COUNTY DONEGAL
FLOOD RELIEF SCHEMES

Comhairle Contae Dhún na nGall
Donegal County Council

Tionscadal Éireann
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OPW Oifig na nOibreacha Poiblí
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BURNFOOT FLOOD RELIEF SCHEME

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BURNFOOT FLOOD RELIEF SCHEME
NON-TECHNICAL SUMMARY

CONTENTS

1. INTRODUCTION AND PROJECT SCREENING

This document is the Non-Technical Summary (NTS) of the Environmental Impact Assessment Report (EIAR) prepared to assess the likely significant effects of the Burnfoot Flood Relief Scheme, (hereafter referred to as the Proposed Scheme) on the environment. The NTS aims to provide the reader with a concise summary of the content of the EIAR presented without technical jargon, hence understandable to anybody without a background in the environment or the project.

The EIAR has been prepared by RPS, on behalf of the applicant, Donegal County Council, for the Proposed Scheme.

An Environmental Impact Assessment Screening Statement on the Proposed Scheme was issued to Donegal County Council in November 2022. The statement determined that the Proposed Scheme falls under Schedule 5 Part 2 of the Planning and Development Regulations 2001, as amended. This determination is due to the Proposed Scheme exceeding the criteria applicable to Part 2 Class 10. Infrastructure Projects (f) (ii). Therefore, it was concluded that a full Environmental Impact Assessment is required for the Proposed Scheme.

Following this an EIA Scoping Report was prepared in order to facilitate a scoping exercise in providing a scoping opinion in accordance with Article 95 of the Planning and Development Regulations 2001 (as amended). The scoping was submitted to statutory authorities in April 2024.

Environmental Impact Assessment is a procedure under the terms of European Directives for the assessment of the likely significant effects of a project on the environment. An EIAR is a statement prepared by the applicant, providing information on the likely significant effects on the environment based on current knowledge and methods of assessment. It is carried out by competent experts, with appropriate expertise, to provide informed assessment within their discipline.

2. NEED FOR THE PROPOSED SCHEME

Burnfoot was designated as an Area for Further Assessment (AFA) in the North Western-Neagh Bann Catchment Flood Risk Assessment and Management study (NW-NB CFRAM) conducted from 2012 to 2017, which evaluated flood risks and proposed solutions to achieve a 1% Annual Exceedance Probability (AEP) Standard of Protection (SoP).

In August 2017, a severe flood event impacted Burnfoot, inundating around 30 homes, primarily in Líos Na Greíne and Páirc an Grianán, and affecting at least seven local businesses. The Burnfoot River overflowed, particularly affecting the area upstream of the R238 bridge, which became impassable, complicating access for emergency services and the community.

In response to the flooding, a review of the CFRAM Study was conducted in 2018 to explore economically viable options for flood protection. The Project Steering Group decided to set the Target SoP of the Proposed Scheme to a 0.5% AEP fluvial event to ensure adequate protection against similar future flood events. Enhanced flood protection aligns with the National Planning Framework, regional and local objectives, and EU policies on flood risk management.

Considering the need for the Proposed Scheme, the objectives are:

- To identify a flood relief scheme for Burnfoot that is economically viable, acceptable to the environment and to the wider community of Burnfoot and Inishowen minimises the risk to human beings, social amenity and landscape character.
- To ultimately protect the affected areas in Burnfoot from fluvial flooding.

3. PROJECT CONSULTATION & SCOPING

Detailed scoping has been undertaken in respect to the Proposed Scheme by engaging in consultations with prescribed and other authorities, bodies and stakeholders and through public consultation, in accordance with the European Commission's 2017 "Environmental Impact Assessment of Projects Guidance on Scoping"[1] and the EPA's "Guidelines on the information to be contained in EIAR"[2].

Through the scoping process which has been carried out in the preparation of this EIAR, the issues which are likely to be important during the environmental impact assessment have been identified. The scoping process has identified the sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors, which are likely to be affected, and has defined the appropriate level of detail for the information to be provided in the EIAR.

All environmental topics have been comprehensively addressed within the EIAR.

4. ASSESSMENT OF ALTERNATIVES

The assessment of alternatives included the strategic consideration of measures during the development of the Flood Risk Management Plan (FRMP) for the North Western River Basin, and a more detailed project level assessment undertaken as part of the Donegal Bundle 1 Project, including the screening of measures, option development process and the associated technical, economic, social, and environmental.

This initial screening of measures at a project level considered a number of flood relief measures ranging from hard defences, to flood storage, channel diversion, dredging and nature based solutions. Through this screening of measures, the following options were identified. All options require the replacement of the R238 road bridge as this represents a major constriction in flood flows through the Village.:

Option 1 – Flood walls, flood embankments, improved conveyance and reconnection with the floodplain;

Option 2 - Flood walls, flood embankments, improved conveyance, reconnection with the floodplain and upstream storage;

Option 3 - Flood walls, flood embankments, improved conveyance, reconnection with the floodplain and property relocation.

An appraisal using Multi-Criteria Analysis (MCA) and Cost-Benefit Analysis (CBA) evaluated the options based on technical, social, economic, and environmental factors. All options meet the required standard of protection

[1] https://op.europa.eu/en/publication-detail/-/publication/4d59e72a-cb4c-11e7-a5d5-01aa75ed71a1/language-en

[2] https://www.epa.ie/publications/monitoring--assessment/assessment/guidelines-on-the-information-to-be-contained-in-environmental-impact-assessment-reports-eiar.php

(SoP), but Option 1 is deemed the most economically viable and environmentally acceptable solution for the community of Burnfoot. Therefore, Option 1 was recommended as the preferred option for the Proposed Scheme, details of this option are provided in the Project Description below.

