (which amended the Wildlife Order by giving protection to a wider range of plants, animals and birds, and providing additional enforcement powers and increased penalties for wildlife related offences) when undertaking any works which will affect protected species.
- In accordance with the requirements of The Wildlife (Northern Ireland) Order 1985 [as amended], no works shall be undertaken to any tree, hedge or other habitat in which any birds may be nesting.
- The Contractor shall appoint an appropriately qualified ecologist (Ecological Clerk of Works (ECoW)) with protected species survey and licence experience, notably in relation to otter, badger and bats. The ECoW will be retained during construction work to deal with any protected species or other ecological issues that may arise.
- The ECoW shall be the source of ecological expertise within the contracting companies, having responsibility for co-ordinating method statement production, obtaining consents and approvals for method statements, overseeing working practices in ecologically sensitive areas and undertaking site briefings and training in issues particularly related to the Shimna River ASSI. This role would include all ecological aspects linked to the project including the Statement to Inform an Appropriate Assessment for the Shimna River Flood Alleviation Scheme. They would be approved by the Employer's Project Ecologist and DAERA - NIEA as necessary. The ECoW would liaise with relevant specialists and statutory bodies to provide mitigation as necessary.
- The ECoW will liaise with relevant specialists, the Employer's Project Ecologist and DAERA – NIEA undertake pre-construction surveys to inform and supervise implementation of mitigation as necessary. DAERA - NIEA may require detailed surveys of protected flora or fauna which may be directly or indirectly affected by the site. In such a case, the Contractor shall undertake these surveys by employing specialists holding appropriate experience and licences approved by DAERA - NIEA and the Employer's Project Manager.
- Given the sensitivity of the receiving water environment, an enhanced system of ecological supervision shall be implemented. This shall comprise the ECoW supervising the implementation of the ecological mitigation measures and monitor construction activities in these areas. A review team involving key stakeholders shall also be developed to ensure that mitigation measures are implemented effectively, whilst taking best practicable means to protect the water environment.
- The Contractor will be responsible for agreeing and implementing appropriate mitigation measures to ensure the protection of the Shimna River as associated designated sites, as detailed in the ES, the Statement to Inform the Appropriate Assessment and this EMP. Measures should be agreed with the DAERA – NIEA, DAERA – Inland Fisheries and the Project Manager at least 4 weeks prior to any works starting adjacent or in close proximity to the designated site. The Contractor will be expected to provide method

statements (including programming of activities). These shall be prepared by the Contractor's ECoW in association with other contractor staff. The method statements must be approved by the Project Manager and with NIEA prior to works commencing. Works shall not start without agreed method statements in place.

- The Contractor shall be responsible for ensuring all site workers are briefed on the ecological sensitivities of the site and its environs through 'toolbox talks' and provision of clear information about protected species and restricted areas and activities. All staff (including sub-contractors) shall receive regular updated talks and briefings, particularly for those working in close proximity to the ASSI or any watercourse, considering the very high sensitivity of the receiving water environment. The Contractor shall also be acutely aware of the importance of woodland vegetation in proximity to and associated with these watercourses, and must be retained/protected where possible and practicable.
- The Contractor shall produce a method statement for any works in close proximity to watercourses. The method statement will include measures to prevent adverse impacts on riparian habitats and should comply with the Water Management Plan. Work within or close to river channels should be avoided where practicable. Where works are required, these will be agreed in advance with DAERA – Inland Fisheries, NIEA - Water Management Unit and the Project Manager.

5.6.2 Fencing/Buffer Zones, Compounds and Storage of Materials

- The storage and construction compounds must be located within areas agreed with the ECoW, and clearly demarcated and fenced to avoid incursion into ecologically sensitive habitats and be secured to avoid malicious damage.
- Site compounds and stores should not be located within 50m of areas of nature conservation value, including watercourses, wet grassland, hedgerows, trees and woodland. Where this is unavoidable, specific measures shall be put in place to protect the nature conservation interest in accordance with relevant guidance. Any of these features in close proximity to the site or to compounds should be fenced to prevent damage by plant or stored materials, to prevent access to the watercourse channel and bank vegetation and to prevent otters, badgers or other large mammals from entering.
- Any fuel or chemical stores must be secure from vandalism and appropriately bunded to at least 110% capacity. These stores should be kept at a safe distance (refer to relevant guidance at time of construction) away from the Shimna River, Tullybrannigan River and other watercourses and storm water drains.
- On-site storage of chemicals, fuel or construction materials shall be limited to those needed for immediate construction. All surplus materials shall be removed from the site as soon as their immediate purpose has been concluded.
- Access of all machinery and personnel should be limited to the site corridor, and robust fencing should be provided along the corridor boundaries to mark the permissible access area.
- Sensitive habitats must be protected by adequate fencing prior to construction site clearance and during construction to prevent damage and 'site creep'. Loss and damage to habitats including mature deciduous trees, hedgerows and other landscape features must be minimised and such features retained wherever possible.
- Protected areas of nature conservation value should either have permanent construction boundary fencing in place, or have temporary fencing to prevent people, machines or materials entering the area.
- Buffer zones around ecologically sensitive features which are to remain shall be marked and fenced as appropriate, prior to site clearance.
- Retained trees shall be protected with tree protective fencing, as outlined in BS 5837: 2005 – '*Guide for trees in relation to construction*' and BS 1722 British Standard for Fencing. These standards shall be applied to fencing installed around trees and shrubs to safeguard the root zone to protect from accidental damage. Site personnel should be made aware of the need to avoid damage.

- A “no access” buffer should be implemented along all watercourses, where works are parallel to the watercourses, to prevent damage to banks and to prevent disturbance of riparian habitats and otter trails. This obviously does not apply to areas where direct access to a watercourse (i.e. Tullybrannigan River) is required to facilitate the works.
- Where fencing is provided perpendicular to stream banks, care should be taken that this action does not block otter access to river banks.
- Where appropriate (at locations agreed by the ECoW) safe means of passage for otters to cross the construction site without the risk of being hit by construction plant should be provided. This may require temporary fencing in additional locations to those where permanent fencing is required.
- Clearance of riparian habitats should be restricted to the immediate footprint of any watercourse crossings/incursion and any essential adjacent working space. The site corridor at watercourse crossings should be fenced and access for plant, vehicles and workers to banks outside the corridor should be prohibited. Following construction, any disturbed bankside vegetation outside the crossing footprint should be restored.
- Any vegetation clearance or river habitat damage within the ASSI will have double that area (where possible) enhanced, to include creation of riffles and pools and appropriate planting of bankside vegetation.

5.6.3 Noise Control

- The layout of the construction site should be such as to avoid siting particularly noisy (for example generators) or busy (for example stores) works areas near to sensitive ecological receptors.

5.6.4 Dust Control

- Dust abatement measures should be implemented (dampening etc.) to prevent deposition on vegetation communities in the vicinity of the site, and outside construction corridors particularly close to designated sites, though this shall be mindful of having adverse impacts upon the water environment.

5.6.5 Excavations

- In line with Health & Safety procedures, any open excavations shall be fenced at night. To prevent mammals being trapped in excavations, a sloping plank or similar should be placed within it and systems or culverts should be checked for animals before final sealing.

5.6.6 Stockpiled Materials

- No storage of stockpiles of soil or overburden within 10m of watercourses or protective features installed to prevent accidental sedimentation during prolonged rain events. Stockpiles of earth must be sited at appropriate distances from watercourses (i.e. where ground is sloping towards the watercourse) and storm water drains, and where possible stockpiles must be covered to prevent run-off of sediment-laden water into watercourses, or at a minimum place a silt curtain at the toe.
- Any soil removed for re-use in ecological mitigation shall be carefully sorted and stored into subsoil and topsoil stockpiles to avoid mixing and/or compaction.
- Small, wet fields that have retained a limited wetland flora should be stripped and the surface layer stockpiled separately and labelled, and should be used around the margins of constructed wetland ponds.

5.6.7 Awareness and Training

- For effective implementation of mitigation measures it is important that all staff working on site, even those just visiting for short periods (including delivery drivers), are fully aware of why particular working practices are in place. This is especially important where the measures may deviate from usual site working practice.
- All staff shall be given a briefing by the Contractor about the importance and sensitivity of the surrounding water environment, the notified interest features, and special measures to be adopted to avoid impacts upon them. The briefing should be provided by the ECoW. All staff will be expected to sign a register to confirm that they have received this briefing prior to entering or working on site. A fact sheet that outlines key measures e.g. procedure to be followed in the case of an accidental fuel spill, or on encountering otters, shall be prepared by the ECoW (an approved by the Project Manager), and provided in copies of all vehicles working on site.
- All site staff shall be briefed regularly by the ECoW on the overall ecological sensitivities of the site through 'toolbox talks' and will be provided with clear information about protected species, restricted areas and activities, and what to do if protected species are encountered. Toolbox talks provide a convenient and effective method of communicating and reinforcing the safety and environment messages throughout the workforce on a regular basis. All staff should receive regular updated talks and briefings.

5.6.8 Water Pollution

- The Contractor shall produce a method statement for all works in close proximity to watercourses. The method statement will include measures to prevent adverse impacts on riparian habitats and should comply with the Water Management Plan as described in this EMP. Work within river channels should be avoided where practicable. Where such works are required, these will be agreed in advance with DAERA - Water Management Unit, DAERA – Inland Fisheries and the Employer's Project Manager as necessary.
- The design shall include habitat creation associated with riparian corridors, and watercourses and sensitive habitats.
- All potentially polluting liquids and solids associated with vehicles, equipment and machinery must be identified to site staff so that spillages and wash waters can be prevented from entering watercourses;
- The Contractor shall not wash tools and equipment in any watercourse. Wash water shall not be discharged into any watercourse or into road drains or disposed of in any way that could result in a discharge to controlled water;
- Settlement basins shall be constructed to allow sedimentation and trap pollution as necessary. The size of the basins would be determined by particle size and predicted discharge rates;
- Mobile bunding or material for bund construction shall be available, should an emergency barrier need to be constructed to prevent material leakage from a works site into a watercourse;
- Quantities of absorbent substrate shall be available to soak up spillages or leaks;
- Specific measures will be required to reduce the risk of release of suspended solids or other pollutants during construction.

5.6.9 Lighting

- Position and direction of lighting should be designed to minimise intrusion and disturbance to river corridors and other areas of nature conservation value.
- Direct illumination of the Shimna River and Tullybrannigan River will not be permitted, in order to reduce impacts on fish, and particularly salmonid passage.

5.6.10 Monitoring

- An ecological monitoring programme shall be agreed with DAERA – NIEA, DAERA – Inland Fisheries and the Project Manager prior to the commencement of construction activities. This system shall involve recording suspended solids levels close to the construction site and comparison with appropriate control sites. Agreed limits of deviation shall be established, with agreed procedures of ameliorative action required if these are breached.
- Ecologically sensitive areas shall be subject to a watching brief at critical construction times. The watching brief shall be undertaken by the ECoW and overseen by the Project Manager to ensure opportunities for minimising effects on features of ecological importance are taken wherever possible, including obtaining and implementing the terms and conditions of any licences for protected species where required, and searches for protected species in affected areas of habitat that are considered suitable.
- Vegetation clearance shall also be subject to a watching brief by the ECoW to ensure that protected species are not adversely affected. Measures to be undertaken in the event of the unforeseen discovery of a protected species shall be agreed with the Project Manager and DAERA - NIEA.
- As it is an offence to disturb a protected species, works in an area found to contain such shall stop, and advice sought from the ECoW. Works can only resume following this advice and approval from the ECoW. For some protected species, there may be a requirement to apply for a licence for works that may disturb them. The ECoW shall inform the Project Ecologist of such occurrences and report the actions taken.

