10 WATER QUALITY

10.1 Introduction

This chapter assesses the potential impact of the Proposed Scheme in Burnfoot, County Donegal on the receiving water environment and Water Framework Directive (WFD) compliance. Existing water quality in the vicinity of the project is established based on available water quality information and WFD monitoring programmes.

This assessment is based on the project description detailed in Chapter 5 and identifies potential significant effects on water quality that may arise from the Proposed Scheme, presenting mitigation measures that will be implemented to address the potential significant effects.

The baseline conditions at the Burnfoot_010, Burnfoot_020, Skeoge_010, Inch Lough and the Outer Swilly Estuary waterbodies have been reviewed to inform the assessment of impacts relating to water quality.

Baseline data has been gathered from existing sources such as water quality monitoring stations included in the Environmental Protection Agency (EPA) WFD monitoring programme, as part of their River Basin Management Plan (RBMP) reporting.

The current WFD environmental objectives for the water bodies that could potentially be impacted by the Proposed Scheme have been collated from the EPA's Catchments.ie portal to ensure the potential impact from the FRS does not compromise the achievement of the WFD objectives.

10.2 Methodology

Baseline water quality within the receiving environment has been established through a review of national monitoring data used to establish water quality status in the context of the EU Water Framework Directive (WFD) and supporting environmental quality standards as published in the European Communities Environmental Objectives (Surface Waters) Regulations 2009, as amended.

The Proposed Scheme will also be assessed with respect to the requirements of the WFD to ascertain if the proposal will have a detrimental impact on the status of water bodies associated with that site and their environmental objectives. On this basis a WFD compliance assessment for the Proposed Scheme has been undertaken. The completion of a WFD Assessment is a staged process where data on the study area and work proposals are assessed with respect to the requirements of the WFD to ascertain if the proposals will or will not have a detrimental impact on the environmental objectives of the water bodies that have the potential to be impacted by the proposed works. If the assessment concludes, after taking account of the mitigation proposed, that the proposal may either result in a deterioration of the status of the water bodies or prevent a water body from achieving its environmental objective, then this represents a failure to achieve the WFD objectives and it should not go ahead unless justification for the works is demonstrated under Article 4.7 of the Directive, in the context of new modification, or

Article 4.3, in the context of existing specified uses and Heavily Modified Water Bodies. The four objectives of the WFD Assessment are:

- Objective 1: To prevent deterioration in the ecological status of the water body.
- Objective 2: To prevent the introduction of impediment to the attainment of Good WFD status for the water body.
- Objective 3: To ensure the attainment of the WFD objectives for the water body are not compromised.
- Objective 4: To ensure the achievement of WFD objectives in other water bodies within the same catchment are not permanently excluded or compromised.

Planning Authorities must consider whether proposals for plans or new developments have the potential to prevent compliance with the WFD objectives i.e. will they cause a deterioration of the status of a water body and / or prevent future attainment of good surface water status/potential and good groundwater status where not already achieved. This is a separate, standalone assessment process but it includes clear opportunities to inform and be informed by other established environmental assessment processes, including but not limited to Appropriate Assessment (AA), Environmental Impact Assessment (EIA) and Flood Risk Assessment (FRA) which may be ongoing in parallel.

All development proposals need to be screened for the need for a WFD Assessment. Development proposals within, or that could affect the water environment must demonstrate that they will not cause a deterioration of the status of water bodies in their zone of influence, or that they will not inhibit their future achievement of “good” status. In some situations, it will be clear that a development proposal would not compromise the achievement of the WFD objectives and therefore no further assessment will be required. However, in other situations, the potential to compromise the achievement of the objectives may be identified or there may be uncertainty and the development proposal will need to undergo a WFD Assessment to inform decision making by the planning authority.

Opportunities to include pro-active design measures to avoid and mitigate impacts will become the norm for developers in order to reduce the scope and extent of the WFD Assessment necessary in any application. These proactive measures will include for example, use of Nature based Sustainable urban Drainage Systems (SuDs), riparian zone improvements, improvement in flow dynamics etc.

10.2.1 Relevant Legislation and Guidance

The WFD (Council Directive 2000/60/EC establishing a framework for community action in the field of water policy) was adopted by the European Commission in December 2000 (EC, 2000). The WFD requires that all European Union Member States prevent deterioration and protect, enhance and restore all bodies of water. This means that Member States must ensure that new development proposals do not adversely impact upon the environmental objectives of waterbodies affected, and that they must address historical modifications that are already impacting a water body.

The WFD was transposed into Irish law through the European Communities (Water Policy) Regulations 2003 (S.I. 733/2003) in respect of the duties on all public authorities to exercise their functions in a manner consistent with achieving the objectives of the WFD. European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272/2009), as amended, and the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. 9/2010) give further effect to the WFD in Ireland. Article 5 of both these regulations provide that public authorities must not undertake their functions in a manner that knowingly causes or allows deterioration in the status of water body.

The WFD is given general effect in planning legislation in Section 1A of the Planning and Development Act 2000 (S.I. 30/2000), as amended; and specifically through amendments made in 2010 which sought to improve how water management and the planning system are integrated.

The EPA consider any development that compromises the achievement of the environmental objectives for a water body, established under the Water Framework Directive (WFD), to represent a significant environmental impact.

The following relevant legislation and guidance relating to water quality will be considered during the preparation of the Water Quality chapter of the EIAR:

- The Water Framework Directive (WFD); the WFD is the European legislation which was developed to establish systems to manage Europe's water environment - rivers, lakes, estuaries, coastal waters and groundwater;
- The European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (SI No.272 of 2009), as amended; this transposes the requirement of the WFD into Irish law and provides Environmental Quality Standards (EQSs) for classifying surface water status; and
- European Communities (Quality of Shellfish Waters) Regulations 2006 (SI No 268 of 2006).; these regulations classify the standards that are set by the Water Framework Directive for priority substances within the water environment and shellfish waters for Ireland;

Other important pieces of EU and national legislation pertaining to the hydrological environment include:

- European Communities (Water Policy) Regulations, as amended (S.I. 722 of 2003);
- European Union (Water Policy) Regulations 2014 (S.I. 350 of 2014);
- The EU Floods Directive 2007/60/EC;
- European Communities (Assessment and Management of Flood Risks) Regulations (S.I. 122 of 2010), and

A requirement of the Second River Basin Management Plan was the development of Guidance for Planning Authorities on WFD Assessment.

Whilst guidance for undertaking a WFD Assessment is being prepared for Planning Authorities in Ireland, it is not yet published and therefore the UK Planning Inspectorate Guidance Note 18: The Water

Framework Directive (Planning Inspectorate, 2017) has been followed. This requires that a WFD Assessment is undertaken in four our stages:

1. Stage 1 Screening – excludes any activities that do not need to go through the scoping or impact assessment stages
2. Stage 2 Scoping – to identify potential risks associated with a development proposal on the relevant water bodies and their water quality elements.
3. Stage 3 Impact assessment – to undertake a detailed assessment of water bodies, their quality elements and activities carried forward from the scoping stage.
4. Stage 4 – Justification or Exemption - rigorous assessment of the appropriateness, or otherwise, of particular developments that, for various reasons, are being considered despite failure to comply with the objectives of the WFD, as laid down in Article 4(7).

The WFD Assessment (Water Status Impact Assessment [WSIA]) for the Burnfoot FRS is included in Appendix 10.1.

10.2.2 Study Area

The Proposed Scheme is within the Burnfoot_020, Burnfoot_010 and Skeoge_010 river water bodies, while the Inch Lough and Outer Swilly Estuary transitional waterbodies lie downstream. The Lough Swilly groundwater body underlies the Proposed Scheme area. The river water bodies are within the Burnfoot_SC_010 sub-catchment (39_2) which is part of the Lough Swilly Catchment (HA39).

10.2.3 Baseline

A fundamental requirement of the WFD and the environmental objectives for a water body is to attain good ecological and chemical status and ensure that any deterioration in the status of waters is prevented. Any new development therefore must ensure that these two fundamental objectives of the Directive are not compromised, nor are there any detrimental impacts to the objectives of water dependent protected areas, as define in Article 3 of the WFD, that are hydrologically or hydrogeologically linked to the Proposed Scheme. The WFD Assessment has been undertaken for the Proposed Scheme to ensure that the environmental objectives of the water bodies affected are not compromised (Appendix 10.1).

A desk-based assessment of surface water quality in the vicinity of the Proposed Scheme area was conducted. The sources of the water quality information include:

- Water Framework Directive water body status information arising from the Water Framework Directive monitoring programme.
- Water Quality in Ireland Report 2019-2024 (EPA, 2025) supported by water quality information available on the EPAs online Water Framework Directive Application (www.catchments.ie);
- Protected areas datasets including:
  - information on Nutrient Sensitive Areas as outlined in the EPA's most recent Urban Waste Water Treatment Report (2021); and

  - the existing Register of Protected Areas (under Article 6 of the Water Framework Directive) for water dependent habitats and species in the SAC and SPA networks held by the EPA.

- EPA Water Quality in 2023: An Indicators Report (EPA, 2024);

For the purposes of monitoring and assessing the quality of surface waters, all rivers, lakes, coastal inter-basins, estuaries, and coastal waters (within 1 nautical mile of the shoreline) have been divided into management units called “water bodies”. Under the WFD condition of each water body must be reported to the European Commission in the form of ecological status and chemical status. Ground water bodies are similarly delineated with status identified.

Surface water bodies are grouped into sub-catchments for the purposes of water management, of which there are 583 nationally, which are further grouped into catchment management units of which there are 46 based on the hydrometric areas used by public authorities.