5. PROJECT DESCRIPTION

The Proposed Scheme for Burnfoot to protect against the 0.5% annual exceedance probability (AEP) fluvial flood event consists of the following main elements:

- Demolition and replacement of the existing R238 road bridge with a clear span structure and raising of the approach roads to the bridge to allow tie in with existing roads, designed to DMURS standard;
- Upgrade to existing culverts (2 no.) on the Carnashannagh Stream, a tributary of the Burnfoot River, which joins the main channel upstream of the existing R238 road bridge. These works consist of the construction of a new culvert inlet where the watercourse passes beneath Brae Road and a new culvert approximately 400m upstream;
  - Upgrade of lower culvert on the Carnashannagh Stream to a box culvert (1.2m height x 2.4m width), sized for future climate change flood flows, under Brae Road extending beyond the proposed embankment, with new headwall structures and debris screens as required;
  - Upgrade of upper culvert (box culvert of 1.2m height x 2.4m width), on the Carnashannagh Stream, sized for future climate change flood flows. To include new headwall structures and debris screens as required.
- 38m of reinforced concrete flood walls with foundations to accommodate future climate change flood scenarios on both banks of the Carnashannagh Stream upstream of the Brae Road, with a replacement shed to accommodate the construction.
- 315m of embankment, tying into raised laneways, around three properties to the south of the village near Slab Road (R239) with an average height of 0.79m.
- 630m of embankment along / adjacent to the Burnfoot River with an average defence height of 1.1m above ground level;
- 395 metres of sheet piled wall with an average height of 1.1 metres above existing ground adjacent to the Burnfoot River upstream and downstream of the R238 bridge;
- 35 metres of reinforced concrete flood walls with an average height of 1.1 metres above ground level upstream of the R238 road bridge. The foundations have been designed to accommodate future climate change flood scenarios;
- The first 183m of the Burnfoot/Skeoge Arterial Drainage Scheme embankment, downstream of Burnfoot, removed to provide short term storage on a recurring basis to reduce flood levels in the town centre by reconnecting the existing floodplain.
- The removal of 345m of embankment from the right bank of the Skeoge River as well as localised drainage amendment as required, to reconnect the existing floodplain.
- 120m of embankment with an average height of 0.8m around the existing sewerage treatment works to the west of Grianán Park estate
- 145m of embankment removed from the right-hand bank of the Burnfoot River, 168m upstream of the R238 bridge.
- Existing land on the right-hand bank of the Burnfoot River upstream of the R238 bridge, to be utilised for construction and safeguarding of existing floodplain within the settlement framework, will be landscaped.
- Surface water measures (road reprofiling / cambering, additional gullies and swale to discharge to watercourse) at:

a. R239 / Fairview Manor

b. L-1881 Brae Road

- Back drainage behind the proposed defences with associated outfalls;
- Land take to facilitate future operation and maintenance of flood embankments, including for embankment top ups and/or access to complete the same as well as general maintenance e.g. grass cutting and ad hoc repairs as necessary. Access to complete this work will be required on the defended side of embankments which are on benefiting lands, at the embankment on the left-hand bank immediately upstream of the bridge and at the embankment on the right-hand bank downstream of the bridge.
- The construction of the Proposed Scheme will require additional working areas, construction compounds, haul routes and site access. The proposed location of these is provide in the planning drawings in Appendix 5.1.

Operational Phase

The Proposed Scheme uses hard flood defences, improved culverts, and a replacement bridge. Routine inspections, cleaning, and ordinary repairs will be the main ongoing tasks. There are no unusual or specialist maintenance needs expected.

- Defence walls (Piled and RC) – maintenance regarding these will be minimal. Inspections in accordance with standard asset management procedures are likely to be the main activities. Dealing with vandalism (graffiti or damage) to capping stones can be an issue. This will require access to private gardens and properties, especially at the rear of Líos Na Greíne and Páirc an Grianán.
- Flood Embankments – these will need regular inspection and should be mowed at least twice annually to prevent growth of significant vegetation. Inspection activities will need to look for presences of animal burrowing or damage from livestock through fencing of the defences, where located within agricultural fields should prevent the latter. Access to embankments is easily achieved for both inspection and maintenance purposes. It is envisaged that embankments adjacent to the R238 bridge will be maintained by a ride on or pushed mower whereas the agricultural embankments may be cut by tractor mounted flail.
- Culverts – Inlet structures and screens will need regular inspection and cleaning. This is particularly important prior to and post significant rainfall events. The inlet structures will be designed to facilitate ease of access for cleaning and removal of debris.
- Drainage elements – Flap valves will need checked regularly to ensure they are working as they form a key aspect of Scheme function. These will be designed in such a way to provide safe access. This can be within a manhole on the defended side of the defences rather than at the point of outfall to the river. Back drainage will need to be checked for blockage and rodded if necessary. Manholes will be provided to enable this to happen. These manholes will be located on private property including residential gardens and agricultural land. Although potential road drainage improvements will only be confirmed at the design stage, their maintenance will be required for these elements. Swales will require little maintenance; however, it is important to inspect for any obstructions in the channel which may hinder

flows or that may be conveyed into the Carnashannagh Stream / Burnfoot River, as well as management of vegetation growth within the channel.

- Bridge – The bridge will be maintained by Donegal Council Roads in accordance with their inspection and asset management procedures. Detailed design of the bridge will consider any requirements in this regard but there is not envisaged to be any unique challenges specific to Burnfoot.

6. BIODIVERSITY – AQUATIC

Desk studies and field surveys were used to describe the current state of fish populations, fish habitat and the quality of the aquatic environment at streams and rivers closely associated with the Burnfoot Flood Relief Scheme. This information was then used to produce an assessment of the possible impacts that the construction and operation of the scheme might have on fisheries and aquatic ecology. A series of mitigations was recommended to prevent or reduce the potential impacts described.

The main rivers and streams crossed or closely associated with the scheme include the Burnfoot River, the Carnashannagh Stream, and the Skeoge River. The Skeoge and Burnfoot Rivers currently support Brown trout, lamprey and invertebrate communities that are sensitive to changes in habitat and water quality; both rivers have historically documented the presence of Atlantic salmon. Although the Carnashannagh Stream does currently not support fish, its invertebrate communities are sensitive to changes habitat and water quality.

For the construction phase of the project, the assessment identified the main possible impacts on streams and rivers as the release of sediment and other pollutants, the removal of fish and other sensitive species, temporary blocking of the movement of fish, and noise and vibration. Proposed mitigations include avoiding construction works during key periods of fish migration and spawning, careful management of water and adherence to industry best practice and government guidelines when working near watercourses, project design that avoids excavation in sensitive streams, and the removal and transfer of fish away from some locations until construction work is complete.

For the operational phase of the project, the report did not identify any significant impact the movement of fish because of the proposed installation of a new clear span bridge over the Burnfoot River.

Full implementation of the mitigations described will ensure that no adverse impacts on fish, their habitats and that of the general aquatic environment will occur.