5.6.11 Protection of Birds

- In accordance with the requirements of The Wildlife (Northern Ireland) Order 1985 [as amended], no works shall be undertaken to any tree, hedge or other habitat in which any birds may be nesting.
- Any necessary site clearance of trees, scrub, tall herbaceous vegetation, bare ground should occur outside the bird-breeding/nesting season (i.e. undertaken between September [October for house martins] and February inclusive) and must be preceded by a check by an ornithologist, especially for the potential presence of early or late nesting species.
- If vegetation clearance cannot be undertaken outside of the breeding bird season, then all trees and vegetation must be checked for breeding birds by the ECoW immediately before the clearance commences, and trees/hedges with active nests must be left until the hatchlings have fledged.
- For reference, the breeding bird season is generally taken as the 1st March until 31st August inclusive. However, it is also noted that birds can nest at any time of the year and are therefore protected when they do.
- All cleared material of bird nesting potential must be either chipped or moved and stored off-site to ensure that birds do not use the cleared material for nesting during the bird breeding season. Similarly, stockpiles of earth must be left without vertical faces during the spring and summer period. This will avoid potential nesting by sand martins which bury into the earth.
- The Contractor's programme shall clearly indicate any areas of existing vegetation to be removed and their programmed schedule for removal.
- There are no specific development constraints in respect of non-breeding birds.

5.6.12 Protection of Mammals

5.6.12.1 Bats

- It is a legal requirement to consult DAERA - NIEA before any work is undertaken that might affect a European Protected Species (EPS), such as bats, or known bat roosts. This includes buildings, alteration or maintenance work, demolition, re-roofing, remedial timber treatment as well as the felling of trees acting as bat roosts. Provisions are made within the legislation to allow works to take place under an EPS development licence that would otherwise contravene legislation.
- The ECoW or bat ecologist must undertake pre-construction inspection and survey of trees to be felled which have been identified as bat roosts or have potential to support bat roosts. The ECoW or bat ecologist must have a means of accessing features that may support roosting bats in order to inspect them if necessary. A dusk and dawn survey shall be carried out immediately prior to their removal.
- Trees scheduled for felling must be subject to inspection to identify bat roosts or potential bat roosts in accordance with Bat Conservation Trust – Bat Surveys Good Practice Guidelines, 2016 (or the latest version of this guidance available) and NIEA guidance “Bat surveys - NIEA Specific Requirements”.
- Confirmed bat roost sites must not be disturbed or obstructed until a licence has been obtained from the DAERA - NIEA. The licence will stipulate legally-binding conditions for mitigation and compensation which must be followed to ensure compliance with legislation protecting bats. The Contractor is obliged to ensure that all necessary licences are in place, and appropriate mitigation measures have been undertaken.
- The ECoW or bat ecologist shall be present at the time of implementing the mitigation measures during the construction period. The ECoW shall be responsible for ensuring that the Contractor implements the mitigation measures as intended under the terms of any licence.
- DAERA - NIEA are required to provide a licence to approve destruction of a roost. The destruction must not occur whilst the roost is inhabited. Mitigation measures must be in place (in the form of alternative roosts) prior to destruction of an existing roost.
- Potential tree roosts should be felled under the supervision of a qualified bat worker, generally in autumn when bats have completed breeding and hibernation has not commenced. Tree felling should include wedging to prevent cracks closing and trapping bats, and leaving felled limbs in situ for at least 24 hours to enable bats to escape.
- All workers on-site shall be made aware of the possibility of finding bats during works at built structures and tree felling. If bats are found in structures or trees, workmen should stop work immediately and contact the ECoW and the DAERA - NIEA who will advise accordingly. The ECoW will advise and assist with any subsequent mitigation for bats.
- Bat flight lines/commuting corridors should be maintained by use of temporary measures, such as poles with tape/ribbon along lines of maintained crossings immediately following vegetation clearance (as advised by the CEMPC) if necessary.
- Where suitable bat foraging habitat has been removed, replacement habitat should be provided. Where riparian habitats considered of importance for commuting and foraging bats are removed or temporarily impacted, the provision of replacement habitats and safe crossing points under river bridges (i.e. no lighting or obstructions) should be considered.
- The Contractor shall ensure that all mitigation outlined within the ES shall be incorporated into any licence applications to form part of the mitigation strategy.
- Night time working shall be kept to a minimum in order to prevent disturbance to sensitive nocturnal species such as bats. Any artificial lighting will be localised and temporary and should not be directed onto any adjacent hedges or treelines. As bats are active mainly at dusk and dawn, construction activities (such as earthworks, surfacing etc.) would be restricted to daylight hours in areas in close proximity to the Shimna River and Tullybranigan River in order to limit disturbance to these protected species.

5.6.12.2 Otter

- A pre-construction check by the ECoW should be undertaken of watercourses to determine the level of otter use prior to any construction works related to watercourses. The surveys should determine the presence, if any, of potential or confirmed dens, holts or couch areas within or immediately adjacent to construction activities and to update

existing survey data and to inform an application for a European Protected Species (EPS) licence in respect of otter. The pre-construction survey must be undertaken in good time before site mobilisation and construction to enable a licence to be obtained and mitigation to be in place.

- If otter or their evidence is found unexpectedly during the site, the Contractor shall immediately halt all construction activities within the area. The ECoW will contact the DAERA - NIEA Wildlife Officer (where necessary) to discuss actions and appropriate mitigation before works in the area can re-commence.
- The Contractor will be responsible in all cases to apply and obtain a licence where required. An appropriate mitigation strategy should be developed and comply with guidance issued by the DAERA - NIEA "Otters and Development".
- Due to potential disturbance to otter, including the destruction of refuges, and the potential disruption of otter movements, an EPS licence would be required from NIEA to undertake the construction work and apply the necessary mitigation measures to minimise impacts. An otter specialist should assist with the EPS licence application and undertake/supervise the mitigation work legally required under the terms of the licence.
- Works near rivers must ensure that access is maintained along the river bank for otters at all times.
- Use of noisy or large machinery within 30m of otter resting places to cease at least two hours before sunset
- Otters are principally nocturnal. Where artificial lighting is used, light spill over watercourses or riparian habitat must be avoided or minimised to avoid disturbance to otter activity. Night time working shall be kept to a minimum in order to prevent disturbance to sensitive nocturnal species such as otter. Any artificial lighting shall be localised and temporary and direct illumination of main watercourses will not be permitted.
- Precautions shall also be necessary to prevent otters from gaining access to the site compounds through the use of specified otter fencing. Deep, steep-sided excavations must be securely fenced or covered out of working hours, or a securely-fixed mammal escape ramp must be installed within the excavation.

5.6.12.3 Badger

- If a badger sett is directly affected by the site and requires closure, a licence will be required from DAERA - NIEA before badgers are disturbed or excluded. No construction, access or other activities that could disturb badgers shall be undertaken within 30m of the original sett, the artificial sett, or the route between the two, until badgers have been successfully excluded from the original sett. Successful exclusion works must be confirmed in writing by the licence holder and be endorsed by DAERA - NIEA.
- The Contractor shall be aware of the timing constraints for exclusion of active badger setts. In general, setts can only be closed under licence between 1st July and 30th November in any one year to avoid the breeding season of badgers.
- If badger or their evidence is found unexpectedly during the site, construction activities shall be halted immediately until the ECoW is consulted. Where necessary, the ECoW shall contact the DAERA - NIEA Wildlife Officer and the Project Manager for advice on how to proceed.
- Any construction works within 30m of an active badger sett, will require the Contractor to provide protection of the sett by means of a protection zone.
- Other indirect activities that may pose a threat to badgers or cause disturbance (and the associated mitigating strategy) that may also be added as a condition to any licence applications include the following:
 - the use of noisy plant and machinery in the vicinity of the protection zone should cease at least two hours before sunset;
 - security lighting should be directed away from setts;
 - chemicals should be stored as far away as possible from setts and badger trails;

- Trenches must be covered at the end of each working day, or include a means of escape if a badger were to fall in e.g. steps up from a hole or platform for escape;
 - Any temporarily exposed open pipe system should be capped in such a way as to prevent badgers gaining access; and
 - Trees should be felled away from setts and must not block badger paths.
- Mitigation must allow for the integration of measures designed to minimise impacts related to the development on resident badger populations. Firstly, this must include mitigation for setts that are likely to be affected by the project. Secondly, it must incorporate mitigation to enable continued safe movement of badgers throughout their territory.
 - Artificial setts must be constructed in the vicinity of any sett that is being destroyed under Licence. NIEA should advise on the final size, design and location of these. Indicative locations are shown in the confidential badger report.
 - Clear passage for mammals shall be provided along river banks during non-working periods.
 - Best practice advises a number of mitigation measures in order to minimise disturbance to badgers or damage to badger setts. The following mitigation must be undertaken:
 - NIEA consulted and mitigation measures agreed before any action is taken that under normal circumstances would be subject to licence;
 - A Badger Protection / Mitigation Plan must be produced and submitted for review. This shall detail mitigation measures, lines of responsibility, communication and emergency procedures;
 - Construction works that may result in disturbance to badgers in setts or loss or damage to badger setts must occur [under licence] between 1 July and 30 November in any one year to avoid the badger breeding season;
 - The ECoW shall meet the Contractor on-site before the start of construction activity, to ensure that the necessary mitigation measures are implemented;
 - The ECoW shall undertake pre-construction checks for badger and any work that would be undertaken under licence;
 - Setts must be closed [under licence] if they are directly impacted or would become vulnerable or untenable.

5.6.13 Control of Invasive Species

- Invasive non-native plants are those which have been introduced to Northern Ireland by accident, or as a consequence of trade or deliberate collection. Invasive non-native plant species tend to share characteristics that make them successful. These include fast growth rates, high capacity for spreading and reproducing, persistence and therefore their resistance to control.
- Japanese knotweed and Himalayan knotweed and Giant knotweed has been identified at various locations along the project, particularly in the vicinity of watercourses. Japanese knotweed and Himalayan knotweed and Giant knotweed are listed in Part II of Schedule 9 to The Wildlife (Northern Ireland) Order 1985 [as amended] as an invasive species, which makes it an offence to plant or otherwise cause to grow in the wild. As a result, measures must be taken to prevent it from being spread during construction or maintenance of the project.
- The Contractor shall prepare an Invasive Species Management Plan (ISMP) and include procedures for the removal of any soils within 7m of any invasive species which may be encountered over the course of the site. The Contractor shall provide a method statement for working in proximity and dealing with these invasive species. This management plan must be submitted to the Project Manager and DAERA - NIEA for approval.

- Measures must be taken to prevent the spread of invasive species during construction or maintenance of the project where they are encountered. As new plants can generate from seeds, live tissue and root fragments, it therefore makes it an offence to move contaminated plant or soil material to new sites.
- The Wildlife (Northern Ireland) Order 1985 [as amended] places a legal duty on the Contractor to carefully manage any invasive species and to prevent the spread of invasive species. Failure to do so can (and has) led to prosecutions.
- Responsibility for dealing with invasive plant species rests with the Contractor. Control efforts can help reduce the spread of invasive non-native species and are most successful if carried out as a wider co-ordinated strategy with collaboration of all relevant parties / landowners / managers. Control often needs to be repeated year-after-year.
- The Contractor is responsible for identifying and dealing with all areas of invasive species present (those already identified and any new locations) within the lands owned by the Employer and any land privately owned by survey prior to the construction works. Any updated invasive species survey report in relation to the project will be provided to the Contractor, but this must be supplemented by his own survey.
- The Contractor is responsible for identifying and dealing with all areas of invasive species present (those already identified and any new locations) within the site by survey prior to the construction works.

5.6.13.1 General Control Methods

- There are two basic methods of controlling invasive plant species: mechanical or chemical.
 - Mechanical control includes cultivation, pulling, cutting or excavation to remove the entire plant including its roots.
 - Chemical control uses specific herbicides.
- Due to the persistence of these species, a combination of these methods may be required and it is likely that treatment would take a number of years.

5.6.13.2 General action to be taken

- Fencing should be erected, preferably with a buffer area of 5-7m immediately after invasive species have been identified on the site. Appropriate signage should be added to deter any unauthorised access to the area and to prevent any further spread of the species.
- To begin control and prevent future spread of the plant, the relevant Invasive Species Management Plan should be implemented on the site as soon as possible; this is likely to involve chemical control using herbicides over a number of years. Where time constraints are an issue, removal by excavation may be required.
- Any Management Plan should consider the wider context of the invasive species. Co-operation from other adjacent landowners may be required to successfully eradicate an invasive species from a particular site.