10.2.4 Consultation

Extensive consultation has been undertaken as part of the Proposed Scheme. This includes an Opening Collaborative Workshop (19th January 2021) and a Design Review Collaborative Workshop (29th April 2022) with the relevant bodies. These workshops are discussed in detail in Chapter 3 Scoping and Consultations.

In addition to this, individual consultations were undertaken with relevant parties during the EIA Scoping process in order to determine the existing water quality status in the context of the Water Framework Directive (WFD) and to establish a scope for the assessment of water quality impacts, thereby enabling an appropriate assessment of the impact of the Proposed Scheme to be made. A summary of the relevant issues identified and how these have been addressed are included in Table 10.1.

Table 10.1: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How/ Where addressed
23 August 2023	**Planning and Response Team - Department of Agriculture, Environment and Rural Affairs (DAERA)**; Impact on Fisheries Sediment release and impact on fish	Skeoge River has been heavily impacted by previous drainage schemes over several decades. In spite of this the river maintains good trout populations and sea trout, eels and salmon have the potential to be present. These species are of high in nature conservation and biodiversity value. Inland Fisheries note the majority of the works are in relation to the Burnfoot and Carnashannagh Stream and should not impact on fisheries in DAERA’s jurisdiction There are 2 aspects that may impact the Skeoge catchment. The proposed embankment flood protection of the three properties in Slab area, however it is unlikely that the impact of this aspect will be significant to fisheries interests as the location is away from the river. The 2nd aspect is the removal of embankment at lower Skeoge at its confluence of the Burnfoot river, Inland Fisheries welcome reconnection between the river and its

Date	Consultee and Issues Raised	How/ Where addressed
		floodplain. These works are to be carried out with full pollution prevention measures, especially in regard to the release of sediment to the watercourse. Sediment release can affect salmonid habitats in degrading spawning beds and impact salmon and trout eggs' development. The stretch of river within the works area is utilised as a migratory corridor for these species and suspended sediment can act as a barrier to fish migration. A Construction and Environmental Management Plan (CEMP) should be drafted for consideration
25 September 2023	Impact on hydrologically connected European Sites Recommendations for CEMP	**Designated Sites** A watercourse adjacent to the Elagh Business Park, Buncranna Road, Londonderry, is hydrologically connected to the Burnfoot River, Skeoge River and Carnashannagh Stream which are hydrologically connected to Lough Swilly Special Area of Conservation and Lough Swilly Special Protection Area, in Republic of Ireland NIEA Natural Environment Division (NED) recommends the applicant should submit a CEMP which will include mitigation measures that will protect the aquatic environment from pollution. CEMP should include: 1. Construction Method statement; 2. Pollution prevention plan; 3. Site Drainage Plan; 4. Soil Management Plan; 5. Environmental Emergency Plan; 6. Water Quality Monitoring Plan, and; 7. Ecological Clerk of Works (ECOW) appointment
9 October 2023	The development Applications Unit of the Department of Housing, Local Government and Heritage (DHLGH)	The development Applications Unit of the Department of Housing, Local Government and Heritage (DHLGH) recommend water quality and aquatic ecology is protected through following IFI guidelines with an Emergency Response Plan to be completed as part of the construction methodology in case of spills or major events.
29 April 2022	Inland Fisheries Ireland	IFI also engaged in the opening and design review workshops, details of which are provided in Chapter 3 Scoping and Consultation and Appendix 3.1. The IFI stated that the bridge replacement should be undertaken in accordance with IFI guidance and that the habitat at this location should be restored correctly. Fisheries enhancement measures should be considered. The IFI were in agreement with the field surveys undertaken as part of the project demonstrating that there are good numbers of juvenile trout / adult trout and occasional salmon. The IFI's preference was for the bridge replacement option would be beneficial from fisheries perspective and would be preferable to undertaking upgrades to the existing structure.

10.2.5 Assessment Criteria and Assignment of Significance

An assessment has been made of the components of the Proposed Scheme that have the potential to have a significant impact on water quality using criteria for rating significance and magnitude 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).

The significance of impact on surface water quality likely to occur during the construction and operational phases of the Proposed Scheme are determined using a predominantly qualitative methodology. The approach to assigning significance of impact relies on reasoned argument, professional judgment and taking on board the advice and views of appropriate organisations. The assessment is a consideration of a combination of receptor sensitivity (Table 10.2) and the potential magnitude of the impact on the water environment (Table 10.3), in order to determine significance (Table 10.4). The approach to assessing the significance of impacts comprises assigning each impact to one of the categories of magnitude as outlined in Table 10.4 enables different components to be assessed based upon the same scale.

10.2.5.1 Receptor Sensitivity / Value

The significance of effects on water quality likely to occur during the Proposed Scheme particularly from (construction activities and physical changes to the water body) at Burnfoot are determined using the predominantly qualitative process described below. The criteria for determining the significance of effects is a two-stage process. The first step in the process is to determine the sensitivity of the receiving environment and then to define the magnitude of the potential impact. This section describes the criteria applied in this chapter to assign values to the receptor to assist in defining sensitivity of receptors (Table 10.2).

10.2.5.2 Magnitude of Impact

The magnitude of the impact has also been adapted from the generic methodology for environmental assessment outlined in the NRA publication (Table 10.3). Impacts may be considered to have no affect or be negligible to high and their magnitude has necessarily been assessed on a qualitative basis.

10.2.5.3 Significance of Effects

Applying the formula, the greater the environmental sensitivity or value of the receptor or resource, and the greater the magnitude of impact, the more significant the effect. The consequences of a highly valued environmental resource suffering a major detrimental impact would be a very significant adverse effect. Table 10.4 illustrates how the sensitivity of attributes was considered against the magnitude of impacts to determine the significance of potential impacts.

To conclude the assessment, mitigation measures are proposed to reduce, avoid and prevent these likely significant effects, where appropriate. This enables a “with mitigation” assessment to be made of any residual impact as a result of the construction and operational phases of the project and/or in combination with other existing or approved projects in the vicinity of the Proposed Scheme.

The significance determination and assessment of the potential likely environmental effects of each component of the Proposed Scheme has been made based on the matrix presented in Table 10.4 and defined in Table 10.5.

Table 10.2: Criteria for Rating Receptor Sensitivity (NRA, 2008)

Value (Sensitivity)	Typical Descriptors
Extremely High	***Attribute has a high quality or value on an international scale.*** Examples: River, Wetland or surface water body ecosystem protected by EU legislation. i.e. designated under the Habitats, Birds, Shellfish, Bathing Water or Freshwater Fish, Drinking Water or Nitrate Directives. High Status objective water body as designated by the EPA under the Third River Basin Management Plan.
Very High	***Attribute has a high quality or value on a regional or national scale.*** Examples: River, Wetland or surface water body ecosystem protected by national legislation (NHA status), Regional important potable water source supplying >2500 homes, nationally important amenity site for wide range of leisure activities, Quality Class A (Biotic Index Q4), Flood plain protecting more than 50 residential or commercial properties from flooding.
High	***Attribute has a high quality or value on a local scale.*** Examples: Salmon fishery, locally important potable water source supplying >1000 homes, Quality Class B (Biotic Index Q3-4), Flood plain protecting 5 to 50 residential or commercial properties from flooding, Locally important amenity site for wide range of leisure activities.
Medium	***Attribute has a medium quality or value on a local scale.*** Examples: Coarse fishery, Local potable water source supplying >50 homes, Quality Class C (Biotic Index Q3, Q2-3), Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	***Attribute has a low quality or value on a local scale.*** Examples: Locally important amenity site for small range of leisure activities, Local potable water source supplying <50 homes, Quality Class D (Biotic Index Q2, Q1), Flood plain protecting 1 residential or commercial property from flooding. Amenity site used by small numbers of local people.

Table 10.3: Criteria for Rating the Magnitude of Impact (NRA, 2008)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Loss or extensive change to a water body or water dependent habitat.
		Increase in predicted peak flood level >100mm.
		Extensive loss of fishery
		Extensive reduction in amenity value
		Potential high risk of pollution to water body from routine run-off
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Increase in predicted peak flood level >50mm
		Partial loss of fishery
		Potential medium risk of pollution to water body from routine run-off
		Partial reduction in amenity value
Minor Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm
		Minor loss of fishery
		Potential low risk of pollution to water body from routine run-off
		Slight reduction in amenity value
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level Negligible loss of amenity value Negligible loss of fishery

Table 10.4: Criteria for Rating the Significance of Environmental Impacts (NRA 2008)

Importance of Attribute	Magnitude of Impact			
	Negligible	Minor	Moderate	Large
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant / Moderate	Profound / Significant	Profound
High	Imperceptible	Moderate / Slight	Significant / Moderate	Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

Table 10.5: Defining Impact Significance (NRA, 2008)

	Attribute Importance				
Impact Level	**Extremely High**	**Very High**	**High**	**Medium**	**Low**
Profound	Any permanent impact on attribute	Permanent impact on significant proportion of attribute			
Significant	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute		
Moderate	Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute	
Slight		Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute
Imperceptible			Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute

10.3 Baseline Environment

10.3.1 Water Framework Directive Status

The fundamental objectives of the WFD are to maintain “high status” of surface waters where it exists, prevent deterioration in the existing status of waters, and achieve at least “good status” in relation to all waters by the end of the current river basin management cycle unless a water body is subject to an extended deadline under Article 4 of the Directive. A water body must achieve both good ‘ecological status’ and good ‘chemical status’ before it can be considered to be at good overall status. An assessment of the risks to the achievement of these objectives for water bodies has been undertaken by the EPA through the extensive characterisation of water bodies and the key pressures acting upon them. This characterisation process allows the development of a programme of measures to aid the achievement of the WFD objectives. A Programme of Measures (POMs) outlines the steps that will be taken to meet the environmental objectives applicable to each water body. This Programme is contained within an overarching River Basin Management Plan (RBMP). These measures will require implementation at strategic level but also at regional and local level through the establishment of Regional Integrated Catchment Management Programmes. Both Burnfoot and the Skeoge water bodies are within the project area (Figure 10.1) have been included amongst those 527 prioritised areas for action in the Third River Basin Management Plan for Ireland 2022 - 2027 (DHLGH, 2024).