7. BIODIVERSITY – TERRESTRIAL AND BIRDS

Ecological impact assessment was completed on the terrestrial ecology features of the proposed development at Burnfoot, County Donegal. The assessment has been informed by a habitat, flora and fauna survey undertaken by a competent ecologist in September 2020 and January 2023. Impact assessment was undertaken in accordance with the Chartered Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland.

Historical biological records were sought from the National Biodiversity Data Centre (NBDC).

Potential effects upon sites designated for their nature conservation value were considered. Consideration was given to construction effects of earthworks leading to pollution of watercourses, aerial noise and visual

disturbance, habitat fragmentation and the potential spread of invasive species which might affect the following nationally designated and European sites:

- Lough Swilly SPA;
- Lough Swilly SAC;
- Lough Swilly including Big Isle, Blanket Nook & Inch Lake pNHA.

The site of the proposed development is located within Lough Swilly SPA in addition to the underpinning pNHA. The site is hydrologically linked to Lough Swilly SAC which is located 200 m downstream.

The possibility of increased suspended sediment or contaminants entering the watercourse as a result of poor construction, earthworks or haulage practice and resulting in a significant effect upon the waders, wildfowl, and intertidal and subtidal habitats of the nationally designated and European sites downstream is considered to be a likely significant environmental effects, and has been predicted to result in Major Adverse and Significant effects in the absence of mitigation measures being applied at construction phase.

To reduce the risk of suspended sediment or contaminants entering a watercourse, the appointed contractor responsible for enabling and earthworks contracts will implement a remediation strategy and comply with Pollution Prevention Guidelines and best practice.

Nine broad habitats were recorded within the project footprint including improved grassland, amenity grassland, scrub, recolonising vegetation, buildings/hardstanding, invasive species (Japanese knotweed, Salmonberry, Rhododendron) hedgerows, treelines and watercourses.

All features that may be used by bats were identified. No roosts were identified in any structures surveyed.

The proposed development will not have a significant effect on breeding or wintering birds following implementation of mitigation measures. The removal of flood embankments along Burnfoot and Skeoge Rivers will allow restoration of natural processes for downstream areas of Lough Swilly SPA and enhance foraging opportunities which will be beneficial to wintering birds.

No badger setts or holts were recorded which will be directly impacted by the development. The Burnfoot River and Skeoge River are likely utilised by otter.

Incorporation of bat boxes into new bridge design and features to allow dry passage for otter will enhance habitat connectivity.

An Invasive Species Management Plan will set out to how to control or eradicate the spread of Japanese knotweed and Salmonberry recorded within the site.

No significant residual environmental effects on ecological resources are predicted.

8. POPULATION AND HUMAN HEALTH

This chapter assess the impacts of the Proposed Scheme by applying a broad socio-economic model of health that encompasses conventional health impacts such as disease, accidents, and risk, along with wider socio-economic health determinants vital to achieving good health and wellbeing. Environmental health determinants (such as changes to air quality and waste emissions) are likely to have a local impact where potential change

in hazard exposure is limited by physical dispersion characteristics. As a result, and where available, the study area for health-specific baseline statistics relating to Population and Human Health effects focus on the electoral divisions (EDs) immediately adjacent to the Proposed Scheme, i.e., Birdstown ED and Fahan ED, using Ireland averages as comparators.

Demographic and housing stock statistics show that there is limited population growth in Burnfoot, the Birdstown ED and Fahan ED. Generally, employment, and income levels are all below the national averages and Burnfoot is classified as marginally below average in terms of the deprivation index. Currently in Burnfoot, there are 41 residential properties at risk of flooding.

The Proposed Scheme must be cognisant of the tourism role of the Burnfoot River and downstream amenities connected to the river, including the Inch Wildlife Reserve and walkway, which are key for angling and tourism in the area. Therefore, connectivity and protection of the river for recreational needs is vital.

Overall, the local community surrounding the Proposed Scheme are not considered particularly sensitive to Population and Human Health effects resulting from changes to environmental or socio-economic health determinants. However, the impact of flooding on the homes and businesses affected can have a significant impact on the wellbeing of those affected. In particular, there is potential for human health to be impacted through the flooding of waste water infrastructure within the floodplain.

Likely significant effects associated with the construction phase of the Proposed Scheme were assessed, including:

- Changes in emissions to air;
- Socioeconomics;
- Changes to water environment;
- Changes to noise levels;
- Changes to traffic and transportation; and
- Risk of accidents and disasters.

Likely significant effects associated with the construction phase of the Proposed Scheme were also assessed, including:

- Risk of major accidents and disasters;
- Water Quality and Flooding; and
- Traffic and transportation.

With mitigation measures in place throughout the construction and operational phases, there will be no significant negative impacts to population and human health. Furthermore, as the pressures of climate change are exacerbated over time, built in mechanisms are planned to allow adaptation of the Proposed Scheme to seamlessly evolve and to provide the Standard of Protection required for the local population throughout the design life of the scheme. This adaption will ensure the population and human health are afforded protection from flood risk in the future.

9. FLOOD RISK

The flood risk assessment considers the potential impact of the Proposed Scheme on flood risk within the study area. It sets out the methodology employed in the assessment; summarises the baseline flood risk as defined through desk-based assessments, assesses the potential impact of the Proposed Scheme, and identifies mitigation measures. The assessment has been carried out in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (2009).

OPW flood maps indicate a significant existing flood risk to the Burnfoot area. Flooding in Burnfoot comes from the Burnfoot River and the Carnashannagh Watercourse, a tributary of the Burnfoot River. Several reported incidents of flooding have occurred in Burnfoot, with the most recent significant fluvial flooding recorded in November 2015 and August 2017. Updated hydraulic modelling of all watercourses in the Study Area was completed as part of the Proposed Scheme, and the results **Error! Reference source not found.**show significant fluvial flood risk in Burnfoot. 42 residential properties and 9 commercial properties are at risk of flooding in the 0.5% AEP flood event. Roads are also impacted including the R238, and the main wastewater treatment works is also at risk.

During construction, there is a risk of flooding to the works from extreme events that will need to be managed. Met Éireann provide a weather warnings alert service which is available on the Met Éireann app or through its website. These warnings can be used during construction to manage the risk of flooding to the works from extreme events.