Table 5.4. Biodiversity – Terrestrial Ecology Register of Environmental Actions & Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Potential additional Consultation Required
BTE1	In the vicinity of the proposed works	Prevent pollution or silt laden runoff from the site from potentially entering European designated sites (Murlough SAC, Eastern Mourne SAC, and Carlingford Marine pSPA) via the Shimna River.	Any impact on water quality could cause a negative effect on breeding success / winter feeding of selection feature bird species by affecting ability to feed. Best practice drainage management would be implemented throughout the development process by the Contractor. Pollution Prevention Guidance –Standing Advice (DAERA Planning and Environment, 2016) and Discharges to the Water Environment – Standing Advice (DAERA Planning and Environment, 2017) must be adhered to, and suitably implemented into the CEMP, where relevant.	During construction	Monitoring of works to ensure compliance with requirements and standards	Project Manager, NIEA – Natural Heritage
BTE2	In the vicinity of the proposed works	Prevent impacts on water quality during the construction phase on Shimna River ASSI and SLNCI.	Avoid works during the Salmonid spawning season and egg incubation phases (1 October – 30 April) at waters of fisheries significance. Appropriate site management during in-stream and bank works outside of this period would ensure that the channel remains passable for migratory Salmonids at all times.	During construction	Monitoring of works to ensure compliance with requirements and standards	Project Manager, NIEA – Natural Heritage
BTE3	In the vicinity of the proposed works	Reduce risk of deposition of dust on foliage of associated riverine habitats, and disturbance of protected species via noise and vibration.	The Contractor shall prepare an Air Quality Management Plan (AQMP) and incorporate the relevant mitigation measures within; reflecting the requirements of best practicable means and level of risk.	During construction	Monitoring of works to ensure compliance with requirements and standards	Project Manager, NIEA – Natural Heritage
BTE4	In the vicinity of the proposed works	Control the spread of invasive species. Habitat clearance within 7m of any invasive species may result in the further within habitat across the site and wider area.	An Invasive Species Management Plan shall be prepared and implemented to prevent the spread of invasive species during construction. It would be included as a sub-plan of the CEMP.	During construction	Monitoring of works to ensure compliance with requirements and standards	Project Manager, NIEA – Natural Heritage
BTE5	In the vicinity of the proposed works	Prevent pollution or silt laden runoff from the site entering Nationally designated sites (Mourne Coast ASSI and Murlough ASSI) via the Shimna River.	Best practice drainage management would be implemented throughout the development process by the Contractor. Pollution Prevention Guidance –Standing Advice (DAERA Planning and Environment, 2016) and Discharges to the Water Environment – Standing Advice (DAERA Planning and Environment, 2017) must be adhered to, and suitably implemented into the CEMP, where relevant.	During construction	Monitoring of works to ensure compliance with requirements and standards	Project Manager, NIEA – Natural Heritage
BTE6	In the vicinity of the proposed works	Minimise habitat loss and vegetation clearance to accommodate contractor working areas and possible contractor	Any additional vegetation clearance should be completed outside of the bird breeding season, or if this is not possible,	Prior to construction	-	Project Manager, NIEA – Natural Heritage

		compounds. Habitat loss should be kept to a minimum where possible.	then an ECoW should first check the area for ecological constraints, especially for nesting birds and roosting bats. Any vegetation clearance or river habitat damage within the ASSI will have double that area (where possible) enhanced, to include creation of riffles and pools and appropriate planting of bankside vegetation.			
BTE7	In the vicinity of the proposed works	Reduce potential impacts on otter including the loss of otter commuting habitat and potential (terrestrial) breeding sites. There is also the possibility of severance of habitat connectivity as a result of the proposed wall.	<p>ECoW should undertake a pre-construction survey for otter activity within the original study area, as a means of establishing the current status of otters.</p> <p>The following mitigation must be adhered to avoid impacts on otter during the construction phase of the project:</p> <p>All works must be largely restricted to daylight hours, so as to cause as little disturbance as possible. The use of artificial lighting during the construction period should be limited and construction activities during hours of darkness should be avoided. Lighting should be kept to essential locations only, with the position and direction of lighting being designed to minimise intrusion and disturbance to river corridors and their nature conservation value. Use of full cut-off lanterns would minimise light spillage onto adjacent areas;</p> <p>If noisy or large machinery is required within 30m of otter resting places, then use of such machinery must cease at least two hours before sunset;</p> <p>Drainage and attenuation ducts should restrict otter entry, and any temporary features which are liable to entrap wildlife should be covered or have a means of escape;</p> <p>Any excavation / trench must either be covered or fenced-off at the end of each working day. If this is not practicable, a means of escape for any animal which may fall in (e.g. mammal ladder or ramps) must be provided;</p> <p>Water sources which may be used by otter must be safeguarded (pollution guidance must be adhered to.</p>	In advance of and concurrent with construction	To be detailed in method statement	Project Manager, NIEA – Natural Heritage
BTE8	In the vicinity of the proposed works	Reduce potential impacts on badger, a nationally protected species are susceptible to impacts from development such as disturbance or direct impacts on their places of refuge.	<p>A pre-construction survey for badger must be carried out within the proposed site and accessible environs within the Zol (i.e. 25 m) immediately prior to works commencing, to determine if any breeding or resting sites have become newly established since the surveys completed in summer 2018.</p> <p>Any areas which are cleared of vegetation in order to facilitate temporary working areas or compounds should be reinstated with like-for-like native planting, thus minimising the impact of habitat severance and loss to badger.</p>	In advance of and concurrent with construction	To be detailed in method statement	Project Manager, NIEA – Natural Heritage
BTE9	In the vicinity of the proposed works	Two trees of Moderate suitability to host a bat roost, and numerous trees of Low suitability to host a	A suitable pre-construction survey (e.g. endoscopic under licence, emergence/re-entry survey) must be carried out	In advance of and concurrent with construction	To be detailed in method statement	Project Manager, NIEA – Natural Heritage

bat roost would be felled in order to facilitate the scheme.

immediately prior to felling, in order to inform a suitable mitigation strategy.

To compensate for the loss of suitable roost sites, five no. woodcrete bat boxes suitable for bats of the Pipistrellus genus must be erected within the site, mounted on mature trees to be retained in areas away from disturbance and prior to work commencing on site. The contractor can liaise with the Project Manager about the suitability of locations.

Bat boxes must be erected under the guidance of a suitably experienced ecologist / ECoW.

BTE10	In the vicinity of the proposed works	Reduce potential impacts on Red squirrel, which are known to be present in the vicinity, and may have established new dreys since previous surveys.	A pre-construction survey for red squirrel must be carried out within the proposed site immediately prior to works commencing, to determine if any breeding or resting sites have become newly established since the surveys completed in summer 2018. No further mitigation is recommended.	In advance of and concurrent with construction	To be detailed in method statement	Project Manager , NIEA – Natural Heritage
BTE11	In the vicinity of the proposed works	Reduce impacts as a result of extensive loss of woodland and scrub nesting habitat.	Any vegetation clearance or river habitat damage within the ASSI will have double that area (where possible) enhanced, to include creation of riffles and pools and appropriate planting of bankside vegetation. It is not expected that the contractor will result in any such losses however. Vegetation clearance must be restricted to the non-breeding season (i.e. carried out from September to February inclusive). For the avoidance of doubt, it should be noted that birds may nest in grass and low scrub, in addition to trees. Any vegetation clearance work which is required within the bird breeding season must be approved by a suitably experienced ecologist / ECoW, who will make a detailed check of any suitable vegetation for nests prior to vegetation / tree removal, and advise the contractor of any exclusion zones around potential or confirmed nests. A range of bird box styles, suited to various different species found on site are recommended to compensate for the loss of suitable nest sites.	In advance of and concurrent with construction	To be detailed in method statement	Project Manager, NIEA – Natural Heritage

5.7 Landscape & Visual

The Contractor shall comply with the summarised mitigation measures set out in Table 5.5), the Contract Documentation and Works Information and any updated or new supplementary environmental reports made available to the Contractor as necessary. This prescribes the mitigation measures necessary for the Contractor to implement in order address adverse landscape and visual (including amenity) effects associated with constructing the Project.

5.7.1 General Measures

- The Contractor shall consider the locations of site compounds, heavy plant and material stockpiles which may have a significant landscape and visual effect during the construction phase. The movement and activity of heavy plant, which has a significant visual presence due to size/scale and hazard lighting, would remain a transient issue, irrespective of where the site compound(s) are located.
- Construction compounds and stockpile locations shall be sensitively located in relation to adjacent and nearby properties to reduce the extent of adverse visual impacts:
- Construction compounds shall be fully reinstated and landscaped following completion of the site.
- The Contractor shall prepare a Landscape and Ecology Aftercare Plan, as outlined in the EMP.
- Landscape proposals shall be developed to meet a number of important project requirements and to satisfy the various commitments made within the Contract Documentation and Works Information. The landscape proposals shall provide mitigation and must be comprehensively applied throughout the site area as necessary.
- The Contractor shall ensure that the full provision for planting and other landscape requirements is made in completing the site.
- The Contractor shall enhance the landscaping and planting commitments within the context of the overall design philosophy.
- Requirements for general topsoiling, grass seeding, new planting works and protective measures, including staking, guards and fencing are a mandatory requirement.
- Existing road pavements and other paved areas forming part of proposed landscape areas shall be treated in accordance with the Contract Documentation and Works Information prior to topsoiling to a suitable depth to ensure establishment of planting and vegetation.

Table 5.5. Landscape & Visual Register of Environmental Actions & Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Potential additional Consultation Required
LV1	Within footprint of the proposed works	Reduce/soften landscape and visual impacts of the Project.	Implementation of landscape management programme/restoration plan. Use of stone cladding to walls, retention of existing vegetation along river banks and replacement of removed vegetation with native vegetation.	During detailed design and construction	Planting operations to be supervised during construction and inspected during maintenance period to ensure survival and establishment.	Project Manager
LV2	In the vicinity of the proposed works	To minimise damage to existing vegetation.	Protect existing vegetation in proximity to the site in line with BS5837:2012.	During construction	Protection measures to be inspected and monitored during construction.	NIEA – Natural Heritage

5.8 Population & Human Health

The Contractor shall comply with the summarised mitigation measures set out in Table 5.6, the Contract Documentation and Works Information and any updated or new supplementary environmental reports made available to the Contractor as necessary. This prescribes the mitigation measures necessary for the Contractor to minimise impacts upon the local community, residents and landowners directly affected by the site or Traffic Management.

5.8.1 Traffic Management

Although the direct impact to the existing road network will be minimal due to the scale and location of the works, the Contractor shall be required to establish a traffic management system for:

- planning and controlling the movement of vehicles, plant and non-motorised users that are present within the site, access to and egress from the site and on the adjacent road network; and
- ensure that safety of construction operatives, motorised and non-motorised users are not compromised.

This shall be achieved by effective implementation of a Construction Traffic Management Plan (CTMP) to be prepared and initiated by the Contractor and agreed with the Employer. The CTMP shall be included as part of the CEMP. The objective of this plan shall be to:

- minimise journeys to and from the site by the workforce, sub-contractors, suppliers and anyone else who is likely to visit the site regularly;
- provide protection from traffic hazards that may arise as a result of the construction activities and journeys to and from the site;
- manage potential adverse impacts on the public road network and ensure network performance is maintained at an acceptable level;
- minimise adverse impacts on users (motorised and non-motorised) of the public road network and adjacent properties and community facilities;
- plan deliveries to the site; and
- ensure that the roads and footways at the site access are kept clear of debris, soil and other material.

The Contractor shall include measures to restrict construction traffic to designated local roads. Traffic management shall be closely monitored on-site and every effort will be made to ensure the safety of local road users, pedestrians, equestrians and cyclists is maintained.

Traffic management shall be in operation to facilitate safe passage for pedestrians and others, including barriers defining the footpaths and safety zones to prevent construction vehicles encroaching on pedestrian areas. Where appropriate, segregated pedestrian routes shall be provided. Temporary warning signs shall be erected as necessary to highlight particular hazards, including site accesses and temporary traffic management measures.

5.8.2 Community Consultation

Developing an effective communication and consultation strategy with the local community is important to minimise the likelihood of causing a nuisance (i.e. from noise, dust, waste).