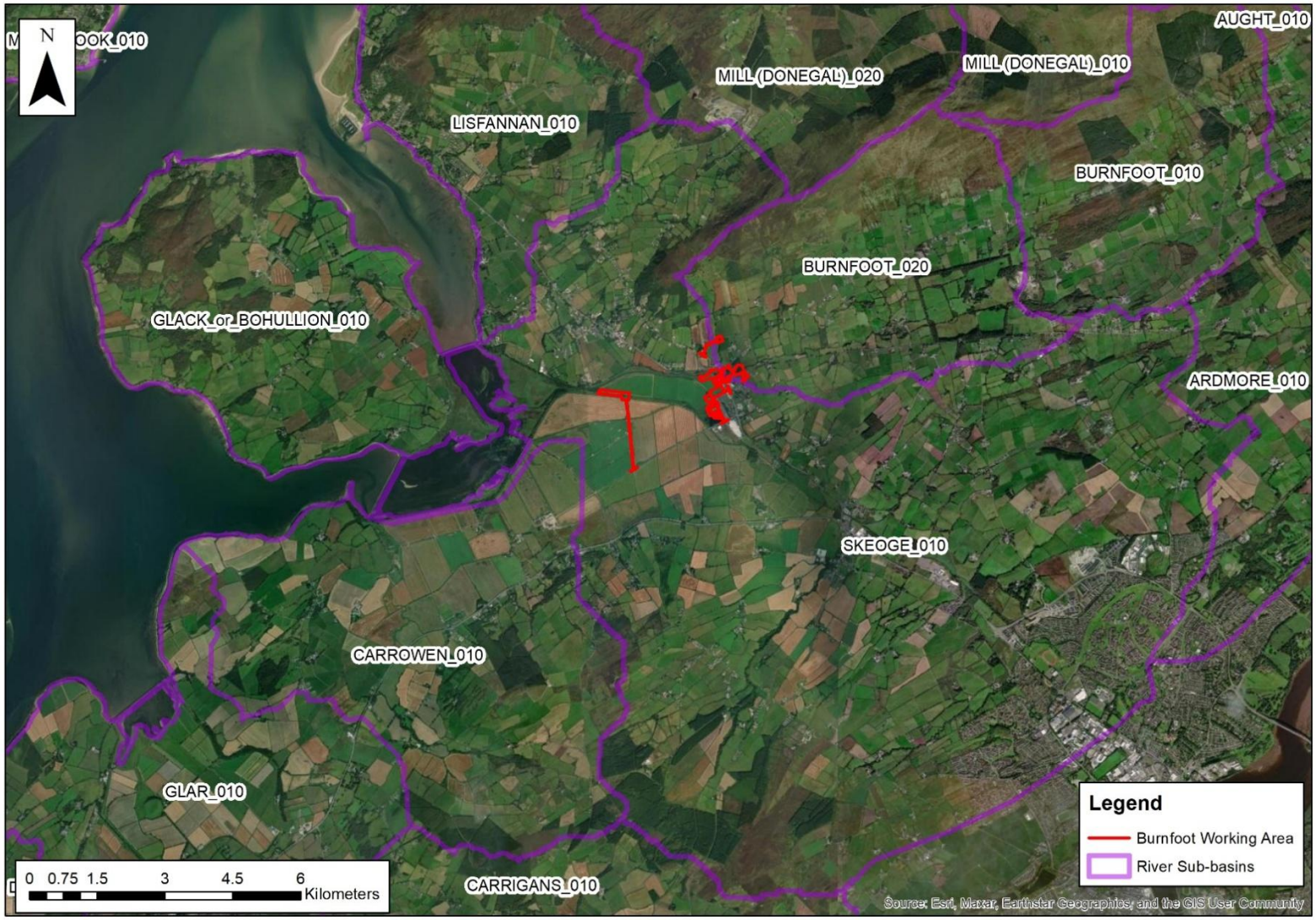

Figure 10.1: Site Location in the Context of the Water Framework Directive River Sub Basins

Environmental Quality Standards (EQSs) for classifying surface water status are established in the European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (SI No. 272 of 2009), as amended. These regulations set standards for biological quality elements, physico-chemical conditions supporting biological elements (including general conditions and specific pollutants), priority substances and priority hazardous substances.

As shown in Figure 10.2, the 'ecological status' of a water body is established according to compliance with the EQSs for biological quality elements, physico-chemical conditions supporting biological elements and relevant pollutants and hydromorphological quality elements. The 'chemical status' of a water body is established according to compliance with the EQSs for priority substances and priority hazardous substances.

In addition to achieving good ecological and chemical status, a water body must achieve compliance with standards and objectives specified for protected areas, which include areas designated by the Bathing Water Directive; the Urban Waste Water Treatment Directive; the Shellfish Waters Directive; the Habitats Directive and the Birds Directive. Waters bodies that are compliant with WFD standards, but that contain protected areas that are non-compliant with protected area standards are downgraded to 'less than good' status. Based on monitoring information and data from 2019 to 2024, the most recent WFD monitoring available, the current WFD status classification of river water bodies potentially affected by the Proposed Scheme is illustrated in Figure 10.3.