One of the objectives of the Proposed Scheme is to reduce the flood risk in the area from fluvial flooding. Flood protection can therefore be considered as 'Primary mitigation' which is modifications to the location or design of the Proposed Scheme made during the pre-application phase that are an inherent part of the project, and do not require additional action to be taken.

The Proposed Scheme has been designed to provide a 1 in 200-year return period Standard of Protection (SoP), which is also described as an 0.5% Annual Exceedance Probability (AEP). As part of the Burnfoot FRS a freeboard assessment was undertaken to determine a suitable freeboard for each reach of the flood defence. A freeboard allowance of 0.3- 0.56m for walls and 0.5-0.75m for embankments has been included for in the design, which is a higher freeboard than the standard allowances used in Ireland. Climate change is predicted to have a significant effect on flood risk when considered over the design life of a flood relief scheme (50 years). As part of the Proposed Scheme, a Climate Change Adaption Plan was undertaken to assess and consider the potential impacts of climate change on the development and design of the options for a Proposed Scheme. The plan identified several amendments to the Proposed Scheme to maintain the design SoP in the future. These are to be designed for and delivered as part of the Proposed Scheme.

It is necessary to determine that the Proposed Scheme will not increase the risk from flooding elsewhere. This was done by assessing the results of the hydraulic modelling completed as part of the Proposed Scheme. This shows very limited areas where the flood risk is increased as a result of the Proposed Scheme, and these areas are mostly confined to the agricultural lands downstream of Burnfoot which will be reconnected to the river through the removal of the Arterial Drainage Scheme embankments.

It is necessary to consider the impact of the Proposed Scheme on storm runoff in the area. The new flood defences will have some degree of cut-off to prevent excessive flow beneath the embankments. Conversely this adversely restricts the ability of the land behind the defences to drain post-scheme. To facilitate this drainage and ensure the land behind the defences does not become water-logged, a series of land drains will be constructed behind the defences. This will consist of a series of perforated pipes bedded in no fines granular material and laid parallel defences at the rear toe. Precast concrete manholes will be provided at regular intervals to facilitate access for maintenance or changes in direction. At suitable locations the drainage pipe will need to be cored through the flood wall and outfall to the river via a flapped discharge.

The Proposed Scheme will be constructed within Flood Zones A and B as defined in 'The Planning System and Flood Risk Management Guidelines for Planning Authorities'. Under the Guidelines, the Proposed Scheme which can be described as 'Flood Control Infrastructure' would be classified as 'Water Compatible Development'. According to the Guidelines, this type of development is appropriate in all flood risk areas.

After completion of construction the flood relief scheme, monitored and maintenance will be carried out by Donegal County Council.

The assessment has demonstrated that:

c. all sources of flood risk to and from the Proposed Scheme have been identified; and

d. there are adequate measures to manage and mitigate any increase in flood risk arising from the development and its operation.

10. WATER QUALITY

This assessment is based on the potential impact of the Proposed Scheme on water quality within the receiving environment.

Baseline water quality within the receiving environment was established through review of national monitoring data used to establish water quality status in the context of the EU Water Framework Directive and supporting environmental standards.

Using baseline water quality data and site specific water quality model simulation outputs, an assessment of the Proposed was conducted to determine the likelihood of significant impacts on water quality. The determination was made by using criteria for rating significance and magnitude as set out in the National Roads Authority (NRA) publication "*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*" (NRA, 2008). Appropriate mitigation measures to reduce impacts were proposed where necessary.

In circumstances where the appropriate mitigations measures are fully implemented during the construction and operational phases, the impact of the Proposed Scheme on water quality in the project zone of influence will be imperceptible. An assessment of potential cumulative impacts has also been made. The Proposed Scheme is therefore not expected to significantly impact water quality, either alone or in combination with other projects, in the receiving waters.

It can therefore be concluded that the Proposed Scheme works are compliant with the requirements and environmental objectives of the EU Water Framework Directive and the other relevant water quality objectives for the water bodies in which the Proposed Scheme is sited including the Burnfoot_010, Burnfoot_020 and Skeoge river waterbodies, the Inch Lough and Outer Swilly Estuary transitional waterbodies and the Lough Swilly groundwater body.

11. SOILS, GEOLOGY AND HYDROGEOLOGY

The Soils, Geology and Hydrogeology chapter describes the ground conditions in Burnfoot, how the proposed Flood Relief Scheme may affect them, and what measures will be taken to minimise these effects.

The study area is underlain by strong, stable bedrock made up mainly of schist, grit and occasional thin marble layers. Overlying this bedrock are natural deposits such as sands, gravels, silts and glacial till, along with some areas of made ground in the town centre. The soils are generally of low to moderate fertility.

Groundwater (water beneath the ground) is present at shallow depths in many locations, typically between 0.2–2.2 metres. A deeper groundwater body also exists in some areas. The overall aquifer (water-bearing rock) is classified as “generally unproductive except for local zones”, meaning it is not a major water supply source. Only one groundwater well is recorded within 1 km of the scheme.

Testing of soils and groundwater found no contamination concerns in soil and only minor exceedances of two naturally occurring metals (manganese and barium) in groundwater. These exceedances are not considered a risk because no buildings or sensitive uses are planned.

No geological heritage sites, economic geology facilities (such as quarries), or protected groundwater zones were identified within the study area.

Construction activities may temporarily disturb soils and groundwater and may include:

- Disturbance, compaction or erosion of soils from vehicle movement and excavation (minor adverse).
- Temporary changes to groundwater flow, particularly where trenches or culverts are installed (minor adverse).
- Piling works, which could briefly create pathways for water to move between shallow and deeper layers (major adverse but temporary).
- Small risks of spills or leaks of fuels or oils from construction machinery (minor adverse).
- Removal of some low-fertility soils and the need for imported fill material (minor adverse).
- Re-use of excavated soil on-site, which is considered beneficial as it avoids disposal to landfill (moderate beneficial).

Overall, the construction phase will mainly result in short-term, local and minor adverse effects, with one temporary major effect relating to piling.

Once the flood relief works are completed, the scheme will have negligible ongoing impacts on soils, geology or groundwater. The works do not create new contamination risks, nor do they significantly alter the underlying geology or soil quality.

A range of standard mitigation measures will be applied to minimise impacts, including:

- Careful topsoil stripping, storage and reuse.