The Employer recognises the importance of community involvement in its activities and decision-making, and is committed to upholding its responsibilities in an open, consultative and inclusive manner and expects the Contractor to do the same. During the Works, if the community is aware of what is happening, it is likely that complaints will be reduced. The Contractor should try to explain the efforts that are being made to limit the impact of operations by phasing activities and other control measures.

As outlined in the fourth edition of CIRIA's '*Environmental good practice on site guide*' (C741), when considering how to liaise with the local community, the following steps should be adhered to:

- identify and keep informed key local community representatives, such as Councillors and residents' representatives;
- prepare a leaflet and distribute it to nearby residents or occupiers. Provide updates or regular contributions to existing community newsletters;
- write articles about the progress on site for the local media;
- display a 'contact board' at various locations along the site perimeter so that the public know who to contact if they have a complaint or a comment. Use this board to display information on project phasing and other relevant matters;
- join the Considerate Constructors Scheme (CCS);
- establish a complaint line and call it to ensure that it works;
- deal quickly with any complaints that arise and in accordance with a defined complaints procedure. Create a log of complaints. Make sure all complaints are properly followed-up and resolved, and the responses to them are recorded;
- issue site-based staff with contact cards to give to the public if approached to ensure complaints/queries are dealt with effectively.

The Contractor shall arrange for at least one public meeting prior to the commencement of the site in order to publicise the start of the site and to assess the concerns of the public. The Contractor shall hold a pre-construction exhibition prior to the commencement of the site to publicise the start of the site and assess the concerns of the public.

The Contractor shall also hold biannual liaison meetings with local councillors and other interested organisations throughout the contract period. The Contractor shall also hold liaison meetings with other local authority officers, statutory and other authorities and third-party interest groups as required. The Project Manager and the Employer shall be invited to all such meetings, with a minimum of 10 working days' notice.

The Contractor shall undertake activities within the local community with the objective of involving and educating the local community about the project and construction process.

Where the work directly affects local residents and landowners, the Contractor shall also arrange for local community meetings to be held as well as letter drops and house calls in order to ensure that those affected are totally aware of the implications of the site.

As a part of his role, the Liaison Officer (i.e. CEMPC) shall call on all residents prior to the start of work in close proximity to their property. They shall explain the extent and likely duration of the work; this shall not be limited to liaison required to deliver accommodation works.

Where necessary, arrangements for temporary access shall be outlined and residents will be given the opportunity to explain any temporary access arrangements that need to be facilitated by the Contractor in order to complete the site and accommodation works.

On completion of the work outside of individual properties, the Contractor shall arrange for the Liaison Officer to call in order to ensure that there are no outstanding issues which still need to be addressed by the Contractor.

5.8.3 Complaints, Comments and Queries

- Complying with the requirements of the Data Protection Act, and other relevant legislation, the Contractor shall record all Complaints, Comments and Queries (correspondence) received during the site. Stored data shall be secured against theft, intrusion or modification by malicious third parties in-line with current best practice.
- The Contractor shall record any actions, including further correspondence, taken in respect of any Complaint, Comment or Query.
- The following timescales shall apply in the Contractor's management of correspondence following submission:
 - Within 12 hours, an acknowledgement shall be sent to the correspondent; and
 - Within 72 hours, the Contractor shall issue a response to any correspondence detailing further actions to be undertaken.
- The Contractor shall aim to have completed and implemented their actions within seven working days of receiving correspondence.
- The Contractor shall report to the Employer during the monthly progress reporting, details of all new correspondence received and actions taken. The Contractor's reporting shall include details of the period of time taken to complete the actions detailed above.
- The Contractor shall have a means by which to explore the Complaints, Comments and Queries interface within the reception area of the site offices, to allow access to the records during normal working hours.
- Upon completion of the site, all records of correspondence and the actions taken shall be passed to the Employer.

5.8.4 Access to the Site

- Notwithstanding the other provisions of the Contract, the Contractor may gain entry to the Site from or through private land only with the prior written agreement of the landowner and occupier, after having obtained any necessary planning consent and advising the Project Manager. Access to the private land from the public road shall be to the satisfaction of the Employer.
- Access to the Site from public roads shall be to the satisfaction of the Employer. In providing access to the site, from either public roads or private land, the Contractor shall bear the responsibility for and bear the costs relating to any such accesses, installations, removal and maintenance.
- In providing access to the site, either from public roads or private land, the Contractor shall assess the environmental impacts and ensure that adverse environmental impacts are avoided. The Contractor shall be responsible for any matters arising with any third parties who consider them to be affected by such accesses.
- In all cases, the Contractor shall prepare a condition report showing condition of lands and road surfaces prior to commencement of use of the accesses. The report shall be accepted by the Project Manager prior to use of any access by the Contractor.
- The Contractor shall prepare and submit a haulage route plan showing the routes proposed for all materials and equipment deliveries to the site. This plan shall be approved by the Employer and Project Manager in writing prior to implementation. The Contractor shall allow six weeks for consideration of these proposals by the Employer. The Contractor's proposals shall include details of any maintenance or enhancements required to ensure proposed routes are suitable for construction traffic. Details of any systems and signage to ensure correct routing of vehicles shall also be included. The haulage route plan will also include the inspection and maintenance strategy for these routes.
- All proposed haulage routes will be inspected jointly by the Project Manager and the Contractor prior to the start of the site and at periods during the site as agreed by the Project Manager.

- The Contractor shall erect appropriate signs to show accesses and restricted routes.
- The programme for access to all private land for accommodation works shall be the responsibility of the Contractor.

5.8.5 Accommodation Works

- The Contractor shall not use areas of land owned by the Employer or land privately owned for any purpose other than the construction and maintenance of the site unless otherwise agreed and approved by the Employer, landowner and occupier.
- The Contractor shall ensure that all areas of land which have been occupied to provide the site or carry out accommodation works including the construction of other carriageways, are reinstated to the satisfaction of the affected landowner, occupier and the Employer.
- The Contractor shall complete all accommodation works relevant to each particular plot and vacate the areas owned by specific landowners in the most time efficient manner to minimise nuisance and disruption to the landowner.
- Any agreement to alter accommodation works in any way shall be requested in writing by the Contractor with the appropriate landowners, occupiers and other authorised users, and the Contractor shall be required to have such agreement in writing prior to any proposed alteration to the accommodation works. The Contractor shall assess the environmental impacts of the proposed changes to the site and ensure that all reasonable measures are taken to avoid or mitigate adverse environmental impacts.
- The Contractor shall make his own arrangements with landowners to access land for the purpose of undertaking the accommodation works, advising the Project Manager two weeks before entry. Such owned land shall be vacated as soon as possible after accommodation works are completed. The Contractor shall complete accommodation works at each location as efficiently as possible to ensure minimal disruption to each landowner.

5.8.6 Public & Private Roads, Accesses and Rights of Way

- All public & private roads, accesses and Rights of Way affected by the site shall be retained and maintained throughout the period of the Contract until an alternative suitable means of access is provided.
- No private accesses affected by the site shall be stopped-up until the alternative accesses have been provided or written agreement made with the landowner by way of the Consultation process.
- Any agreement to alter a private road or access in any way shall be confirmed in writing by the Contractor with the appropriate landowners, occupiers and other authorised users. The Contractor shall be required to have such agreement in writing prior to any alteration to the access. The Contractor shall assess the environmental impacts of the proposed changes to the site and ensure that all reasonable measures are taken to avoid or mitigate adverse environmental impacts.
- Temporary access to individual properties and premises shall be maintained at all times. The Contractor shall notify the Employer, in writing, of all properties which are likely to be affected by sections of the site at least ten days before the site commence.

Table 5.6. Population & Human Health Register of Environmental Actions & Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Potential additional Consultation Required
PH1	Within footprint and vicinity of the proposed works	Ensure that safety of construction operatives, motorised and non-motorised users are not compromised throughout the works	Preparation and effective implementation of a Traffic Management Plan	Prior to and throughout construction	Traffic management shall be closely monitored on-site and every effort will be made to ensure the safety of local road users, pedestrians, equestrians and cyclists is maintained.	DfI-Roads, NMDDC & PSNI
PH2	North bank of River Shimna, downstream from Bryansford Road bridge.	Realignment and regrading of footways across flood wall embankment.	Replacement footways, accessible for all NMUs to be implemented across embankment at a suitable gradient, to allow continued access to Islands Park.	During detailed design and construction	Ensure constructed as per design specifications	NMDDC
PH3	At affected properties	Minimise impacts to private land.	Ensure appropriate liaison with landowners to discuss finish of affected property boundaries.	Prior to construction	-	Affected landowners

5.9 Noise & Vibration

The Contractor shall comply with the summarised mitigation measures set out in Table 5.7, the Contract Documentation and Works Information and any updated or new supplementary environmental reports made available to the Contractor as necessary. This prescribes the mitigation measures necessary for the Contractor to minimise and monitor noise and vibration impacts and effects associated with constructing the project.

5.9.1 General Measures

- It will be necessary for the Contractor to liaise with the Environmental Health Unit within Newry, Mourne & Down District Council (NMDDC), to ensure that noise and vibration during construction is effectively managed. This will include communicating details of the various phases of work, demonstrating how good site practices will be adopted in order to mitigate construction noise and vibration impacts. This must include details of noise reduction/management methods to be employed during piling activities. The Contractor will be required to employ best practicable means (as defined in Article 52 of the Pollution Control and Local Government (Northern Ireland) Order 1978) to minimise noise and vibration resulting from his works (as described in Article 40 of the 1978 Order).
- The Contractor shall designate an Environmental Manager/Responsible Person who, amongst a range of other responsibilities, will liaise with environmental advisors, statutory bodies and the local community as required with respect to noise and vibration impacts during the construction phase.
- In all cases, the best practicable means of minimising noise on the site must be adopted. In this respect, guidance is given in BS 5228-1:2009 'Code of practice for noise and vibration control on construction and open sites'. The following recommended mitigation measures, as suggested in BS 5228, shall be employed by the Contractor to lessen the noise impacts from the construction phase:
 - The establishment and maintenance of good community relations will be a priority. This may include informing local residents on progress of the site by way of leaflet drops and/or public meetings and ensuring measures are put in place to minimise noise impacts. A telephone "hot line" and agreed procedure for the contractor to investigate and report on complaints will be set up.
 - Operatives shall be trained to employ appropriate techniques to keep site noise to a minimum, and shall be effectively supervised to ensure that best working practice in respect of noise reduction is followed.
 - The hours of working shall be planned and account taken of the effects of noise upon persons in areas surrounding site operations and upon persons working on site, taking into account the nature of land use in the areas concerned, the duration of work and the likely consequence of any lengthening of work periods.
 - Positioning of static plant as far as possible from residential properties, and utilising available screening by temporary structures, stock piles, etc.
 - For any particular job, the quietest available plant and/or machinery should be used. Where appropriate, it must be constructed to meet the requirements of EC Directives
 - All equipment should be maintained in good mechanical order and fitted with the appropriate silencers, mufflers or acoustic covers where applicable. All plant and vehicles used in the site shall have exhaust silencers in good working order and diesel plant shall be fitted with effective air intake silencers. All ancillary pneumatic percussive tools shall be fitted with mufflers or silencers as recommended by the manufacturer.
 - Construction methods and programme shall be selected to minimise noise and vibration at sensitive receptors. Where reasonably practicable, quiet working methods should be employed, including use of the most suitable plant, reasonable hours of working for noisy operations, and economy and speed of operations. Site work continuing throughout 24 hours of a day shall be programmed, when appropriate, so that haulage vehicles will not arrive at or leave the site between 18:00 and 08:00, unless emergency works, or agreed with the council environmental health unit.