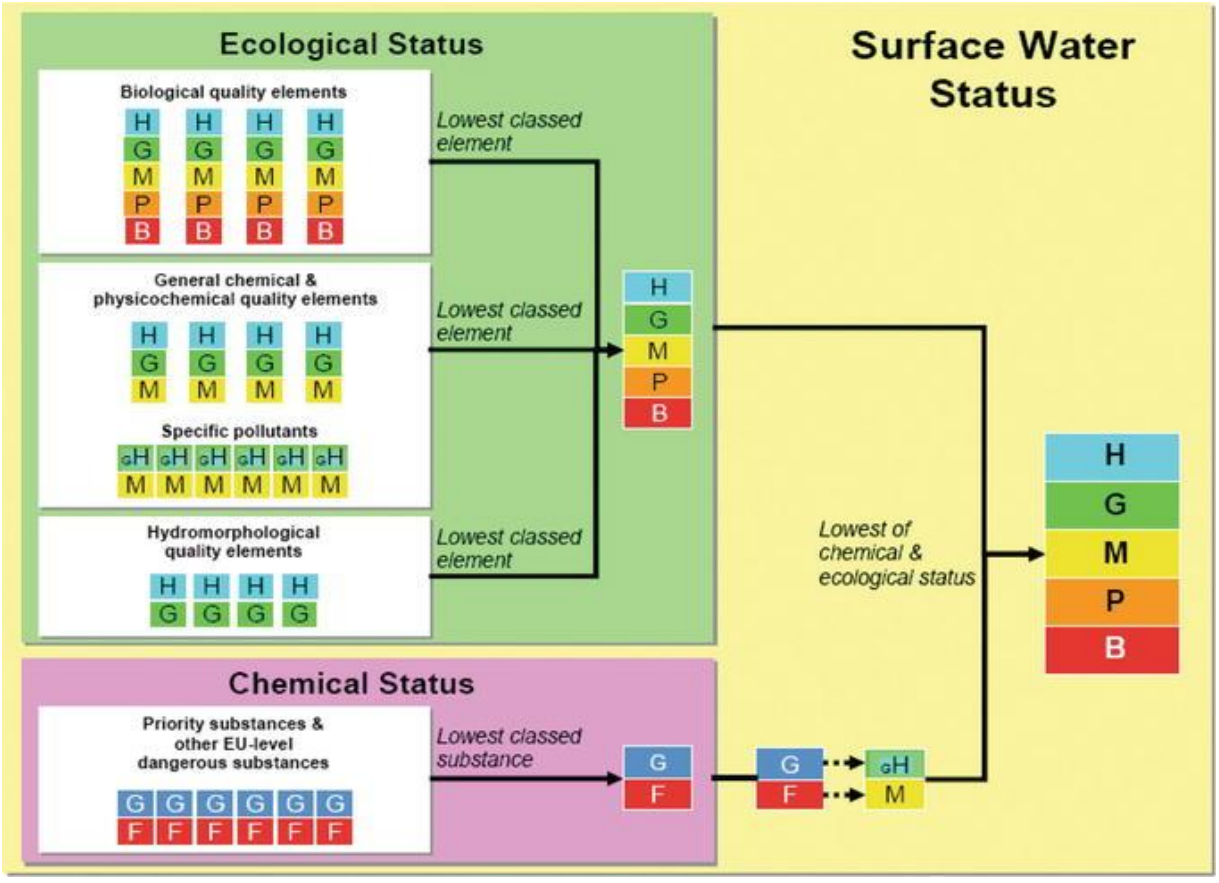

Figure 10.2: Elements of the Water Framework Directive Status

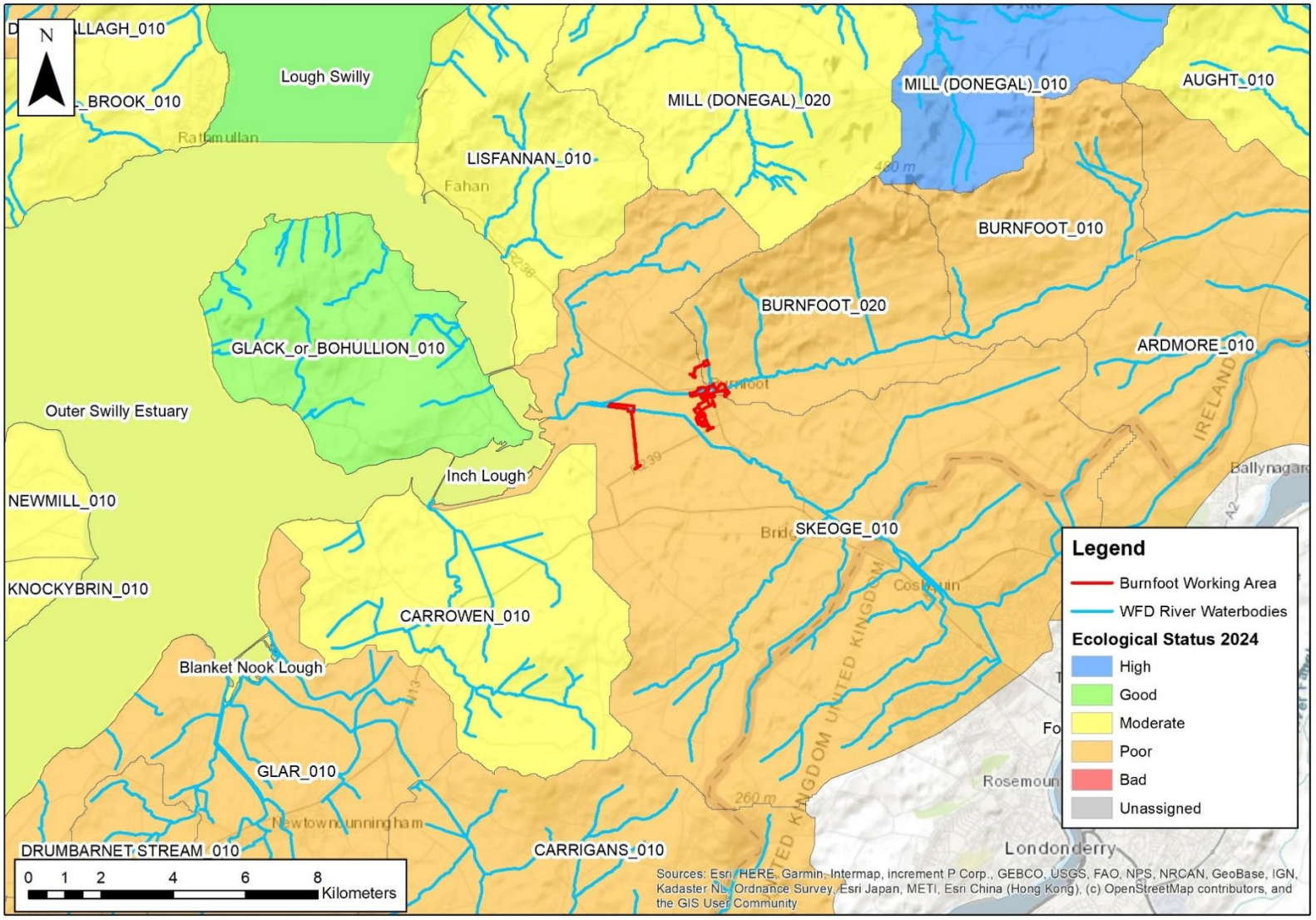

Figure 10.3: Water Framework Directive Water Body Status 2024

The WFD status classification between 2007 and 2024 is shown in Table 10.6 for each of these water bodies. In summary, Burnfoot_010 was classified as “poor” ecological status, while the downstream Burnfoot_020 and Skeoge_010 have been assigned “poor” ecological status. The downstream transitional waterbodies, Inch Lough and the Outer Swilly Estuary have most recently been reported as both “moderate” status, respectively.

Table 10.6: WFD Status (2007-2024)

WFD Status 2007-2021	Burnfoot_010	Burnfoot_020	Skeoge_010	Inch Lough	Outer Swilly Estuary
	NW_39B020200	NW_39B020600	UKGBNI1NW393901002	NW_220_0300	NW_220_0500
Overall WFD Water Quality Status (2007-2009)	Unassigned	Moderate	Poor	Moderate	
Overall WFD Water Quality Status (2010-2012 - Interim)	Poor	Poor	Poor	Poor	
Overall WFD Water Quality Status (2010-2015)	Poor	Moderate	Poor	Poor	
Overall WFD Water Quality Status (2013-2018)	Good	Poor	Poor	Moderate	Unassigned
Overall WFD Water Quality Status (2016-2021)	Moderate	Poor	Poor	Moderate	High
Overall WFD Water Quality Status (2019-2024)	Poor	Poor	Poor	Moderate	Moderate

Table 10.7 details the elements identified in the most recent WFD reporting data which are driving the status of the waterbodies.

There are multiple parameters driving the status for Inch Lough and the Outer Swilly Estuary which are at moderate status, respectively. A further breakdown of the ecological and chemical elements for the 2019-2024 WFD cycles is shown in Table 10.8 and Table 10.9. The Burnfoot_020 is the only river waterbody with further breakdown information available in the most recent WFD monitoring cycle. It is currently classified as “poor” due to invertebrate status. This has remained poor since the 2010-2015 monitoring where it was assigned “moderate” status for invertebrate status.

The assessment of likely significant effects on water quality has been undertaken having regard to the necessity to comply with the WFD and in doing so ensuring that the project does not prevent the achievement of the WFD objectives for these water bodies in subsequent RBMP cycles. Table 10.10 shows the status classification of the Lough Swilly Groundwater body, which has been consistently assigned Good groundwater status since 2007. The Lough Swilly groundwater body is classified as good for both chemical and quantitative status. Therefore, the waterbody is meeting its WFD objectives.

Table 10.7: Most recent available WFD reporting data (2019-2024) iteration

Waterbody Name	Waterbody Code	Waterbody Type	WFD Status	WFD Risk (3rd Cycle)	Status Driver	High Status Objective (Y/N)
Burnfoot_010	IE_NW_39B020200	River	Poor	At Risk	Invertebrate status	N
Burnfoot_020	IE_NW_39B020600	River	Poor	At Risk	Fish status is driving status while invertebrate status is poor. There is no chemical status available	N
Skeoge_010	UKGBNI1NW393901002	River	Poor	At Risk	Invertebrate status	N
Inch Lough	IE_NW_220_0300	Transitional	Moderate	At Risk	Invertebrate status, dissolved oxygen (% Saturation) and nutrient conditions	N
Outer Swilly Estuary	IE_NW_220_0500	Transitional	Moderate	Not At Risk	Other Aquatic Flora Status or Potential	N
Lough Swilly	IEGBNI_NW_G_059	Ground	Good	Not at Risk	-	-

Table 10.8: River water body WFD status breakdown

WFD Status 2019-2024			*Burnfoot_010 NW_39B020200*	*Burnfoot_020 NW_39B020600*	*Skeoge_010 UKGBNI1NW393901002*
Ecological Status	*Biological Status*	*Phytobenthos Status*	*Not available*	*Good*	*Not available*
		Angiosperm (seagrass) Status	*Not available*	*Not available*	*Not available*
		Macroalgae Status	*Not available*	*Not available*	*Not available*
		Invertebrate Status	*Poor*	*Poor*	*Poor*
		Fish Status	*Not available*	*Poor*	*Moderate*
	Supporting Chemistry Conditions	*Oxygenation Conditions*	*Not available*	*Pass*	*Not available*
		Nitrogen Conditions	*Not available*	*High*	*Not available*
		Phosphorus conditions	*Not available*	*High*	*Not available*

WFD Status 2019-2024			Burnfoot_010 NW_39B020200	Burnfoot_020 NW_39B020600	Skeoge_010 UKGBNI1NW393901002
	Hydromorphology	Hydrology, Morphology, Continuity	Not available	Not available	Not available
	Ecological Status (2019 – 2024)		**Poor**	**Poor**	**Poor**
Chemical Status	Specific Pollutant Conditions		Not available	Pass	Not available
	Chemical Status (2019 – 2024)		Not available	Not available	Not available
Overall WFD Quality Status 2019 - 2021			**Poor**	**Poor**	**Poor**

Table 10.9: Transitional water body WFD status breakdown

WFD Status 2019-2024			Inch Lough NW_220_0300	Outer Swilly Estuary NW_220_0500
Ecological Status	Biological Status	Phytoplankton Status	Not available	High
		Angiosperm (seagrass) Status	Not available	Not available
		Invertebrate Status	Moderate	High
		Other Aquatic Flora Status	Good	Moderate
	Supporting Chemistry Conditions	Oxygenation Conditions	Not available	High
		Nutrients Condition	Not available	High
		Phosphorus conditions	Not available	High
	Hydromorphological Quality Element	Hydrology, Morphology, Continuity	Not available	Not available
	Ecological Status (2019 – 2024)		**Moderate**	**Moderate**
Chemical Status	Specific Pollutant Conditions		Not available	Not available
	Chemical Status (2019 – 2024)		Not available	Not available
Overall WFD Quality Status 2019 - 2024			**Moderate**	**Moderate**

Table 10.10: Groundwater body WFD status breakdown

WFD Status 2019-2024			*Lough Swilly*
			IWGBNI_NW_G_059
Overall Groundwater Status	*Quantitative Groundwater Status*	*Saline (or Other) Intrusions Test*	*Good*
		Impact of Groundwater on Surface Water Ecological / Quantitative Status Test	*Good*
		Groundwater Dependent Ecosystems (GWDTE) – Quantitative Assessment Test	*Good*
		Water Balance Test	*Good*
	Chemical Groundwater Status	*Saline (or Other) Intrusions Test*	*Good*
		Impact of Groundwater on Surface Water Ecological / Quantitative Status Test	*Good*
		Groundwater Dependent Ecosystems (GWDTE) – Quantitative Assessment Test	*Good*
		Drinking Water Protected Area Test	*Good*
		General Chemical Assessment Test	*Good*

10.3.2 Protected Areas

A significant proportion of the area of the Lough Swilly catchment is protected under existing EU legislation requiring special protection due to the sensitivity to pollution or particular environmental importance. All of the areas requiring special protection in the Irish River Basin District have been identified by EPA, mapped and listed in a national register of protected areas (required under Article 6 of the WFD Directive). The register of protected areas includes:

- Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas);
- Areas designated for the protection of economically significant aquatic species, i.e., Freshwater Fish and Shellfish;
- Bodies of water designated as recreational waters, including areas designated as bathing waters;
- Nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive or areas designated as sensitive under Urban Waste Water Treatment Directive; as well as
- Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection including relevant Natura 2000 sites (Special Protection Areas (SPAs); and candidate Special Areas of Conservation (cSACs).