- Management of excavated materials to avoid erosion and runoff.
- Strict control of fuels, oils and chemicals, including designated storage and refuelling areas.
- Emergency spill response procedures.
- Avoiding work near drainage features where possible.
- Using biodegradable geotextiles to protect new embankments until vegetation grows.

These measures ensure that any impacts remain minor and temporary.
After mitigation, the project is expected to have neutral to minor effects on soil, geology and groundwater, with no significant long-term impacts.

The flood relief scheme is limited in scale and does not include permanent buildings, so it is unlikely to contribute meaningfully to cumulative environmental impacts when considered alongside other local projects.

12. NOISE AND VIBRATION

This assessment evaluates the likely effects of noise and vibration in relation to the Proposed Scheme. Operational noise and vibration affecting noise receptors has been scoped out as there are no known significant vibration sources associated with the Proposed Scheme. During the construction phase, there is potential for noise impacts at the nearest noise sensitive properties from the use of associated construction plant and equipment.

Construction noise and vibration were identified using Google maps and there are 204 sensitive receptors located within the study area of 300m. The construction assessment assumed that there would be eight activities:

- Site establishment and clearance and general plant/transport activity
- Flood embankment
- Sheet piled wall
- Flood wall
- Bridge replacement
- Culvert
- Improvement
- Alterations to arterial drainage
- Reinstatement.

Construction noise thresholds have been set using BS 5228-1 assuming that background levels within the study area are less than 65 dB and qualify for the lowest thresholds values. Category A threshold limits are 65 dB for the daytime period. No night-time or evening works are planned therefore a threshold value has not been provided for this period.

To ensure a worst-case assessment, the predicted noise levels take account of the likely plant required to facilitate the construction process, assume that all plant items are in operation 100% of the time period and are located on the boundary closest to the nearest noise sensitive receptors. Within each activity, there are a number of receptors predicted to exceed the 65dB threshold.

Mitigation measures have been recommended to reduce the significance of effects on the nearest receptors. These included general best practice measures, a 2m high acoustic fence being erected around construction works and a letter to closest residents informing them of the planned works.

During the construction phase, there is potential for noise and vibration impacts at the nearest noise sensitive properties from construction plant and equipment.

It is concluded that there is the potential for slight to major significant impacts arising from the Proposed Scheme during the construction phase without mitigation. With the mitigation measures implemented and construction activities being transitional across the entirely of the Proposed Scheme, it has been concluded that these effects will be temporary and are not significant.

No operational noise or vibration impacts resulting from the operation of the Proposed Scheme are anticipated. There will be no significant effects arising from the operational phase.

Construction vibration has also been assessed within this section. BS 5228-2 states the levels of vibration associated with continuous flight auger injected piling are minimal, as the processes do not involve rapid acceleration or deceleration of tools in contact with the ground but rely to a large extent on steady motions. Continuous vibrations at a low level could be expected from the prime movers. Vibration from the construction of the sheet piled walls will be temporary and minimal and therefore it has been concluded that vibration from construction is not significant.

13. AIR QUALITY AND CLIMATE

Introduction and scope

This chapter of the Environmental Impact Assessment Report (EIAR) explains how the proposed Burnfoot Flood Relief Scheme (FRS) may affect air quality and climate and sets out the methods used to assess those effects. Two linked topics are covered: (a) local air quality, focusing on pollutants that affect human health and nearby ecosystems (including construction dust and traffic emissions); and (b) climate change, including greenhouse gas (GHG) emissions associated with the project and the scheme's resilience to projected future climatic changes. The assessment follows national and international guidance (including EU EIA requirements, EPA and IEMA guidance, and TII standards for road-related air quality assessments).

Study area and key receptors

The FRS site is located within EPA Air Quality Zone D (Rural Ireland). Sensitive receptors in the immediate area include residential properties bordering the works, local schools and community facilities, and nearby watercourses and habitats. Two EPA monitoring stations provide regional air-quality context: Buncrana (local) and Letterkenny (regional). These stations show that nitrogen oxides (NO_x) and particulate matter (PM_{10} and $PM_{2.5}$) are the pollutants of greatest relevance to health and the environment in this part of Ireland.

Baseline conditions — Air quality and Climate

Air quality: In rural County Donegal background pollutant concentrations are typically lower than in urban areas, but $PM_{2.5}$ and PM_{10} episodes can occur, particularly in towns and villages where solid fuels (peat, coal, wet wood) are used for domestic heating. Road traffic is the main local source of NO_x; construction and industrial

activities provide localised contributions. Regional monitoring shows compliance with current EU legal limits, but some monitored locations in Ireland exceed World Health Organization (WHO) guideline levels, particularly for fine particulate matter.

Climate: Ireland has a temperate maritime climate influenced by the Atlantic. Observed trends include rising average temperatures, changes in precipitation patterns, rising sea levels and increased frequency/intensity of extreme weather events (storms, heavy rainfall). These trends have implications for flood risk and the design life of civil infrastructure.

Potential impacts — construction phase

The construction phase has the greatest potential to affect air quality and climate. Key potential impacts identified are:

Construction dust and soiling: Earthworks, excavation, stockpiling, material handling, demolition and vehicle movements can generate airborne dust. The greatest risk of nuisance or receptor exposure is properties within relatively short distances (standard guidance indicates potential effects up to c.25 m for soiling on minor sites, greater for larger sites or intensive operations). Local meteorological conditions (dry spells, wind direction and speed) will influence dust dispersion and deposition.

Construction traffic emissions: Movement of plant, material deliveries and temporary diversions can increase local vehicle kilometers. The assessment screens construction traffic using TII criteria (changes in alignment, daily traffic volumes, heavy-vehicle movements and speed changes). For this scheme the expected changes do not meet the thresholds for a significant air quality impact from construction traffic. Construction greenhouse gases (GHGs): Emissions will arise from on-site plant and machinery, fuel consumption by delivery vehicles, and embodied carbon in construction materials. These emissions are typically temporary and concentrated in the construction period.

Potential impacts — operational phase

The scheme is not expected to materially change operational traffic flows on the local road network. Consequently, no significant long-term changes in local air pollutant concentrations or operational GHG emissions are anticipated, and operational traffic impacts have been scoped out of detailed assessment.

Climate vulnerability and adaptation considerations

Flood risk is central to this project and climate change projections (more intense rainfall, higher river flows, sea-level rise) increase the long-term importance of resilient design. The assessment considers both mitigation (reducing GHGs) and adaptation (making the scheme resilient). Design measures, site selection and specification aim to ensure the work remains effective under future climate scenarios and reduce vulnerability to more frequent extreme weather events.