- It may be necessary for some construction works to take place outside normal hours. Moreover, there may be items of plant (e.g. dewatering pumps and similar) in use during night-time hours. They should be chosen, sited and enclosed such that levels at the nearest properties do not exceed 45 dB LAeq. This level is based on the World Health Organisation criteria for undisturbed sleep, and assumes a resident may have a partially open window.
- Stationary noise sources should be sited as far away as possible from Noise Sensitive Receptors (NSR), and where necessary acoustic barriers should be used to shield them. The spread of noise should be limited, i.e. by distance between source and receiver and/or screening.
- Temporary screening using sandbags, 20mm plywood sheeting or similar dense boarding may be required to reduce impact of static machinery or extensive works close to noise sensitive locations. Such measures can be best assessed during the contract by monitoring.
- Noise should be controlled at source, for example, by modification of existing plant/equipment, its use and location and ensuring maintenance of all noise-generating equipment;
- On-site noise levels should be monitored regularly, particularly if changes in machinery or project designs are introduced, by a suitably qualified person appointed specifically for the purpose. A method of noise measurement shall be agreed prior to commencement of site works.
- On those parts of a site where high levels of noise are likely to be a hazard to persons working on the site, prominent warning notices shall be displayed and, where necessary, ear protectors shall be provided.
- Where practicable, piling should be carried out by the method causing the minimum of noise or vibration; and
- any machinery which is in intermittent use should be shut down in intervening periods of non-use or where this is impracticable, it should be throttled back to a minimum.
- Site staff should be informed about the need to minimise noise and should be supervised to ensure compliance with the noise control measures adopted.
- The Contractor should seek to minimise the total level (ambient plus construction) noise and strive not to exceed the pre-construction ambient level by more than 1dB A. However, where it is not possible to reduce noise levels to within limits prescribed below (despite extensive mitigation); consent to undertake noisy works will be made to the NMDDC – Environmental Health Unit, in consultation with neighbouring NSR.
- For the purpose of noise and vibration limits, NSRs are to be regarded as any residential or office accommodation in the vicinity of the construction works. The Contractor shall programme operations and use methods/techniques to minimise noise and vibration at NSRs.
- Construction site traffic should be managed on the public road network, so as to prevent queuing or parking of vehicles outside of the site compounds.
- Programme and route for the transportation of construction materials, spoil and personnel should be selected to minimise noise and vibration at sensitive receptors.
- A range of good site practices should be adopted in order to mitigate construction phase noise and vibration. Such measures, and other good site practice mitigation techniques, are defined below:
 - Proper use of plant with respect to minimising noise and vibration emissions and regular maintenance. All vehicles and mechanical plant used for the purpose of the site will be fitted with effective exhaust silencers and will be maintained in good, efficient working order;
 - Selection of inherently quiet plant where appropriate. All major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers;
 - Machines in intermittent use will be shut down in the intervening periods between work or throttled down to a minimum;

- All ancillary plant such as generators, compressors and pumps will be positioned so as to cause minimum noise and vibration disturbance. If necessary, acoustic barriers or enclosures will be provided. A well-constructed 3m high barrier of 10mm softwood can reduce noise levels by 5-10 dB;
- Adherence to the codes of practice for construction working and piling given in British Standard BS 5228:2009 and the guidance given therein minimising noise and vibration emissions from the site.
- In order to minimise the likelihood of complaints, the Council and affected residents shall be kept informed of the site to be carried out and of any proposed work outside normal hours. Residents will be provided with a point of contact for any queries or complaints.

5.9.2 Local Authority Information/Requirements

- The NMDDC – Environmental Health Unit may require the submission of a regularly updated CEMP and the Contractor shall carry out all works in accordance with this and the recommendations in British Standards Institution BS 5228: (2009+A1: 2014), '*Code of practice for noise and vibration control on construction and open sites*' and other relevant British Standards, as necessary.
- The Contractor shall carry out all works in accordance with the requirements of:
 - i. The Pollution Control and Local Government (Northern Ireland) Order 1978 (which regulates noise nuisance);
 - ii. The Noise Insulation Regulations (Northern Ireland) 1995 (which regulates the insulation of buildings or makes a grant where noise is caused by the construction or alteration of roads); and
 - iii. The Control of Noise (Codes of Practice for Construction and Open Sites) Order (Northern Ireland) 2002 (which approves four British Standards Institution codes of practice for appropriate methods of minimising noise and vibration from construction and open sites in Northern Ireland).
- The Council has the power to serve a legal notice under Article 40 of the Pollution Control and Local Government (Northern Ireland) Order 1978. This notice is served on the person carrying out, or about to carry out the site, including relevant sub-contractors and it also may be served on those having responsibility and control for the site.
- Notices may prohibit the use of certain equipment such as breaking tools, specify the hours during which the site may be carried out, and/or stipulate noise and vibration limits. It will also require the adoption of best practicable means to minimise noise and vibration as defined in relevant codes of practice.
- The Contractor may also apply for consent under Article 41 of the Pollution Control and Local Government (Northern Ireland) Order 1978. The Council must give consent if it considers that the Contractor's proposals are reasonable and, if he acts in accordance with his application, the Council would not serve a prohibition notice.
- The consent application must contain details of:
 - a) the site the Contractor wants to undertake;
 - b) the location of the site;
 - c) proposed working hours;
 - d) the method of work; and
 - e) the steps that will be taken to minimise noise.

- It is envisaged that this process will ensure disturbance due to noise and vibration arising from major construction and civil engineering works is kept to an acceptable level without the imposition of unnecessary or unduly onerous restrictions on the Contractor.

5.9.3 Monitoring Requirements

- The Contractor shall be responsible for compliance with any noise and vibration levels as agreed with NMDDC – Environmental Health Unit, including any ongoing monitoring required in this regard.
- Monitoring is necessary in order to highlight any potential noise nuisance arising from the site. In order to minimise and effectively respond to situations that may cause nuisance, real time measurements are necessary to permit immediate remedial actions to be taken.
- When the Contractor and/or the Project Manager consider it necessary, the Contractor shall submit with any programme of works, a copy of noise calculations to show that his proposed method of working will not produce noise levels greater than those agreed with NMDDC – Environmental Health Unit.
- Noise monitoring shall be undertaken with a hand held or tripod-mounted integrating sound level meter to determine noise levels at specified locations at known times during the working day. The monitoring equipment shall comply with at least BS 7580-2: 1997 Type 2 specification, as required by BS 5228-1:2009 '*Code of practice for noise and vibration control on construction and open sites*' Part 1: Noise, Annex G.
- All noise monitoring equipment shall be calibrated before and after use to check for calibration drift. It shall be in good working order at all times. All equipment shall be subject to annual calibration by the manufacturer and a certificate of calibration shall be available with the equipment for the purpose of inspection.
- A suitable number of noise monitoring locations shall be established at the site boundary and agreed with NMDDC – Environmental Health Unit. The microphone shall be situated in a free-field location, approximately 1.2 to 1.5 metres above local site level. Measurements shall be made in accordance with good acoustical practice, care being taken to avoid the effects of local acoustic screening and acoustic reflections. The calibration level and battery level of the sound level meter shall be recorded at the beginning and end of each monitoring session.
- Adequate background noise levels shall be obtained at all monitoring locations prior to commencement of construction works.
- All operators of noise monitoring equipment shall be trained and competent to undertake the measurements.
- Prevailing weather conditions (including wind direction and speed, air temperature, incidence of precipitation and degree of cloud cover) shall be recorded with each set of monitoring results. Wind speed and direction shall be recorded daily using a portable anemometer and compass.
- Copies of all noise measurements shall be made available to the Employer and to NMDDC – Environmental Health Unit.

5.9.4 Restrictions on Working Hours

- The normal working hours relating to noise and vibration within the boundaries of the site can vary between seasons, with the working day extended to take advantage of extended daylight hours during the period from April to October. Typically, these hours are 07.00 to 19.00hrs in the summer months and 07.30 to 17.30hrs in the winter, with no working on Sundays or public holidays. Exceptionally, consent for work outside these hours may be given after any necessary consultation. This is consented under an Article 41 Application, as per the requirements of the Pollution Control and Local Government (Northern Ireland) Order 1978. Twenty-eight days' notice (or within such longer period as the NMDDC – Environmental Health Unit and the Contractor may at any time agree in writing) is required from the Contractor when seeking such consent. Should working be permitted during evening, night or Sunday, the noise and vibration levels should be agreed with NMDDC – Environmental Health Unit prior to commencement of the site.

- The noise and vibration levels defined by NMDDC – Environmental Health Unit for periods outside the normal working hours, will only be permitted when consent has been given to exceptional working. The restriction of working hours is often the most practicable option for reducing the impact on local residents and local businesses. In most circumstances, however, this must be balanced against other considerations such as public safety, the disruption of services and transport, and the need to complete the site with minimum delay.
- The noise and vibration levels during the construction are to be kept within acceptable levels in accordance with the current codes of practice, approved as being suitable for giving guidance on appropriate methods for minimising noise.

5.9.5 Noise Limits

- With regards to Noise Limits (unless agreed otherwise with NMDDC – Environmental Health Unit), Method 2 (Local Authority Noise Limit) will be used for noise restrictions associated with the site. This is also known as 'the ABC Method', and is one two main methods to determine potential significance based on noise change.
- The following noise limits may be applicable in certain circumstances for residential areas:
 1. not exceed 75 dB LAeq, 12-hour between 07.00 and 19.00hrs on Mondays to Fridays, or 75 dB LAeq, 5-hour between 08.00 and 13.00hrs on Saturdays, when measured at any point, 1 metre from any façade of any residential accommodation;
 2. not exceed 65 dB LAeq, 1-hour between 19.00 and 22.00hrs on Mondays to Fridays, or between 13.00 and 22.00hrs on Saturdays, when measured at any point 1 metre from any façade of any residential accommodation; and
 3. not be audible between 22.00 and 07.00hrs on Mondays to Fridays, or between 22.00 and 08.00hrs on Saturdays, or at any time on Sundays, at the boundary of any residential accommodation. (As a guide, the total level (ambient plus construction) shall not exceed the pre-construction ambient level by more than 1dB A). This will not allow substantial noise producing construction activities but other "quiet" activities may be possible). Routine construction and demolition work, which is likely to produce noise sufficient to cause annoyance, will not normally be permitted between 22.00 and 07.00hrs.
- Under this Method, if the ambient noise level exceeds the above threshold values (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total LAeq, T noise level for the period increases by more than 3 dB due to site noise.
- If access cannot be obtained to enable measurements to be taken at the facade, measurement shall be taken at the nearest accessible point and facade levels calculated, by a suitably qualified acoustician, using methods to be approved by the NMDDC – Environmental Health Unit.
- In commercial areas or in close proximity to office accommodation, the priority is for workers not to be subjected to noise at a level which causes speech interference (e.g. conversation should not be too difficult with the windows shut). In dealing with complaints it may be necessary for the Council to restrict the hours of operation of noisy equipment such as pneumatic drills, kango hammers and breaking tools. This can be achieved by an informal compromise agreed with the Contractor (depending on the nature of the commercial premises, noisy work may be prohibited between 10.00 - 12.00hrs and 14.00 - 16.00hrs) or by serving a legal notice where appropriate. It is recognised that for some offices lunch time may be their most busy period, whilst others may be closed.

5.9.6 Vibration Control

- The requirement whether or not to undertake vibration monitoring will be agreed with NMDDC – Environmental Health Unit. Guidance on the magnitude of vibration and methods of measurement are detailed in BS 5228-1:2009 '*Code of practice for noise and vibration control on construction and open sites*'.

- Vibration levels shall be predicted in accordance with the methods set out in BS 5228: 1992: Part 4. Guidance in BS 6472, BS 5228 and BS 7385 shall be used to establish criteria, controls and working methods unless otherwise agreed with NMDDC – Environmental Health Unit.
- Human beings are very sensitive to vibration and piling operations, which are a common source of complaint. Residents are likely to complain when vibration levels are only slightly in excess of perception levels. Sensitivity to vibration varies and peak particle velocities in the range 0.1 – 0.3 mm/s equate to the human threshold of vibration perception at frequencies of 1-80 Hz. Vibrations above these values can startle, cause annoyance or interfere with work activities, as well as give rise to structural damage.
- Guidance on the magnitude of vibration and methods of measurement are detailed in BS 5228. The following limits may be applicable in certain circumstances.