These protected areas have their own monitoring and assessment requirements to determine their condition. They are often assessed for additional pollutants or requirements relevant to their designation. Figure 10.4 shows the protected areas in the vicinity of the Proposed Scheme.

10.3.2.1 Nutrient Sensitive Waters

The Urban Waste Water Treatment Regulations 2001, as amended (which transpose the Urban Wastewater Treatment Directive (91/271/EEC) into Irish law and update the Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations 1994, as amended) list nutrient sensitive waters in the Third Schedule. There are no nutrient sensitive areas in the sub catchment.

10.3.2.2 Natura 2000 Protected Areas

Natura 2000 is a European network of important ecological sites. The EU Habitats Directive (92/43/EEC) places an obligation on Member States of the EU to establish the Natura 2000 network. The network is made up of Special Protection Areas (SPAs), established under the EU Birds Directive (79/409/EEC), and cSACs, established under the Habitats Directive itself.

As illustrated in Figure 10.4, the project activities within the Proposed Scheme area are within Natura 2000 sites (i.e., SPA or SAC). The Proposed Scheme may therefore have a direct impact on the Natura 2000 sites. Additionally, there is the potential for water dependent protected areas downstream of the Proposed Scheme to be indirectly affected in the event of water pollution, in the absence of mitigation.

One of the main purposes of the water quality assessment is to ascertain whether the Proposed Scheme will cause significant effects on the ecological status of the water bodies affected having regard to the environmental objectives for the water bodies, including conservation objectives for qualifying features of the downstream Natura 2000 network. It should also be noted that potential effects on Natura 2000 or “European” sites will be considered extensively in the appropriate assessment process and in Chapter 6, Biodiversity - Aquatic and Chapter 7, Biodiversity – Terrestrial.

The Proposed Scheme overlaps the Lough Swilly SPA, while the Lough Swilly SAC lies downstream.

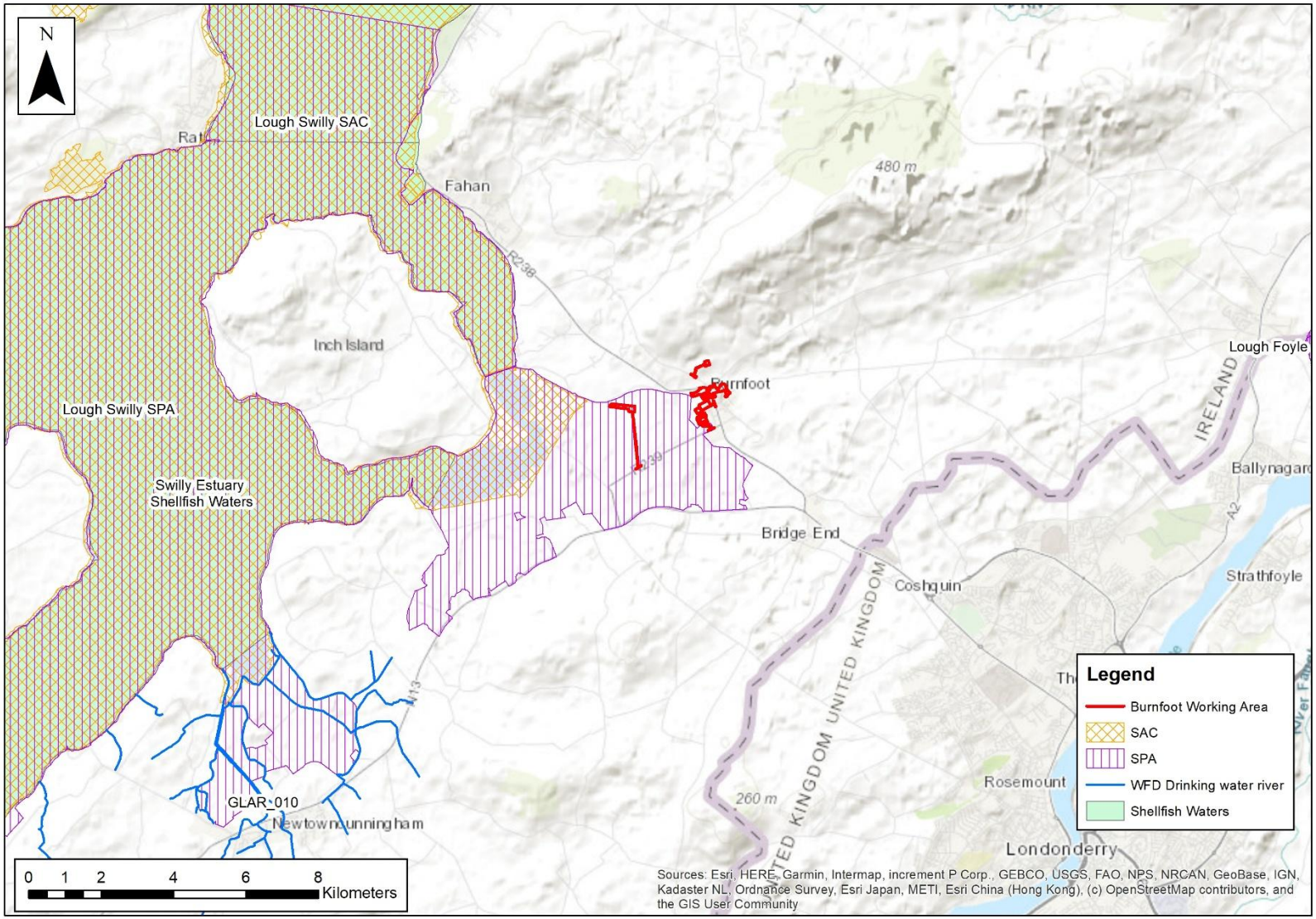

Figure 10.4: Natura 2000 Designated Sites

10.3.2.3 Bathing Waters

The Bathing Water Directive (2006/7/EC) came into force in March 2006, and was transposed into Irish law by the Bathing Water Quality Regulations, 2008, as amended. The previous 1976 Directive was repealed with effect from 31 December 2014. Since 2014, the annual water quality classification (rating) of a beach or lake has been based on water quality results covering a four-year period rather than a single previous season's data. Water quality at beaches and lakes is classified as Excellent; Good, Sufficient or Poor (Table 10.11). This approach is common across all EU Member States and there is a requirement to ensure that bathing waters are of 'Sufficient' standard or better. Any 'Poor' bathing water requires a programme of adequate management measures to be implemented. A minimum of 16 samples are required for formal annual assessment.

Table 10.11: Annual Assessment Criteria for Bathing Waters

Parameter	Excellent	Good	Sufficient
E. coli (Freshwater) cfu/100 ml	500*	1000*	900**
E. coli (Coastal) cfu/100 ml	250*	500*	500**
Intestinal enterococci (freshwater) cfu/100 ml	200*	400*	330**
Intestinal enterococci (Coastal) cfu/100 ml	100*	200*	185**

*based on 95-percentile value **based on 90-percentile value

There are several designated bathing waters in the catchment. The bathing areas downstream are located at Lisfannan, Rathmullan, Lady's Bay, Buncrana and Portsalon Bathing waters are between 7 to 20 km downstream, with Lisfannan the closest. Most recently, both Lisfannan and Rathmullan have been classified as good in 2024; while Portsalon has been classified as Excellent in 2024. Lady's Bay, Buncrana however has deteriorated from Good to Sufficient to Poor during 2019-2021 monitoring periods. From 2022 to 2024 the Lady's Bay bathing waters have remained at Poor quality. It is for this reason that a bathing restriction was put in place in Lady's Bay advising the public not to swim in the location during the 2024 season. An Advice Not to Swim restriction applies to 2025 bathing season at Lady's Bay.

10.3.2.4 Designated Shellfish Waters

The Shellfish Waters Directive (2006/113/EC) is implemented in Ireland by the European Communities (Quality of Shellfish Waters) Regulations 2006 (SI No 268 of 2006).

The Lough Swilly shellfish waters are located within 4km downstream of the Proposed Scheme.

10.3.3 EPA Water Quality in 2023: An Indicators Report

In 2024 the EPA published the Water Quality in 2023, An Indicators Report (EPA, 2024). The intention of the report is to keep decision makers and the public informed by providing timely, scientifically sound information on water quality using a series of water quality indicators. Of the ten indicators four relate to river water bodies located in close proximity to the Proposed Scheme;

- Indicator – River Biological Quality;
- Indicator – Nitrate in Rivers;
- Indicator – Phosphate in Rivers;
- Indicator – Oxygen Demand in Rivers.

In this water quality assessment consideration has been given to potential effects of the Proposed Scheme on these environmental indicators.