Assessment approach and criteria

Dust and local air quality: The construction dust assessment follows TII and IAQM guidance, using a qualitative risk-based approach that considers activity type, duration, proximity to sensitive receptors, and local weather patterns. Sensitivity of receptors is classified (very high to negligible), and potential magnitudes of impact are described; significance is derived by combining these factors.

GHGs and climate: The GHG assessment follows IEMA guidance and is proportionate to the project scale. A qualitative approach is used where detailed quantification is not required or data is limited. Significance is judged by using professional interpretation of net emissions, project lifetime contribution, and the capacity to apply mitigation measures.

Monitoring and management commitments

The contractor will be required (through contract specification) to implement the draft CEMP measures and to carry out periodic inspections and monitoring of site roads, stockpile management and any complaints-handling procedures. Visual monitoring and, where necessary, targeted particulate monitoring or deposition gauges may be deployed at locations close to sensitive receptors during high-risk activities. If unexpected issues arise, adaptive measures will be implemented.

14. MATERIAL ASSETS

A material asset can generally be categorised under the 'built environment' (transport, energy and services infrastructure, settlement and commercial land, community resources and the historical environment, etc) and natural environment (forestry, open space including agriculture, minerals, water resources). Historical Environment is dealt with under Cultural Heritage and there are also dedicated Chapters for Agriculture and Water Resources. This Chapter therefore considers transport and utilities.

The assessment on traffic and transportation is based on the potential impact upon the surrounding highway network within the receiving environment. Baseline AADT traffic surveys have been extracted from available data sources on the R238 and N13 which would be the main approach routes to / from the site. The analysis is based on the guidance as set out in the Traffic and Transport Assessment Guidelines (May 2014) published by TII. Using the baseline traffic data, an assessment of the impact of the construction traffic upon the surrounding highway network can be analysed.

The significance of effects of the Proposed Scheme as it relates to transport is predicted to be low as an alternative temporary road will be constructed whilst the construction work on the new R238 road bridge is ongoing. Furthermore during the peak construction period of the Proposed Scheme, it is predicted that there will be a maximum of 64 HGV trips to the site. This equates to 32 loads and this will occur when the existing embankment material is being removed in addition to other material being brough to the site. At the peak of the construction there is anticipated to be up to 50 staff at the site. As with most construction sites, staff are anticipated to arrive in work vans in teams of 4 – 5 persons. Allowing for a percentage of singular travel (assume 25% - although likely to be less in practice) this equates to a total of 21 staff vehicles , or 42 trips, accessing or exiting from the site during the peak construction period. Parking for all staff will be facilitated in the temporary construction compounds which will be set up for the duration of the construction programme.

During the peak construction period, the impact upon the R238 from the additional construction traffic (106 trips) represents a 0.85% increase in traffic on a temporary basis, which is an insignificant impact upon the surrounding highway network.

Therefore, there will be no detrimental impact upon existing traffic and transport movements.

Burnfoot comprises mainly residential and commercial properties. In order to determine the impacts of the Proposed Scheme on material assets in Burnfoot, it is important to take into consideration:

- Buildings and Structures
- EPA Licensed Facilities
- Water
- Wastewater Treatment
- Communications Infrastructure and Utilities

Impacts on material assets - utilities during the construction phase of the Proposed Scheme have the potential to be significant without mitigation measures. Therefore, the design, proposed construction methodology and mitigation measures have been proposed to prevent impacts to the surrounding material assets.

Impacts on material assets during the operation phase of the Proposed Scheme are likely to be limited once construction has been completed. The overall effect of the Proposed Scheme is profoundly positive as material assets will be permanently protected against flood risk and the only negative is temporary disruption to traffic and to local residents and businesses.

15. CULTURAL HERITAGE

In broad terms, 'Cultural Heritage' includes the designated and non-designated heritage categories of (i) archaeology (known and unknown), (ii) architectural (built) heritage and (iii) history and folklore.

Impact assessment has been carried using data retrieved from desk-based studies, field-based terrestrial walkover surveys, underwater archaeological surveys, archaeological test trenching surveys and an architectural heritage survey of Burnfoot Bridge.

A total of seven Cultural Heritage receptors have been identified within the Proposed Scheme that will have direct negative impacts. These include:

- Recorded archaeological monument (DG038-059---): a burnt spread of material observed during field survey and subsequently added to the Sites and Monuments Record (SMR). This location at Carnashannagh was archaeologically test trenched, and no archaeological features were noted. However the burnt spread itself, at the riverbank face, was not conducive to testing due to health and safety issues. This is determined a Minor/Moderate significance of effect at construction stage.
- Burnfoot Bridge (road over river bridge). The bridge will require removal and replacement and although altered by modern interventions, it retains eighteenth century masonry. This is determined a Moderate significance of effect at construction stage.
- An outbuilding to the rear of a property in Burnfoot village at Carnashannagh. This building formed part of a nineteenth century Royal Irish Constabulary barracks in the village and has been much altered. It is determined a Slight significance of effect at construction stage.
- Former Burnfoot Brickworks site (levelled). This former site is apparent on nineteenth and twentieth century historic mapping and survives as partial remains of wall footings, and a water-filled clay extraction area today. It is determined the significance of effect is not significant at construction stage.

- Skeoge Embankments (19th Century) – direct impact in part only. The embankments form part of the land drainage and reclamation carried out in the mid-nineteenth century. The embankment will be replaced in part and is determined the significance of effect is not significant at construction stage.
- Two greenfield areas of archaeological potential (AAP): AAP01 (at Carnashannagh, and area of DG038-059---) and AAP02 at Ballyderowen. Both AAPs have potential to retain sub-surface unrecorded archaeological features. This is determined a potential Moderate significance of effect.

These seven direct impacts will be mitigated by way of preservation by record for the known Cultural Heritage receptors (burnt spread, bridge, outbuilding, former brickworks, Skeoge embankment) and by way of preservation in situ (if feasible) or preservation by record for the potential sub-surface archaeological resource at the AAPs. Should archaeological features be identified at AAP01 and/or AAP02 this is considered a potential Minor residual impact on the overall archaeological resource pertaining to Burnfoot village and surrounding environs.