5.9.6.1 Vibration monitoring Equipment

- The type of instrumentation suitable for monitoring vibration shall be a digital seismograph having the following specification:
 1. Minimum sampling rate 100 samples/second/channel.
 2. Capable of recording Peak Particle Velocity (Directly), Peak Acceleration (Calculated), Peak Displacement (Calculated), Frequency at the Peak Velocity (Calculated).
 3. Dual Mode instrument having (a) Self Triggering Mode, and (b) Continuous Monitoring Mode.
 4. Transducer – 3 orthogonally-mounted transducers on one mounting unit.
 5. Frequency Range – 4.5 to 200 Hertz.
 6. Minimum Resolution – 0.05 mm/s, velocity.
 7. Range - 0 to 100 mm/s, velocity.
 8. Record of Events – hard copy printout and storage on solid state memory or disc for subsequent Printout.
 9. Power – 240 volt mains for continuous unattended operation plus internal battery with minimum of 24 hours capacity.

Table 5.7. Noise & Vibration Register of Environmental Actions & Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Potential additional Consultation Required
NV1	Within footprint and vicinity of the proposed works	Limiting potential impact to noise sensitive locations, and ensure that noise and vibration is effectively and sensitively managed during construction.	<p>The appointed contractor shall be required to undertake liaison with NMDDC and the local community to ensure that noise and vibration during construction is effectively and sensitively managed. This is particularly important for works in the vicinity of the Autism Initiatives facility on Bryansford Road.</p> <p>There are a number of mitigation measures which are considered appropriate and of good working practice for all construction contracts. These measures are detailed in BS5228 (2009), 'Noise and Vibration Control on Construction and Open Sites'. Typical measures would include positioning of static plant as far away from receptors as possible, using well-maintained plant, temporary screening, enclosures, restricting works (where feasible) to daytime and staggering high vibration activities such as piling and jack hammering.</p> <p>Other guidance includes: HSE Dust and Noise in the Construction Process CRR 73 HSE Books 1995; HSE Noise at Work – Guidance for Employers on the Control of Noise at Work Regulations 2005; and BRE Control of Dust from Construction and Activities 2003.</p>	During construction	Monitoring of works to ensure compliance with requirements and standards	NMDDC Environmental Health, local community
NV2	Within footprint and vicinity of the proposed works	Due to the proximity of many receptors NMDDC Environmental Health would recommend a start time of 08:00 for noisy activities e.g. piling.	The appointed contractor shall be required to comply with the control of noise and vibration, and working hours specifications prescribed within the Works Contract. This shall require that noisy activities do not commence earlier than 08:00am. This requirement shall also be addressed within the environmental control measures section of the EMP.	During construction	Monitoring of works to ensure compliance with requirements and standards.	NMDDC Environmental Health, local community
NV3	Within footprint of the proposed works	NMDDC Environmental Health notes there will be no 24-hour pumping. If there is to be a change to working hours Environmental Health must be notified in advance and neighbouring residential properties notified as well.	<p>The appointed contractor shall be required to notify NMDDC – Environmental Health of any planned changes to the pumping regime. This shall be prescribed with the Works Contract and addressed within the environmental control measures section of the EMP.</p> <p>The Contractor shall be required to liaise with the local community during the contract. This shall include providing information about activities likely to give rise to nuisance, and a telephone number for complaints to be registered.</p>	During construction	<p>Monitoring of works to ensure compliance with requirements and standards.</p> <p>A log of all complaints and follow up actions shall be kept and shall be issued to the Project Manager on a monthly basis. This log shall be made available to</p>	NMDDC Environmental Health, local community

					NMDDC – Environmental Health upon request.	
NV4	Within footprint and vicinity of the proposed works	As the project is to take approximately 12 months to complete it is anticipated that the contractor and the Department will facilitate regular meetings including NMDDC Environmental Health to keep all parties informed etc.	The Contractor shall be required to hold monthly liaison meetings with NMDDC – Environmental Health at a convenient location or on site. The location of the meeting shall be at the determination of NMDDC – Environmental Health. This shall be identified as a requirement within the Works Contract and the EMP.	In advance of and during construction	Records/Minutes of all liaison meetings shall be taken and circulated to NMDDC – Environmental Health and the Department for acceptance	NMDDC – Environmental Health
NV5	Within footprint and vicinity of the proposed works	NMDDC Environmental Health to be consulted upon noise threshold value for the works	The works information within the contract documents will clearly state the threshold value that the appointed contractor must complete the works within. This will in effect make it a contractual requirement for sheet piles to be installed within these limits. In addition to this, pre and post condition surveys will be completed on all structures within the zone of influence, circa 25m. As NMDDC – Environmental Health shall be consulted upon the works information and EMP in advance of contract award and the CEMP post contract award, the opportunity remains to determine a different threshold level as per the ABC method if required.	In advance of and during construction	Onsite noise monitoring to be undertaken by a competent person	NMDDC – Environmental Health
NV6	Within footprint of the proposed works	NMDDC Environmental Health require reassurance upon responsibilities in terms of piling operations	NMDDC – Environmental Health shall be consulted upon the works information and EMP in advance of contract award and the CEMP post contract award. This shall allow for the Department to be more definite in terms of responsibilities in the piling operations. At this stage however, the Department is not in a position to determine how the contractor is to install piles. The Department is only in a position to specify what cannot be done and the limits the contractor must keep within to install the piles.	In advance of and during construction	See requirements above	NMDDC – Environmental Health
NV7	Within footprint of the proposed works	Any vibration monitoring results should be shared with the Department and NMDDC Environmental Health upon request.	All vibration monitoring results shall be shared with the Department and NMDDC -Environmental Health upon request. This requirement shall be included as a clause within the Works Contract and within the EMP.	During construction	Onsite vibration monitoring to be undertaken by a competent person	NMDDC – Environmental Health

5.10 Drainage & the Water Environment

The Contractor shall comply with the summarised mitigation measures set out in Table 5.8, the Contract Documentation and Works Information and any updated or new supplementary environmental reports made available to the Contractor as necessary. This prescribes the mitigation measures necessary for the Contractor to minimise and monitor impacts and effects upon the water environment during construction.

5.10.1 General Measures

- The Contractor shall be aware of and outline to all sub-contractors his/their legal responsibilities under the Water (Northern Ireland) Order 1999 and the implications of causing a pollution event.
- Any works in, near or liable to impact a waterway (including measures to mitigate adverse impacts) 'must' gain the consent of NIEA - Water Management Unit and DAERA – Inland Fisheries as necessary, with sufficient notice to process (i.e. water discharge and in-stream work consents) prior to commencement of such works.
- In order for the Contractor to formulate appropriate method statements and processes for implementing mitigation measures (as set out below), it will be necessary for him to prepare these in consultation with the relevant stakeholders (as listed above), to ensure that potential for significant impact upon the water environment is addressed and appropriate measures to mitigate effects are employed. This will allow the Contractor to develop approved method statements for sensitive activities, such as working within or near a surface water, disposal of groundwater intercepted in cuttings or during de-watering, and disposal of runoff during the construction phase.
- Measures to protect the water environment shall be formulated in accordance with best practice guidance, such as:
 - PPGs/GPPs, jointly published by NIEA, the Environment Agency, and the Scottish Environment Protection Agency (SEPA) including;
 - GPP 5 'Works and Maintenance In or Near Water',
 - PPG 6 'Working at Construction and Demolition Sites', and
 - GPP 2 'Above Ground Oil Storage Tanks'.
 - DAERA's Standing Advice Notes (all of which were updated in November 2017) including;
 - Pollution Prevention Guidance;
 - Sustainable Drainage Systems;
 - Vehicle washing;
 - Discharges to the Water Environment; and
 - Abstraction and Impoundment.
 - CIRIA guidance documentation C648 'Control of Water Pollution from Linear Construction Projects'; and
 - CIRIA guidance documentation C532 'Control of water pollution from construction sites: guidance for consultants and contractors'.

- This documentation comprehensively details issues that present the risk of adverse impacts occurring within the water environment and how to mitigate such impacts. These are too numerous to discuss in detail, however in general, the following mitigation proposals are considered standard measures that should be applied during construction of such a project.

5.10.2 Sedimentation (Suspended Solids)

- The CEMP must include a Water Management Plan (WMP) and this must be submitted to NIEA - Water Management Unit, DAERA – Inland Fisheries and the Project Manager, in accordance with the Acceptance procedures, at least three weeks prior to works starting on site.
- The greatest risk to the water environment as a result of the site works would relate to sedimentation. Consequently, as part of the WMP, the Contractor will have to implement measures that will minimise erosion by reducing disturbance and stabilising exposed materials.
- The first step towards preventing silt pollution from the site shall be to minimise the generation of silt-laden runoff. This can be achieved by the Contractor carefully planning the site works so that activities likely to generate silt-laden runoff are carried out during drier months, and erosion of surface soils is controlled. Seasonal weather patterns should be taken into consideration by the Contractor when programming and planning construction activities.
- As local weather is inherently unpredictable, the control of erosion from surface soils will be paramount to the protection of the water environment. This shall encompass the requirement that attenuation measures applied to this part of the development are designed to cope with one-off adverse precipitation events and cannot be overwhelmed resulting in polluted runoff reaching the main watercourse to the detriment of the aquatic environment.
- Consideration should be given to the Source – Pathway – Receptor model, as this 3-step linkage should not be completed in order to mitigate any impact on surface watercourses. This can be achieved by removing the source (e.g. exposed soil) or pathway of contamination (e.g. runoff into storm water drains with no treatment measures installed).
- Stockpiles should be kept to a minimum, however to control erosion, areas of exposed ground and stockpiles should be minimised to reduce silty runoff and located well away from drains and watercourses (by a minimum distance of 10m where the land is flat, and further if there is a slope to a watercourse), stabilised as soon as possible (e.g. seeded or geotextile mats), and bunded by earth or silt fences (if required) at the toe of the stockpile to intercept silt-laden runoff during rainfall events. Stockpiles shall not be located where there is a steep slope towards a watercourse.
- Consideration should be given to ground water level and ground saturation to prevent excessive overland flow and associated scouring and mobilisation of suspended solids. The area to be stripped should be kept to a minimum and phased during the planning and construction phase to reduce the amount of land exposed, which would generate suspended solids.
- Existing vegetation should be retained where possible, as mature vegetation stabilises the soil and prevents erosion. Areas where vegetation clearance is required should be kept to a minimum, and the site divided into phases, with seeding and planting of the phases that are complete. This will minimise the areas of exposed soil and thus the risk of erosion. A minimum of a 10m vegetative buffer (as per the requirements of NIEA – Water Management Unit Pollution Prevention Team) shall be maintained adjacent to watercourses except where works are specifically required to the watercourse. Where this is not possible, the NIEA – Water Management Unit shall be consulted with respect to secondary defence mechanisms regarding suspended solids (e.g. erection and maintenance of silt fencing alongside waterways as per the Water (Northern Ireland) Order) 1999.
- The NIEA - Water Management Unit advocate discharge to vegetated land but consideration must be given to ground water level and ground saturation to prevent excessive overland flow and associated scouring and mobilisation of suspended solids. The area to be stripped/cleared should be kept to a minimum and phased during the planning and construction phase to reduce the amount of land exposed, which will generate suspended solids.

- If de-watering activities are required, discharge from the site into stormwater drainage would require consent from NIEA – Water Management Unit (and NI Water consent for discharge into public foul/combined sewers). Water should be treated (if required) to achieve acceptable turbidity and discharge standards as outlined in the consent. *Guidance for Pollution Prevention 5: Works and Maintenance In or Near Water* (January 2017) outlines measures of treatment and disposal that can be considered by the Contractor.
- Use of cut-off V drains (diverting water entering site) will reduce the amount of water needing managed on-site. The NIEA - Water Management Unit recommends protection of cut-off V drains and temporary channels against scour to minimise mobilisation of suspended solids. This can be achieved by lining the length with hessian, clean stone, and hydro-seeding options. The placement of check dams along the length and maintenance of the drains would be essential to ease burden on settlement features.
- Vehicle crossings of watercourses shall be minimised and use designated crossing points and existing road infrastructure only. Mud shall be controlled at entry and exits to the site using wheel washes and/or road sweepers, and tools and plant must be washed out and cleaned in designated areas.
- Facilities for vehicle washing/wheel washing should be provided at all site exits as well as procedures for effective cleaning and inspection of vehicles, to keep mud off the public road network. Tools and plant must be washed out and cleaned in designated areas. Consideration of containment of wheel washings for treatment prior to discharge should be given. The NIEA - Water Management Unit will require assurances that there is protection against ingress of suspended solids at the proposed locations and that there would be ongoing maintenance of roadways over crossings during the construction phase to clear 'slurry' to prevent excessive build-up of suspended solids that could impact a waterway.
- Areas of hard standing and surface roads shall be swept regularly to prevent the build-up of material which could be washed into watercourses.
- Subject to consent, water that is unpolluted, aside from its silt content, may also be pumped out over adjacent vegetated ground where the land is part of the site or permission has been obtained from the landowner, providing the land is not contaminated or a site of wildlife importance. The water shall be pumped at a rate that allows absorption into the ground without significant basining, and the discharge point shall be moved regularly to prevent significant basining. A weekly monitoring and management programme must be in place to ensure effective functioning, as per NIEA – Water Management Unit requirements.
- The use of settlement systems, the collection of surface drainage and associated management and treatment prior to discharge requires considerable consideration. Communication (ongoing and regular) with NIEA - Water Management Unit is essential. This will likely take the form of site inspections, monthly meetings with the Contractor, Employer's Project Manager and other regulators.