10.3.3.1 Indicator – River Biological Quality

The assessment of macroinvertebrates is used to assess the general heath of rivers and general water quality. The health of macroinvertebrate communities is assessed using the Quality Rating System (Q-value). Rivers can then be classed (high/good/moderate/poor/bad ecological status based on these biological elements supporting physico-chemical and hydromorphological conditions) in respect to macroinvertebrate abundance and diversity. The quality is defined by the lowest class recorded. Table 10.8 above details the class recorded for the river water bodies.

10.3.3.2 Indicator – Nitrate in Rivers

Nitrate concentration in rivers is a potential human health concern for drinking water and an indication of nutrient enrichment when present in rivers.

The assessment uses the three-year average of the concentrations from each site and subsequently classes these amongst six different categories in respect to the outcome. Although there are no environmental quality standards set, average concentrations of less than 4mg/l NO_3 (0.9mg/l N) and 8mg/l NO_3 (1.8mg/l N) are considered to be indicative of high and good quality by the EPA, respectively.

The EPA Water Quality in Ireland Report 2019-2024 (EPA, 2025) noted that there has been an increase in the proportion of river sites with increasing nitrate concentration when compared with the 2016-2021 sampling period. This has risen from 43% in 2019-2021, to 44% in 2019-2024 as mentioned above.

Table 10.12 below displays the levels recorded within the river waterbody sections during the most recent monitoring period published, 2021-2025.

The indicator evaluated by the Indicator's Report shows that that 44% of river sites nationally have unsatisfactory nitrate concentrations from 2019-2024. The Border regions have the lowest overall river nitrate concentrations. There has, however, been no change in river nitrate concentrations in all regions over the 12 months from 2022 to 2023.

The EPA Water Quality in Ireland Report 2019-2024 (EPA, 2025) noted that there has been an increase in the proportion of river sites with increasing nitrate concentration when compared with the 2016-2021 sampling period. This has risen from 43% in 2019-2021, to 44% in 2019-2024 as mentioned above.

Table 10.12: Summary of Total Oxidised Nitrogen (as N) mg/l concentrations at the river sections during 2021-2023 and including available data to date for 2025 (Monitoring stations Bridge in Burnfoot, u/s Bridgend WWTW, d/s Bridgend WWTW no 1).

Total Oxidised Nitrogen (as N) mg/l	Burnfoot_020	Skeoge_010
Min	0.23	N/A
Max	2.20	N/A
Mean	0.94	N/A
5%ile	0.48	N/A
95%ile	1.44	N/A

10.3.3.3 Indicator – Phosphate in Rivers

Phosphate is essential for plant growth but excessive levels can be detrimental to river ecological health and lead to eutrophication. The primary sources of phosphate in freshwater systems are sewage/industrial discharges and both diffuse and point sources from agricultural land.

The assessment is undertaken by categorising each site into six different quality classes in respect to concentrations recorded over a three-year average. Environmental quality standards for phosphate levels in Ireland in accordance with the objectives of the WFD have been established. Average concentrations less than 0.025mg/l P and 0.035mg/l P are considered of high and good quality respectively. Mean concentrations above a concentration of 0.035mg/l, which is required to meet good ecological status, are likely to result in nutrient enrichment in the water bodies. The Burnfoot_020 water body is achieving the high status EQS for phosphate based on the mean annual concentrations and the Skeoge_010 water body achieving the good EQS (Table 10.13). However, both water bodies are close to the threshold limits.

The EPA Water Quality in Ireland Report 2016-2021 (EPA, 2022) noted that there has been a decrease in the proportion of river sites with increasing phosphorus concentration when compared with the 2013-2018 sampling period. The EPA Water Quality in Ireland 2019-2024 Report (EPA, 2025) noted 72% of monitored river sites are either high or good quality for phosphorus nutrient condition. This represents an almost 2.5% improvement over 2019-2021 period and almost 10% since 2016 to 2018 period.

Table 10.13: Summary of Orthophosphate (as P) mg/l concentrations during 2021-2023 and including available data to date for 2025 (Monitoring stations Bridge in Burnfoot, u/s Burnfoot WWTW, d/s Burnfoot WWTW u/s Bridgend WWTS, d/s Bridgend WWTW no 1).

Orthophosphate (as P) mg/l	Burnfoot_020	Skeoge_010
Min	0.005	0.020
Max	0.090	0.210
Mean	0.027	0.030
5%ile	0.01	0.025
95%ile	0.068	0.042

10.3.3.4 Indicator – Oxygen Demand in Rivers

Excessive biodegradable organic matter will result in excessive micro-organism growth, a depletion in dissolved oxygen in the water and thus negative effects on the macroinvertebrate communities or possible fish kills. Wastewater treatment plants and agricultural land are a potential source of organic matter to waterbodies. The amount of oxygen used by the microorganisms during the break down of the organic matter is called the Biochemical Oxygen Demand (BOD). High levels of BOD values give an indication of organic pollution within a waterbody.

Nationally from the 2022-2024 average concentrations suggest 82% of sites monitored were meeting the good status threshold pf 1.5 mg/O_2 a drop of over 4% compared with period 2019-2021. 18% of river sites have unsatisfactory BOD levels in 2022-2024..

The assessment is undertaken by categorising each site into six different quality classes in respect to concentrations recorded over a three-year average. Environmental quality standards for BOD levels in Ireland in accordance with the objectives of the WFD have been established. Average concentrations less than 1.3 mg O_2/l and 1.5mg O_2/l are considered of high and good quality respectively. Mean concentrations above a concentration of 1.5 mg O_2/l, which is required to meet good ecological status, are likely to result in organic enrichment. The Burnfoot_020 section is achieving the EQS for high quality for BOD based on the mean annual concentrations, while the Skeoge_010 is achieving the required standard for good quality (Table 10.14).

Table 10.14: Summary of BOD (as O_2) (mg/l) concentrations at the river sections during 2021-2023 and including available data to date for 2024 (Monitoring stations Bridge in Burnfoot, u/s Burnfoot WWTW, d/s Burnfoot WWTW u/s Bridgend WWTW, d/s Bridgend WWTW no 1).

BOD (as O2) mg/l	Burnfoot_020	Skeoge_010
Min	0.5	0.5
Max	5.6	6.0
Mean	1.45	1.49
5%ile	0.5	1.0
95%ile	4.55	3.0

10.3.4 Site Characterisation

The Pollutant Impact Potential (PIP) mapping produced by the EPA ranks areas within river water bodies from 1 (highest) to 7 (lowest) in respect to the potential impact from pollutants. In terms of PIP, the study area was rated a PIP category of 6/7 for nitrate pollution to groundwater and surface waters. However, the PIP for phosphate to surface waters the site is ranked 2 predominantly (second highest).

This characterisation establishes that the main pathway for nutrient enrichment in the catchment is via overland flows carrying phosphate to surface waters

10.3.5 Summary of Existing Water Quality

A review of available national monitoring information for the water bodies in the immediate vicinity of the Proposed Scheme has concluded:

The overall WFD Surface Water Quality status between 2019-2024 is:

- Burnfoot_010 – Poor Status
- Burnfoot_020 – Poor Status
- Skeoge_010 – Poor Status
- Inch Lough – Moderate Status
- Outer Lough Swilly – Moderate Status
- Lough Swilly groundwater body – Good Status
- Downstream of the Proposed Scheme area, there are a number of protected areas under Article 6 of the WFD Directive, i.e., Natura 2000 sites and bathing waters;
- Nutrient levels in the receiving water bodies are the main driver for the unsatisfactory water quality;
- The ground conditions at the site mean that the main pathway for contamination is via surface water pathways which are particularly important for phosphate export which is the key limiting nutrient in freshwater.

10.4 Impact Assessment

A review of the baseline data suggests that the groundwater underlying the site is at good chemical and quantitative status. Of the remaining waterbodies, each are not meeting its objectives by achieving high ecological status. Outer Swilly Estuary, Burnfoot_010, Burnfoot_020, Skeoge_010 and Inch Lough are currently not meeting their WFD objectives. In terms of the risk assessment for the achievement of the water body objectives undertaken by the EPA all river water bodies and the transitional waterbody are considered ‘At Risk’ of failing to achieve their environmental objectives. The WFD environmental objectives require that there should be no deterioration in the status of a water body, i.e., the status of the respective river and transitional water bodies, and the Lough Swilly groundwater body must not be compromised and as such the Proposed Scheme must not cause deterioration in status. It is also an objective of the WFD to ensure that water bodies achieve at least ‘good’ status so it will be necessary to demonstrate that the Proposed Scheme will not cause any impediments to the attainment of good status in all the surface waters that are currently at less than ‘good’ status.

Therefore, as part of the impact assessment, it will be necessary to identify the key parameters contributing to the ecological and chemical status of the water bodies affected to ensure that the Proposed Scheme is not likely to cause a significant impact on water quality that could compromise the environmental objectives under the WFD. Given the nature of the Proposed Scheme there will be potential for the modification of the physical characteristics of the water bodies which could impact on the hydromorphological conditions supporting ecological status. An assessment of the potential for hydromorphological changes has been undertaken to ensure that the impact from the Proposed Scheme does not significantly impact on the ecological status of the affected water bodies. Appropriate mitigation has been recommended where potential risk of impact is identified.

The proposal has the potential to affect the downstream protected sites by noise (and vibration), sedimentation and pollution risk. Birds within the Lough Swilly SPA could be at risk of disturbance from the proposed works.

The impact assessment below adopts the source-pathway-receptor framework and therefore considers hydraulic connectivity and potential water quality impact on any other water bodies and designated sites located within this area. This includes the protected area sites.