There are four Minor indirect operational stage significance of effects noted for the heritage setting of four Cultural Heritage receptors: The Londonderry and Lough Swilly Railway (LLSR) line, Skeoge 19th century embankments, LLSR Tooban Junction – foot bridge, and LLSR Tooban Junction level crossing. These are also considered four Minor residual impacts on the four receptors, following appropriate mitigation measures.

16. LANDSCAPE & VISUAL

A Landscape and Visual Impact Assessment (LVIA) was completed for the Proposed Scheme to identify and determine the potential significant effects on landscape character, landscape features, visual receptors and visual amenity because of works associated with the Proposed Scheme.

The assessment is accompanied by photomontages of the Proposed Scheme from a range of viewpoints located within proximity to the Proposed Scheme. The photomontages have been used as an aid to the assessment of visual impacts predicted to arise because of the Proposed Scheme.

The LVIA includes an assessment of the landscape and visual effects for both Construction Stage and Operational Stage associated with the Proposed Development. The assessment of effects also includes an assessment of the effects following the successful implementation and establishment of mitigation (planting).

The landscape within which the Proposed Scheme is located, has been appraised and classified into landscape character areas that enables the classification of landscape quality. The capacity of the landscape to accept change of the type proposed is assessed by determining the sensitivity of each landscape character area. The LVIA also assesses how the Proposed Scheme would impact directly on landscape features and resources (e.g. woods, trees, walls, hedgerows, water courses) that are components of the landscape character that may be physically affected by the proposed development, such as the removal or addition of trees and alteration to ground cover.

Site visits have been undertaken to assess the existing environment, to establish the existing visual resource and to identify sensitive receptors, i.e. residential properties, scenic viewpoints. Site visits were also undertaken to establish the perceived extent of landscape and visual impacts that may be associated with the Proposed Scheme.

The site for the Proposed Scheme and surrounding environs is wholly contained within County Donegal and as such the County Donegal Development Plan (2024 – 2030) (CDDP) has been reviewed to establish and identify areas of protected landscapes or landscape designations relevant to the LVIA. Following a review of the CDDP it has been established that:

- The Proposed Scheme is within areas identified as being of Especially High and High Scenic Amenity;
- The Proposed Scheme is not located in proximity to any protected views or prospects; and
- The Proposed Scheme is not located in close proximity to any Historic Gardens and Designed Landscapes.

A review of the landscape character assessment, accompanying the CDDP has been undertaken and identified that the Proposed Scheme is wholly located within a single landscape character area, identified as South Inishowen Farmland – LCA 10. The LVIA has identified that during the construction phase, localised effects are predicted to occur for areas near the Proposed Scheme, which have been assessed as minor to moderate, temporary and not significant. The remaining portions of the landscape character area further from the proposed development are predicted to experience no significant effects.

During the operational phase, localised minor to negligible, assessed as not significant effects are predicted to occur at the time of scheme opening, as areas of proposed planting will not be fully established. Following the successful implementation and establishment of the proposed planting and mitigation measures, predicted effects reduce.

As part of the visual assessment, 3 viewpoints have been utilised to aid in the visual assessment of both construction and operational phases of the Proposed Scheme. None of the viewpoint's assessment are considered to experience significant negative effects during the operational phase of the Proposed Scheme as the development will be seen as a positive addition locally and will easily integrate with the existing built form of Burnfoot.

17. WASTE

The Waste chapter evaluates the generation, classification, and management of waste arising from the Proposed Scheme during construction and operation. The assessment considered national and EU legislative frameworks, including the Waste Framework Directive and Ireland's transition toward a circular economy. The assessment was undertaken in line with the Institute of Environmental Management and Assessment (IEMA) published guidance from March 2020 which sets out criteria for determining the value (sensitivity) of material resources and waste (including waste infrastructure). A quantitative methodology was applied, reviewing design information, waste legislation, existing waste infrastructure, and the capacity of facilities in the Connacht–Ulster Region.

Baseline conditions indicate that current waste at the site comprises typical municipal streams from residential and commercial properties with the surrounding area dominated by agricultural lands. Regional (Connacht Ulster Region) waste infrastructure includes 1 licensed soil and stone recovery facilities; 17 permitted soil recovery facilities and 53 registered soil recovery facilities. While capacity is available, there are no inert landfill options in the region. Two of the four operational landfills in Ireland will approach their maximum lifetime

consented capacity by 2027. Hazardous soil treatment capacity in Ireland remains restricted, with reliance on overseas facilities for final disposal.

Construction will generate the majority of waste, principally construction and demolition waste (CDW). Key waste streams include soils (estimated 17,750 m³), demolition waste from removal of the R238 bridge, vegetation and soils containing invasive species and construction related waste from construction works (packaging materials, metals, wood, and potentially hazardous materials). Without appropriate management, some of these streams could require landfill disposal.

The operational phase of the Proposed Scheme is likely to have a negligible impact on waste arisings as the current use of the site for the Proposed Scheme is not anticipated to change and has therefore been scoped out of the EIA. There were no cumulative impacts on waste as a result of neighbouring developments identified.

Mitigation measures include implementing a Site Waste Management Plan within the Construction Environmental Management Plan, segregation and secure storage of waste streams, maximising reuse particularly of excavated soils and use of licensed carriers and facilities, and staff training. A full structural survey of the R238 Bridge will be undertaken to inform a carefully planned demolition method to set out all high value materials. Hazardous materials will be handled in accordance with relevant safety regulations. Continuous monitoring and record-keeping will ensure compliance and promote waste minimisation.

The residual impact of the construction phase in relation to waste management is predicted to be neutral or slight with residual effect outcome being not significant.

18. RISK OF MAJOR ACCIDENTS AND DISASTERS

In light of the nature of the activities that will take place during the construction and operation of the Proposed Scheme, and the nature of the surrounding environment, the most significant risks of major accidents and disasters are associated with the construction of the flood defences and the flood risk associated with the Burnfoot and Skeoge Rivers.

The potential for construction phase impacts is considered to be low in terms of sensitivity, magnitude, and significance particularly as there is an absence of an establishment that falls within the Scope of the Control of Major Accident Hazard Regulations 2015 (the COMAH Regulations).

There is potential to impact upon the natural environment, local land use, settlement, and human population, as a result of accidental discharge of dangerous substations (oils, fuels, cement, and other construction materials) or the release of contaminants exposed through excavation works, during the construction phase. The surrounding area of the Burnfoot River is particularly sensitive given the downstream SAC and SPA designation.