5.10.3 Accidental Spillage

- Measures shall be taken and procedures put in place to minimise the risk and potential effects of spillage incidents, such as the following:
 - Storage of oils and diesel, along with the general maintenance and refuelling of plant, will be restricted to impermeable bunded areas with a minimum 110% storage capacity and away from surface waters or areas where any spillages could easily reach a surface water. All fuel, chemicals and oils will be stored within bunded areas in accordance with GPP2 – Above ground oil storage tanks, and GPP26 – Storage and handling of drums and intermediate bulk containers, and be compliant with The Control of Pollution (Oil Storage) Regulations (Northern Ireland) 2010;
 - Leaking or empty oil drums shall be removed from site immediately and disposed of via an appropriately licensed waste disposal contractor;
 - All hazardous substances on-site shall be controlled in accordance with The Control of Substances Hazardous to Health Regulations (Northern Ireland) 2003 (as amended) (COSHH Regulations). The storage compounds shall be fenced off and locked when not in use to prevent theft and vandalism;

- Refuelling of plant and machinery shall take place at least 10m away from watercourses using a mobile fuel bowser and restricted to designated areas on hard standing. Only double banded fuel bowsers shall be used. Vehicles must not be left unattended during refuelling operations. Fixed plant shall be self-banded. Use of oil interceptors at refuelling areas.
 - Mobile plant must be in good working order, kept clean and fitted with drip trays where appropriate. All water runoff from designated refuelling areas shall be channelled to an oil separator or an alternative treatment system prior to discharge;
 - Spill kits and oil absorbent material must be carried by mobile plant and located at vulnerable locations (e.g. crossings of land drains and ditches) to reduce risk of spillages entering the sub-surface or groundwater environment. Considering the linear nature of the project, spill kits shall need to be provided at a number of sites to ensure that they are easily accessible and can be deployed within a very short period of time. Booms shall be held on-site for works near watercourses;
 - Care must be taken whilst using shuttering oils when preparing formwork. This requires operatives to be trained in the proper handling of materials, the sensitive nature of the wider drainage system, and the consequences of accidental spillage;
 - As part of the Pollution Control and Contingency Plan, an Emergency Response Plan shall be prepared by the Contractor and construction workers trained to respond to spillages, as well as being made aware of the NIEA Water Pollution Hotline to report pollution incidents;
 - Concrete mixing must be undertaken in designated impermeable areas, at least 10m away from a watercourse or surface water drain to reduce the risk of runoff entering a watercourse, or the sub-surface, or groundwater environment; and
 - Equipment, batching and ready mix lorry washing and cleaning should be washed-out on-site into a designated area that has been designed to contain wet concrete / wash waters (see PPG6 – Working at construction and demolition sites).
- It will be the Contractor's responsibility to assess risk and devise mitigation measures for those activities not already covered by statutory requirements. Where possible, risks would be designed-out. Throughout the construction period however, the Contractor shall be required to comply with PPG/GPP requirements regarding pollution of surface waters and refer to CIRIA 648 'Control of Water Pollution from Linear Construction Projects', which provides advice on potential impacts arising during the construction phase and the assessment and mitigation of these risks.

5.10.4 In-Stream Works

- For all in-stream works formal/written consent is required from DAERA Inland Fisheries. For all works in, near or liable to impact the waterway, there must be an undertaking that the Contractor agrees method statements with DAERA - NIEA. The same applies to waterway realignments, whether permanent or temporary. NIEA – Water Management Unit Pollution Prevention Team also requires that placement and work on culverts/waterways to be in the dry (i.e. behind cofferdams, over pumping or temporary channel creation).
- Works likely to generate silt-laden runoff (e.g. earthworks and excavations) shall be undertaken preferably during the drier months of the year. However, with the exception of winter migration and spawning of Salmonids, watercourses are more vulnerable to the effects of elevated suspended sediment levels during the summer when the potential for dilution is reduced. Avoiding works during the Salmonid spawning season and egg incubation phases (1 October – 30 April) at waters of fisheries significance would avoid the risk of damage to spawning areas and losses of fish eggs or newly hatched fry. It would also reduce the potential for ingress of silt to these channels during the wettest period of the year. Appropriate site management by the Contractor during in-stream and bank works outside of this period will ensure that the channel remains passable for migratory Salmonids at all times, as necessary.
- Night time working involving direct illumination of the Shimna and Tullybranigan Rivers will not be permitted, in order to reduce impacts on fish, and particularly salmonid, passage. This shall be included as a condition in the Construction method statement (which would be subject to approval by DAERA – Inland Fisheries).

- Adherence to work method statements for construction within channels or within 50m of sensitive waterways shall reduce impacts on fish. DAERA - Water Management Unit would broaden this objective to include wider environmental parameters as any impact has influence on the ecosystem as a whole. It is also important to note that even 'non-sensitive' waterways could be feeders for larger more sensitive reaches. As such, method statements for ANY WORKS, in, near or liable to impact a waterway, MUST be agreed in advance (preferably 6-8 weeks) of the commencement of works with DAERA - Water Management Unit.

5.10.5 Litter & Debris

- The Contractor shall be required to maintain a tidy site as far as practicable and would be required to dispose of materials in a controlled and responsible manner. These measures should assist in reducing the potential for adverse impacts on surface waters arising from construction activities.
- Areas of hard standing and surface roads shall be swept regularly to prevent the build-up of material which could be washed into watercourses.

5.10.6 Consents

- Works in the vicinity of a watercourse (in, over or under a watercourse, works altering or repairing any structure in, over or under a watercourse) or works within the drainage margin of the watercourse will require consent from the DAERA – Water Management Unit/DfI Rivers/ DAERA – Inland Fisheries.
- In respect of this requirement for all proposed instream works that interfere with the wetted area of a waterbody (including temporary and permanent crossings), the Contractor is required to seek formal/written consent from DAERA – Inland Fisheries in accordance with The Fisheries Act (Northern Ireland) 1966 [as amended].
- As per the requirements of The Water Abstraction and Impoundment (Licensing) Regulations (Northern Ireland) 2006, as amended by The Water Abstraction and Impoundment (Licensing) (Amendment) Regulations (Northern Ireland) 2007, licence shall be obtained from DAERA – Water Management Unit where water is to be abstracted from surface water or groundwater.
- A Discharge Consent issued by DAERA - Water Management Unit under The Water (Northern Ireland) Order 1999, is required for any discharges to the aquatic environment. Any proposed discharges not directly related to construction of the road, such as from wash facilities, would also require separate discharge consent applications. Where discharges are required to controlled waters or sewers, consent shall be obtained from the DAERA – Water Management Unit or the statutory sewerage undertaker as applicable. DAERA – Water Management Unit are also liable for permits for dewatering operations.

5.10.7 Monitoring

- All discharges shall be monitored in accordance with the consents held.
- A water quality monitoring programme shall be implemented by the Contractor and discharges monitored in accordance with the consents held. Routine monitoring shall be undertaken at watercourses upstream and downstream of the site, and at all discharge points to measure turbidity, odour and presence of oil film and to ensure they are free from litter and debris.

Table 5.8. Drainage & the Water Environment Register of Environmental Actions & Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Potential additional Consultation Required
DWE1	Proposed Works	Ensure no sediment mobilisation or release of pollutants into the adjacent watercourses, or risk of contamination to groundwater.	<p>The documents listed below provide key guidance on likely impacts on the water environment as a result of construction, and the methods for controlling impacts. The guidance given in these documents should be followed as closely as is practicable.</p> <ul style="list-style-type: none"> • C648 'Control of Water Pollution from Linear Construction Projects' (CIRIA, 2006); • C532 'Control of water pollution from construction sites: guidance for consultants and contractors' (Masters-Williams et al., 2001); • SP156 'Control of water pollution from construction sites – guide to good practice' (Murnane et al., 2002); and • 'Engineering in the Water Environment Good Practice Guide – Temporary Construction Methods' (Scottish Environment Protection Agency (SEPA), 2009). <p>Consideration should also be given to the Ulster Angling Federation's 'Construction Works - Actions to Prevent Pollution' guidelines, which requires that an additional clear and demonstrable effort is needed by the Contractor to prevent pollution and as a minimum identifies a range of procedures which should be followed.</p> <p>Site works should be planned so that activities likely to generate silt-laden runoff are carried out during drier months (if possible), and erosion of surface soils is controlled. Seasonal weather patterns should be taken into consideration when programming and planning construction activities.</p> <p>A Construction Environmental Management Plan (CEMP) must include an Erosion Prevention and Sediment Control Plan and this must be submitted to NIEA - WMU prior to commencement of any works.</p>	During construction	Monitored on-site during construction to ensure effectiveness of measures.	NIEA – WMU / DAERA – Inland Fisheries
DWE2	In Shimna River/ Tullybrannigan River	Ensure no impact to migratory salmonid fish passage.	Appropriate site management during in-stream and bank works outside of this period would ensure that the channel remains passable for migratory Salmonids at all times.	During Construction		DAERA – Inland Fisheries

5.11 Geology & Soils (including waste)

The Contractor shall comply with the summarised mitigation measures set out in Table 5.9, the Contract Documentation and Works Information and any updated or new supplementary environmental reports made available to the Contractor as necessary. This prescribes the mitigation measures necessary for the Contractor to minimise and monitor impacts and effects upon geology & soils during construction.

5.11.1 General Measures

- Construction works shall be carried out in such a way as to prevent, contain or limit, as far as reasonably practicable, any adverse impacts arising from the presence of contaminated land or material.
- A contamination watching brief must be designed and implemented during construction to ensure that any significant contamination not identified during the investigations is recorded and can be dealt with appropriately.
- Should ground with significant levels of contamination be encountered during construction, working methods and procedures for handling and disposal of material will be employed to minimise risk. If required, the material shall be disposed of at a suitably licensed waste facility.
- 'Clean' and 'dirty' (contaminated) work areas should be divided by internal fencing where contamination is encountered.
- Personal Protective Equipment (PPE) should be worn by ground workers and other staff.
- Those potentially at risk should be made aware of potential site hazards via site safety induction procedures and appropriate induction procedures.
- Standard good housekeeping procedures of materials which have the potential for pollution (i.e. fuels and oils and other liquid chemicals) and which are likely to be used during construction and environmental control measures, should be adopted for the management and mitigation of risks.
- Sealed and bunded enclosures should be provided for storage of fuels and other potentially contaminated liquids. All such liquids and soluble solids should be managed with appropriate care. Accidental spills should be contained and absorbed, for example using straw bales and/or spill management kits.
- Leaks and spills should be prevented and control measures used to prevent contaminants entering the sub-surface or groundwater environment.
- Construction work would involve excavation and removal of glacial deposits at most cutting locations along the route and the removal of schist bedrock in some locations. Material removed as part of the construction should be re-used elsewhere in the project where practicable and possible;
- Topsoil and subsoil should be separated where removal is required, and this should be conserved and stored in a designated area and appropriately protected, ready for re-use as landscape fill for the project.
- Contaminated materials should be assessed as solids, liquids, gas and leachate to allow for appropriate management.
- Measures will be implemented to prevent the contamination of ground and surface watercourses and aquifers during the site, as detailed in the Road Drainage and the Water Environment chapter of the Environmental Statements.
- Hazardous dust emissions should be prevented during excavation or from stockpiles as detailed in the air quality section of the Environmental Chapter.
- Where contaminated materials are to be removed from the construction site they will be stored separately from clean materials and controls put in place to prevent from leaching into the ground or surface waters.