To determine the impact of the Proposed Scheme upon water quality, a consultation process has been undertaken involving all competent authorities and their existing data. Consultation for the surface water impact assessment has been undertaken with the following organisations:

- Environmental Protection Agency;
- Water Policy Advisory Committee (Department of Environment, Community and Local Government);
- The National Parks and Wildlife Service;
- The Office of Public Works;
- Water Service Departments of the County Councils in the study area,
- Irish Water; and
- Inland Fisheries Ireland.

The Proposed Scheme has the potential to directly impact upon the Burnfoot_020 and Skeoge_010 water bodies given the location of the works. The potential to indirectly impact upon sensitive areas further downstream has also been considered.

The significance of any environmental effect is rated based on the magnitude of the impact and the importance of the attribute. Based on these criteria, the receiving environment is considered to be of high importance due to the fact that the water bodies are within the Lough Swilly catchment and provide a hydrological link to the important downstream protected areas, particularly the Natura 2000 sites.

10.4.1 Construction Phase

Based on the nature of the components of works proposed, temporary impacts on water quality have the potential to occur during the construction phase of the works. The following have been considered in this assessment:

Increased suspended sediment levels due to the accidental release of sediment to the water column during:

- Instream works associated with the construction of culverts, temporary and new bridge structures;
- Construction of flood defence structures;
- Earthworks associated with embankment construction;

Suspended sediment, including all soils, sands and rubble is the single main pollutant to the aquatic environment generated at construction sites and largely arises from the erosion of exposed soils and sediments by surface water runoff. Both temporary and permanent impacts on surface waters may occur during construction. Pollution from mobilised suspended solids (silt) is the prime concern. Suspended sediment due to run off from stripped construction areas, stockpiled earth and the dewatering of excavations can have a severe negative impact on water quality. Once suspended

sediment load enters a river it can result in long-term changes that cause chronic harm. Sediment can cause river hydromorphological changes, which in turn change the dynamics of the river in the future and can negatively impact on the supporting hydromorphological conditions and ecological status resulting in an increased risk to the environmental objectives of a water body.

Accidental release of highly alkaline contaminants from concrete and cement during the construction of structures, etc. The construction works associated with the Proposed Scheme will involve the use of cement and concrete for construction of structures. During the construction phases, there is the potential for impact on the water quality and a toxic effect on the biological elements resulting in a possible further deterioration in the ecological status or compromise the improvement in ecological status through the implementation of the programme of measures included in the River Basin Management Plan; and

General construction activities associated with works machinery, infrastructure and on-land operations including the temporary storage of construction materials, oils, fuels and chemicals have also the potential to impact on water quality.

10.4.2 Operational Phase

The key issues surrounding the operational phase relating to water quality are include impact from the maintenance of the embankments, structures and culverts and the possible changes to the hydromorphological supporting conditions of the Burnfoot_020 and Skeoge_010 river water bodies which have the potential to negatively affect water quality or the biodiversity of the waters thus potentially impacting the WFD objectives of the waterbodies. As detailed in previous sections, it is imperative that the objectives of the WFD and the protected areas objectives are not impacted by the Proposed Scheme.

10.5 Description and Significance of Impacts

10.5.1 Construction Phase Impacts

10.5.1.1 Sediment Loading

The works associated with the Proposed Scheme involve extensive earth works throughout with the construction of embankments around properties and the wastewater treatment package plant with associated landscaping. Suspended sediment, including all soils, sands and rubble is the single main pollutant to the aquatic environment generated at construction sites and largely arises from the erosion of exposed soils and sediments by surface water runoff. Both temporary and permanent impacts on surface waters may occur during construction. Pollution from mobilised suspended solids (silt) is the prime concern. Suspended sediment due to run off from stripped construction areas, stockpiled earth and the dewatering of excavations can have a severe negative impact on water quality. This is particularly true in sloping areas with underlying clay following topsoil stripping. In areas of moderate to high rainfall, the potential problems are clearly exacerbated. If allowed to enter surface watercourses this run off can give rise to high suspended solids and detrimental impacts, in particular to fisheries and

aquatic invertebrates which can impact the ecological status of a water body. Suspended solids may have an effect on:

- Sediment movement through rivers and its settlement onto the river bed causing formerly clean gravels to become clogged with fine sediment;
- The survival of fish eggs in gravel beds or spawning grounds as a result of deoxygenation caused by silt deposition;
- The survival of plants and algae by smothering;
- The survival of young fish and aquatic invertebrates such as mayfly larvae (Calopteryz sp.) through gill damage from sediment particles and;
- Amenity value through impaired visual appearance.

Once suspended sediment load enters a river it can result in long-term changes that cause chronic harm. Sediment can cause river hydromorphological changes, which in turn change the dynamics of the river in the future and can negatively impact on the supporting hydromorphological conditions of the water bodies ecological status resulting in an increased risk of deterioration in status.

Both bed and suspended materials, and subsequent changes in channel form associated with changes in sediment supply, may affect benthic invertebrates in many ways at various stages in their life cycle. The direct kill is only the first stage in the damage that silt causes to a benthic invertebrate population. Sediment that infiltrates the river bed decreases oxygen supply in interstitial areas, and destroys habitat for juvenile stages of the many benthic invertebrate life cycles. This can impact on the ecological status of a water body by changing the nature of the invertebrate community to more tolerant species that would not be indicative of the reference conditions expected for an Irish water body typology.

The sediment subsequently provides a medium for macrophyte growth. Macrophytes can smother the river substrate and habitat further. It can trap more sediment which exacerbates the problem in the long term. Silt infiltration of river bed gravels can also have a negative effect on fish species which can further impact on the biological elements of the WFD ecological status classification and could prevent the achievement of the environmental objectives for the water body.

Given the scale and nature of the works, the magnitude of the impact associated with sediment loading is considered to be Large Adverse. The significance of the environmental effect is therefore Significant in the absence of mitigation based on the high sensitivity of the receiving environment.

10.5.1.2 Concrete and Cement Pollution

The construction works associated with the Proposed Scheme will include concrete structures. During the construction phase, there is the potential for accidental spillage of cement materials or during the setting of concrete which could have a significant adverse impact on water quality and a toxic effect on the biological elements resulting in a possible further deterioration in the ecological status or compromise the improvement in ecological status through the implementation of the programme of measures included in the River Basin Management Plan.

Given the scale and nature of the works, the magnitude of the impact associated with concrete and cement pollution is considered to be Large Adverse. The significance of the environmental effect is

therefore Significant in the absence of mitigation based on the high sensitivity of the receiving environment.

10.5.1.3 General Construction Works

The construction works will involve the use of plant and machinery, as well as the associated temporary storage of construction materials, oils, fuels and chemicals. During the construction phase, there is the potential for accidental spillage or release of construction materials (e.g. diesel, oil, chemicals) which could have a significant adverse impact on water quality and a toxic effect on the biological elements resulting in a possible further deterioration in the ecological status or compromise the improvement in ecological status through the implementation of the programme of measures included in the River Basin Management Plan.

The construction works requires in stream works during the construction of both the temporary and new bridge crossings over the Burnfoot river and Carnashannagh culvert upgrades. Guidelines for fisheries protection during construction works, published by Inland Fisheries Ireland (Inland Fisheries Ireland, 2016), recommends that any in-stream river works should be avoided during the main salmonid spawning season and egg incubation phases, 1 October – 30 April.

Additionally, there is potential for the spreading of invasive species during the construction phase if mitigation measures are not adhered to.

Given the scale and nature of the works, the magnitude of the impact associated with general construction is considered to be Large Adverse. The significance of the environmental effect is therefore Significant in the absence of mitigation based on the high sensitivity of the receiving environment.

10.5.2 Operational Phase Impacts

There is potential water quality impacts associated with the operational phase of the Proposed Scheme which can be exacerbated due to poor design and implementation of these measures. There is potential direct impacts to the Burnfoot_020 and Skeoge_010 water bodies that could result in significant changes to the hydromorphological regime. It is therefore imperative to ensure that mitigation proposed during the operational phase of the Proposed Scheme in relation to hydromorphological impacts are adhered to. Furthermore, future maintenance of the proposed structures may give rise to potential water quality issues.

10.5.2.1 Maintenance

Upon completion of the construction of the Proposed Scheme, little will be required in terms of maintenance. Any impact from such maintenance works associated with this new proposal can be considered negligible.

Given the small scale of the Proposed Scheme, the magnitude of the impact is considered to be Imperceptible. The water bodies are considered to be of high importance and based on the rating of the environmental impact presented in Table 10.4 the impact remains as potentially Imperceptible in the absence of mitigation.

10.5.2.2 Hydromorphological changes

The presence of physical alterations within a waterbody has the potential to impact on the hydromorphology of the waterbody. Therefore, should the inclusion of the flood defence structures within the water bodies impact negatively on the hydromorphology, the water bodies may potential be at risk of deterioration and unable to achieve their WFD objectives. Structures may lead to increases or decreases in sediment disposition, currents and/or water flow patterns within the waterbodies.

To determine the impact the Proposed Scheme will have on the waterbodies during the operational phase, WFD assessment was undertaken. The assessment is a staged process where data on the study area and work proposals are assessed with respect to the requirements of the WFD to ascertain if the proposals will or will not have a detrimental impact on the status of water bodies that have the potential to be impacted by the proposed works.

The WFD Assessment included in Appendix 10.1 has considered the potential impacts on the hydromorphological supporting conditions and concluded that for the Skeoge_010 (which is a proposed Heavily Modified Water Body, HMWB) and the Burnfoot_020 river water body the potential impact is large adverse and therefore there are potential significant environmental effects based on the high sensitivity of the receiving environment.