The presence, movement, and navigation of construction vehicles during the construction phase, has the potential to result in accidents; collision with other vehicles or with natural and / or manmade features, which may result in damage to the environment through accidental discharge of substances such as fuels and construction materials.

However given the mitigation included in in other chapters of the EIAR, e.g. biodiversity, water quality, population and human health, soils, geology and hydrogeology and the fact that Ireland is an area of relatively

low seismic activity and low lightning activity, and in general is not subject to extreme weather events other than flooding, the likelihood of the impacts is assessed as very unlikely. The severity or magnitude of the impact is considered to be minor and therefore the significance of the impact in the context of major accidents and hazards is considered to be minor and based on the risk matrix in the DHLGH guidance, normal emergency procedures are considered adequate during the construction phase.

The Proposed Scheme has been designed to mitigate this risk and therefore will reduce the likelihood of flooding in Burnfoot. Therefore, the operation of the Proposed Scheme will have a significant beneficial impact and not further mitigation will be required in the context of Major Accidents and hazards.

19. AGRICULTURE

The study area comprises of approximately 126 acres of low-lying agricultural land located downstream of Burnfoot, between the Burnfoot and Skeoge rivers. The land is under single ownership and when inspected was under managed as grassland for grazing, with historical use for tillage recorded. The land has been historically reclaimed for agricultural use through drainage and embankment works and is prone to flooding during periods of high or prolonged rainfall.

The Proposed Scheme involves the removal of sections of existing embankments downstream of Burnfoot to allow controlled flooding of the agricultural land, thereby reducing flood risk to the village of Burnfoot. Additional embankments will be constructed in limited locations to protect key infrastructure. No permanent change in land use or farm type is proposed.

During construction, there will be temporary disturbance to agricultural land within defined working area associated with embankment removal and construction. Access will be maintained using existing farm roadways, stock-proof fencing will be installed where required, and disturbed land will be reinstated following completion of works. These impacts will be short term and localised.

In the operational phase, some agricultural land will experience slightly more frequent or prolonged shallow flooding under certain flood events. These lands already flood regularly and are managed accordingly. The change in flood behaviour is not expected to result in significant adverse effects on agricultural productivity or farm viability in its current use.

With the implementation of appropriate mitigation measures, the residual impact of the Proposed Scheme on agriculture is assessed as minor and not significant.

20. CUMULATIVE EFFECTS AND ENVIRONMENTAL INTERACTIONS

Cumulative Effects

The potential cumulative effects of consented schemes nearby the Proposed Scheme were assessed. Relevant projects were selected, and the project team defined significance thresholds and criteria for assessment. These were based on professional judgement, alongside relevant standards, and guidelines, to determine whether in-combination effects give rise to additional levels of significance.

The key environmental topics with potential cumulative effects with the Burnfoot FRS were Water Quality Biodiversity, Air Quality and Climate, Waste and Landscape and Visual. Construction and operational phase mitigation measures were identified to prevent the potential interaction, and thus mitigate the potential for, cumulative effects on all of these environmental topics for the duration of the Proposed Scheme.

All mitigation measures for the Proposed Scheme resulting from the individual assessments, and the cumulative effects and environmental assessment are listed in detail in EIAR and the Project Construction Environmental Management Plan (CEMP). Provided are the suggested mitigation measures that are employed during construction and operation phases, the overall impact to the environment considered in combination, is negligible.

Environmental Interactions

For any project with the potential for significant environmental impact there is also the potential for interaction amongst these impacts. The result of interactive impacts may either exacerbate the magnitude of an impact or ameliorate it.

The potential interactions between environmental aspects arising from within the Proposed Scheme were assessed. Each technical environmental chapter within the EIAR identifies and analyses the potential for other environmental interactions. A total of thirty-seven interactions has been identified. These chapters also detail environmental baseline information and identify the significant potential and residual construction and operational effects/impacts of the Proposed Scheme. The cumulative assessment identified many potential inter-relationships and interactions. Additional mitigation measures were included to minimise and/or offset the potential for significant effects resulting from such interactions.

For example, an interaction link exists between Water Quality and Biodiversity. The removal of the Arterial Drainage Embankments offers the opportunity to reconnect the Burnfoot River to the floodplain and this will result in a positive impact on the hydromorphology of the Burnfoot River and the Water Framework Directive status. This element of the scheme will also result in benefits to the downstream protected area interests in that the measure to reconnect the floodplain will reduce velocities and water levels in the downstream reaches and Inch Lough which will have beneficial impacts on ground nesting terns whose nests were subject to significant impact during the 2017 flood events. In general, there are no significant negative effects associated with the Proposed Development or potential interactions. Where any potential negative impacts have been identified during the assessment process, these impacts have been avoided or reduced by design and the proposed mitigation measures, as presented throughout the EIAR.

21. SUMMARY OF MITIGATION MEASURES AND CONCLUSIONS

All mitigation measures relating to the pre-commencement and construction phases of the Proposed Development are set out with the EIAR and the draft Construction Environmental Management Plan (CEMP) submitted as part of this project.

It is intended that the CEMP will be updated where required prior to the commencement of the development, to include all mitigations measures, conditions and or alterations to the EIAR and application documents should

they emerge during the course of the planning process and would be submitted to the Planning Authority for written approval.

All mitigation measures proposed for the project are outlined in Table 20.1 of the EIAR, Volume II. The mitigation measures have been grouped together according to their environmental field/topic.

The mitigation and monitoring proposals are set out in separate tables in the draft CEMP (Appendix 5.2 of the EIAR, Volume III). Where particular monitoring proposed is considered to be a measure of mitigation, it has been included in the consolidated table for all mitigation measures proposed. The mitigation proposals are set out in tabular format to provide an easy to audit list that can be reviewed and reported on during the future phases of the Proposed Scheme.

Overall the Proposed Scheme complies with the principles of proper planning and sustainable development, and that the EIAR has objectively demonstrated that the proposed project does not adversely affect the environment in all its facets, including the integrity of Natura 2000 sites.

The overiding positive and long term effect from the Proposed Scheme is that the primary objective, to protect the affected areas in Burnfoot from fluvial flooding, will be achieved with only negligible effects arising from the Proposed Scheme.