5.11.2 Waste Management

5.11.2.1 Proposed Measures

- The Contractor shall develop a Site Waste Management Plan (SWMP).

- Through preparation of a SWMP, the Contractor is required to implement where possible cost-effective methods of good practice waste minimisation during the detailed design of the project and thereafter during construction. As a minimum, the Contractor shall:
 - Identify appropriate methods of waste minimisation in detailed design before the economic and practical implications of adopting these methods during the development of the design;
 - Agree with the Project Manager which methods of waste minimisation to implement at the appropriate design stage and demonstrate how the methods have been incorporated into the design;
 - Include a list of measures within the SWMP to minimise waste from on-site operations (for example, damage, theft etc.) and demonstrate how these measures have been implemented; and
 - Implement the SWMP in all construction site activities in line with good practice published by Waste & Resources Action Programme (WRAP). The Plan is required to set a target for waste reduction and recovery. It is expected that this target will be set to better the current waste benchmark for project type as published in <http://www.smartwaste.co.uk>, unless otherwise agreed with the Employer.
- The Contractor is also required to meet specified minimum waste recovery rates for the waste streams with the largest cost-effective recovery potential (to be known as 'selected Quick Wins'). The Contractor is required to identify and agree with the Project Manager/Employer the key opportunities for Quick Wins on the project and set minimum recovery rates to be achieved. Specifically, the Contractor's responsibility (in association with his trade Subcontractors and waste management contractors where appropriate) shall be to:
 - Identify, and continually review as the pre-construction design develops, the waste streams with the largest potential and estimate likely recovery rates to be adopted for the project;
 - Agree with the Project Manager/Employer before the commencement of construction those waste streams that will provide the most significant opportunities for cost-effective recovery (to be known as 'selected Quick Wins') and the minimum recovery rates to be adopted for the project;
 - Meet the agreed minimum recovery rates for the selected Quick Wins unless otherwise agreed in writing by the Employer;
 - Measure waste arising during the site and compare with the minimum recovery rates set for the project and then report these findings to the Project Manager (in a form to be agreed) every four weeks at project meetings including the measures to be implemented to meet the minimum recovery rates if actual recovery is below target; and
 - Appoint trade Subcontractors and waste management contractors with the same liability as under the Contract Documentation and Works Information to meet minimum recovery rates (where applicable) and to support the Contractor to measure, monitor and report actual waste during the site.
- As noted previously, to assist the effective delivery of the above requirements, the Contractor shall develop and implement the SWMP to achieve good practice waste management on the project. Specific Contractor responsibilities will be to:
 - Provide and agree a methodology with the Project Manager before detailed design commences regarding how the SWMP will be developed and implemented with specific reference to the constraints of the project, the management of these constraints, their supply chain, programme of key steps and reviewing performance. This should take into account good practice guidance published by WRAP and other organisations;
 - Develop the SWMP as the design progresses in accordance with the agreed methodology for completion prior to construction commencing. A copy of the completed SWMP should be provided to the Employer prior to construction commencing;
 - Implement the SWMP during construction in accordance with the agreed methodology; and

- Ensure compliance of all appointed trade Subcontractors and waste management Contractors with the legal requirements under the Controlled Waste Duty of Care (Amendment) Regulations (Northern Ireland) 2014 and take all reasonable actions as appropriate for non-compliance.

Table 5.9. Geology & Soils Register of Environmental Actions & Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Potential additional Consultation Required
GS1	Within & beyond proposed works	Remediate any areas of contaminated land which may be encountered.	<p>Any areas of contaminated land should be fully investigated and dealt with in accordance with the advice of the relevant authorities, and if necessary, special disposal arrangements for excavated material may be required. Any contaminated materials encountered during the construction would have to be appropriately remediated on-site or disposed of at an appropriately licensed landfill site.</p> <p>In line with NIEA - Waste Management Unit's requirements, if a potentially contaminating source has been identified, a suitable risk assessment and remediation strategy (if required) should be submitted and agreed to mitigate all risks.</p>	During Construction	-	NIEA – WMU NMDDC
GS2	Within footprint of the proposed works	Manage invasive species and prevent spread	An Invasive Species Management Plan shall be prepared and implemented to prevent the spread of invasive species during construction. It would be included as a sub-plan of the CEMP.	During Construction	Monitored on-site during construction to ensure effectiveness of measures.	NIEA / NMDDC

5.12 Biodiversity – Fisheries & Aquatic Ecology

The Contractor shall comply with the summarised mitigation measures set out in the Table 5.10), the Contract Documentation and Works Information and any updated or new supplementary environmental reports made available to the Contractor as necessary. This prescribes the mitigation measures necessary for the Contractor to implement in order to prevent or reduce adverse impacts upon fisheries and aquatic ecological receptors.

5.12.1 General Measures

- Any possible Impacts on fish spawning activities can be minimised by ensuring that works are only to be carried out at the driest time of the year (usually April to July) and should not be carried out during the autumn or winter months. This would avoid the risk of damage to spawning areas and losses of fish eggs or newly hatched fry. It would also reduce the potential for ingress of silt to these channels during the wettest period of the year;
 - The realignments should be done as much as possible within dry channels to prevent sediment being introduced to the river;
 - Establish banks before the water is introduced and reduce the potential for soil to be washed from the bank if there is a flood;
 - New sections of river channel should be adequately protected to enable plant growth to establish banks before the water is introduced and reduce the potential for soil to be washed from the bank if there is a flood;
- Instream or bank works at crossing points shall be properly managed to prevent obstruction of the stream channel during periods of upstream fish migration prior to spawning.
- Where an old section of river is to be dewatered, this should be carried out by a competent person and completed in a manner which would ensure that any fish are removed and returned unharmed to the river. A permit issued by DAERA – Inland Fisheries would be required; and
- Appropriate site management during in-stream and bank works outside of this period must be undertaken to ensure that the channel remains passable for migratory salmonids at all times. This must be included as a condition in the appropriate Construction method statement.
- All precautions must be taken to avoid spillages of diesel, oil or other polluting substances during the construction phase. This may be achieved through good site practices, as described in the Good Practice Guidance notes proposed by EA/SEPA/NIEA, including:
 - PPG1: General Guide to the Prevention of (Water) Pollution;
 - GPP5: Works and maintenance in or near water;
 - PPG6: Working at Construction and Demolition Sites.
- A contingency plan must be prepared setting out the procedure to be followed in the event of a significant spillage occurring. Specific measures should be included in the draft Construction method statement.
- Where works near or in watercourses are unavoidable, sedimentation and pollution will be minimised, and measures should be put in place before the site begin to ensure containment of any released sediments. These may include silt containment booms or straw bales, as appropriate. Land stripping should be done in stages to minimise the potential for concentrated, long-lasting pulses of silt to discharge into watercourses. All filtration systems should be monitored frequently, and they should be replaced before they become ineffective.

Table 5.10. Biodiversity – Fisheries & Aquatic Ecology Register of Environmental Actions & Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Potential additional Consultation Required
BFA1	In Shimna River/ Tullybrannigan River	Ensure silt-laden runoff is prevented from discharging to surface waters.	<p>The Construction Environmental Management Plan (CEMP) must include an Erosion Prevention and Sediment Control Plan which would aim to minimise erosion by reducing disturbance and stabilising exposed materials. The CEMP should also consider control measures to minimise any release of mobilised sediment which may occur, despite the erosion control measures.</p> <p>Mitigation measures to minimise the generation of silt-laden runoff also include:</p> <ul style="list-style-type: none"> • Planning of site works so that activities likely to generate silt-laden runoff are carried out during drier months (if possible), and erosion of surface soils is controlled; • Seasonal weather patterns should be taken into consideration when programming and planning construction activities; • Attenuation measures should be designed to cope with one-off extreme precipitation events so that they cannot be overwhelmed resulting in polluted runoff reaching the main watercourse; • Stockpiles and areas of exposed ground should be kept to a minimum, to reduce sediment runoff. They should be located well away from drains and watercourses (by a minimum distance of 10m where the land is flat, and further if there is a slope to a watercourse), stabilised as soon as possible (e.g. seeded or geotextile mats), and bunded by earth or silt fences (if required) at the toe of the stockpile to intercept silt-laden runoff during rainfall events; • Stockpiles shall not be located where there is a steep slope towards a watercourse; • Existing vegetation should be retained where possible to stabilise soil and prevent erosion. Areas where vegetation clearance is required should be kept to a minimum, and the works divided into phases, with seeding and planting of the phases that are complete; A minimum of a 10m vegetative buffer shall be maintained adjacent to watercourses except where works are specifically required to the watercourse e.g. Tullybrannigan; and 	During Construction	Monitored on-site during construction to ensure effectiveness of measures.	NIEA – WMU / DAERA – Inland Fisheries

- Vehicle/ plant access crossings of watercourse shall be minimised using designated crossing points and existing road infrastructure only (single temporary crossing in the Tullybrannigan). Mud shall be controlled at entry and exits to the site using wheel washes and/or road sweepers.

BFA2	Tullybrannigan River	Impacts on fish spawning season.	Construction of the piling platform in the Tullybrannigan should be avoided when sensitive life-stages are present (incubating eggs/ fry). Overlap across life-stage and species migration periods precludes a period when there is a zero risk. However, DAERA require that in-stream works are conducted between 01 st May and 30 th September to avoid the more critical salmonid spawning season and egg incubation phases, 01 October – 30 April.	During Construction	Monitored on-site during construction to ensure effectiveness of measures.	DAERA – Inland Fisheries
BFA3	Within footprint of the proposed works	Minimise the risk of accidental spillage and release of pollutants into watercourses.	Measures to minimise accidental spillage and the release of pollutants include: <ul style="list-style-type: none"> • Storage of oils and diesel, along with the general maintenance and re-fuelling of plant, should be restricted to impermeable bunded areas with a minimum 110% storage capacity and remote from surface waters or areas where any spillages could easily reach a surface water. • All hazardous substances on-site shall be controlled in accordance with The Control of Substances Hazardous to Health Regulations (Northern Ireland) 2003 (as amended) (COSHH Regulations). • Refuelling of plant and machinery shall take place at least 10m away from watercourses using a mobile fuel bowser and restricted to designated areas on hard standing. Vehicles must not be left unattended during refuelling operations and fixed plant shall be self-bunded. All water runoff from designated refuelling areas shall be channelled to an oil separator or an alternative treatment system prior to discharge. • Spill kits and oil absorbent material must be carried by mobile plant and located at vulnerable locations. • Care must be taken whilst using shuttering oils when preparing formwork. • An Emergency Response Plan shall be prepared by the appointed Contractor & included as part of the CEMP, & construction workers trained to respond to spillages. • Concrete mixing must be undertaken in designated impermeable areas, at least 10m away from a watercourse or surface water drain to reduce the risk of runoff entering a watercourse. 	During Construction	Monitored on-site during construction to ensure effectiveness of measures.	DAERA – Inland Fisheries

- Equipment, batching and ready-mix lorry washing and cleaning should be washed out on site into a designated area that has been designed to contain wet concrete / wash waters. In addition, the Contractor would be required to properly assess risk and devise mitigation measures for those activities not already covered by statutory requirements. Where possible, risks would be designed-out of the programme of works.

BFA4	Within footprint of the proposed works	Piling operations should use non-percussive methods to reduce impact on fish migrations, spawning activity and fish egg survival.	Piling operations within 25m of the channel at sensitive locations (e.g. spawning areas on the Shimna) should, if possible, be avoided when sensitive life-stages are present (incubating eggs/ fry). Overlap across life-stage and species migration periods precludes a period when there is a zero risk. DAERA require that in-stream works are conducted between 01st May and 30th September to avoid the more critical salmonid spawning season and egg incubation phases, 01 October – 30 April (DAERA, 2011). This would also largely avoid the peak period of adult salmon and sea trout runs in the Shimna, typically September to December.	During Construction	Monitored on-site during construction to ensure effectiveness of measures.	DAERA – Inland Fisheries
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