10.5.2.3 Flood Protection

It is proposed to protect the wastewater treatment package plant that serves the Grianan Park housing estate with embankments. This scheme component will prevent the potential interaction of wastewater and surface waters especially during flood events. This will have an overall significant beneficial impact in terms of protection of wastewater infrastructure from flooding and will have negligible effect upon water quality.

10.5.3 Impact Matrix (Absence of Mitigation)

The potential impacts outlined in Sections 10.5.1 and 10.5.2 above are rated based on the impact level criteria in Section 10.2 to indicate their potential severity (profound, significant, moderate, slight and imperceptible) in the absence of any mitigation. The assessment reflects the activities and pollutants listed above and the different considerations for construction and operational phases of the project.

Table 10.15: Potential Impact Rating Matrix (in the absence of mitigation)

	Significance of Environmental Impact
CONSTRUCTION PHASE	
Suspended sediments / sedimentation	Significant
Concrete and cement pollution	Significant
Impacts associated with general construction works	Significant
OPERATIONAL PHASE	
Maintenance	Imperceptible

Significance of Environmental Impact	
Hydromorphological changes	Significant
Flood protection	Imperceptible

10.6 Interactions

The impact assessment also considers the inter-relationship of impacts on individual receptors. Inter-relationships are considered to be the impacts and associated effects of different aspects of the proposal on the same receptor.

The inter-relationship between Soils Geology and Hydrogeology, Air Quality and Climate and Risk of Major Accidents and Disasters and the potential for impact on water quality has been assessed. Given the proposed mitigation will be successfully implemented, there is unlikely to be any significant inter-related impact to water quality.

10.7 Mitigation

In the absence of mitigation, the construction of some elements of the project has the potential to have **Large Adverse** impacts on the high sensitivity receiving environment and therefore a potentially significant environmental effect.

Similarly, with no mitigation the project has the potential to have **Large Adverse** impacts on the impacts on the high sensitivity receiving environment and therefore a potentially significant environmental effect.

With these considerations in mind, the risk to water quality posed by this project during construction and operation will be dependent on the good practice construction measures to ensure contaminants do not enter the watercourse and design consideration that ensures limited hydromorphological impacts occur within the water bodies. Therefore, it is pertinent to ensure that procedures are put in place for the control and minimisation of surface water and suspended solids movement, it is also important that measures are taken to ensure existing drainage pathways are kept free from construction sediment and pollutants through the use of effective barriers to pollutant export and best practice techniques to control these pressures at source. The use of concrete and cement adjacent to and within water bodies requires careful placement is dry conditions to ensure the construction of the structures do not adversely impact on water quality and the ecological and chemical status of the water bodies affected. Section 10.7.1 and Section 10.7.2 details the mitigation measure that will be employed on site during the project construction and operational phases.

10.7.1 Construction Phase Mitigation Measures

10.7.1.1 Construction Phase Best Practice Measures

Mitigation measures will be implemented by the contractors who will construct the Proposed Scheme in accordance with the requirements listed within the draft CEMP which will be submitted as part of the planning applications for the Proposed Scheme. Furthermore, once appointed, the contractors will

submit a detailed CEMP based on the requirements of these submitted planning documents for approval by the Planning Authority. The draft CEMP as submitted with the EIAR as an Appendix (Appendix 5.1) will inform the final contractor's CEMP. The mitigation measures implemented by the contractor will refer to the construction management procedures for best practice regarding the following recognised international guidelines:

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, 2001);
- Control of Water Pollution from construction sites, Guidance for consultants and contractors (C532);
- Environmental Good Practice on Site (3rd edition) (C692); and
- Guidelines on Protection of Fisheries During Construction Works and Adjacent to Waters (2016).

10.7.1.2 Suspended Sediment and Sedimentation

Preventing run-off is an effective method of preventing sediment pollution in the water environment. Therefore, adoption of appropriate erosion and sediment controls to manage run-off during construction is essential to prevent sediment pollution.

Mitigation measures to address the potential impact from suspended solids will be carried out in accordance with a site-specific CEMP. The measures will be employed prior to the commencement and during construction and will include such measures as:

- Drainage and measures to control run-off will be employed to manage sediments prior to any works to be undertaken at the site, i.e., arrangements for the treatment of dirty groundwater ingress from any excavations will be in place in advance of the dewatering to ensure it can be adequately managed on site;
- The site shall be surveyed to identify all existing drainage features and waterbodies.
- Silt fencing will be installed around the perimeter of the site. The location of the silt fencing will be determined in the construction stage CEMP and will be subject to a detailed assessment of the area or phase to be developed. The purpose of the silt fencing is to prevent silt laden water leaving the site and entering neighbouring land with the potential to impact nearby watercourses.
- Emergency contact numbers for the Local Authority Environmental Section, Inland Fisheries Ireland (IFI), the Environmental Protection Agency (EPA) and the National Parks and Wildlife Service (NPWS) will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident;
- Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same;
- The site manager will be responsible for the implementation of these measures. They will be inspected on at least a daily basis for the duration of the works, and a record of these inspections will be maintained;
- Any temporary storage of soil, hardcore, crushed concrete or similar material will be stored as far as possible from any surface water drains.
- There will also be a requirement to periodically pump water from excavations. All collected and pumped water will have to be treated prior to discharge. There can be no direct pumping of silty water from the works directly to any watercourse. All water from excavations must be treated by

infiltration over lands, where suitable areas can be identified, or via appropriately sized settlement areas or silt busters;

- There is a possibility that more severe flooding could occur during the construction period, emergency measures are therefore required. The following control measures will be required:
  - Silt fencing shall be placed above the 10-year flood level, and where that is not possible at the highest level possible within the site. Trapped silt shall be removed from silt fencing at regular intervals;
  - Settlement ponds shall be placed above the 10-year flood level;
  - Met Éireann provide a weather warnings alert service which is available on the Met Éireann app or through its website https://www.met.ie/. These warnings can be used during construction to manage the risk of flooding to the works from extreme events.
  - Stockpiles of soil shall be kept out of the 10-year flood plain. This will not be possible at the northern extent of the site; additional measures will be incorporated at this location including the covering of the stockpiles and the use of silt fencing around the perimeter of any stockpiles.
- Earthworks shall be exposed for the minimum time possible. Earthworks formations shall be protected by a layer of imported granular left fill.
- Landscaping and seeding of the perimeter embankments and retaining structures shall be carried out as early as possible.
- The establishment of a stable working platform from which the piling rig can operate for the sheet pile to the rear of Líos Na Greíne and Páirc an Ghrianán and also on the left (southern) bank downstream of the Burnfoot Bridge will be required. This can be located on top of the bank; however, a working platform may need to be created partially within the Burnfoot River. It is only downstream of the Burnfoot bridge that a working platform will be required.. Any working platform will be constructed from clean stone to minimise sediment. It may be necessary to provide pipes located within the clean stone to help convey river flows.
- An Emergency Response plan (ERP) shall be developed for the site to mitigate against stockpiles or exposed earth that are at risk from flood waters.
- Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:
- Vehicles delivering material with potential for dust emissions to an off-site location shall be enclosed or covered at all times to restrict the escape of dust;
- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only;
- A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate;
- Road sweepers will be employed to clean the site access route as required;
- All ground disturbance works will be archaeologically moinitored as stated in Chapter 15 Cultural Heritage.

The incorporation of these mitigation and monitoring measures during the construction phase means the potential impact to receiving water environment will be reduced to negligible thus reducing the significance of the environmental effect to imperceptible, based on the extremely high sensitivity of the receiving environment.

10.7.1.3 Concrete and Cement Pollution

The impacts in relation to cement and concrete for the Proposed Scheme are, for the most part (but not limited to) the installation of the concrete structures (to be poured in-situ).

The use of concrete in close proximity to water bodies requires a great deal of care. Fresh concrete and cement are very alkaline and corrosive and can cause serious pollution in water bodies. It is essential to ensure that the use of wet concrete and cement in or close to any water course is carefully controlled so as to minimise the risk of any material entering the water, particularly from shuttered structures or the washing of equipment. The following measures will be undertaken to mitigate against possible pollution:

- On completion of the pile driving process for the sheet piled walls, excavation around the top of the pile will be undertaken to facilitate the construction of a capping beam. A blinding layer of site concrete will be formed, capping beam reinforcement will be tied and the erection of formwork and pouring of in-situ concrete, with the careful placement of concrete to ensure containment within the formwork, will bring the flood wall up to existing ground level with starter bars protruding to extend into the cantilevered, above-ground, wall.
- The steel reinforcement for the above-ground concrete wall can then be fixed, shuttering work erected, and in-situ concrete poured again with careful placement to ensure full containment of concrete within the shuttering.
- The walls can either be a patterned concrete finish, formed by fixing a mould to the inside of the shuttering or stone-faced once the wall has cured.
- A pre-cast concrete coping will be fixed to the top of the wall rather than poured insitu.
- The reinforced concrete walls required immediately upstream of the bridge to connect the earth embankments and the bridge parapets will also be subject to insitu concrete pours using the same controls as the for the sheet piled walls;
- The Carnashannagh is a small watercourse and therefore it is likely that the culvert replacement works will be undertaken during a dry period to ensure low flows. This will facilitate the temporary damming of the river and diversion of the flow via temporary pipes over a short section where work is being undertaken and will ensure the use of concrete in the blinding and construction of the headwalls will be undertaken in dry conditions.
- Construction of the new inlet and outlet structures at Monreagh Park on the Carnashannagh Stream will follow a similar methodology to the upstream Carnashannagh Stream culvert, with damming of the stream and over-pumping to ensure the works remain dry for the placement of the concrete base for the new headwalls.
- Plant operating close to water shall be given special consideration in relation to the transport of concrete from the point of discharge from the truck-mixer to final discharge into the delivery pipe (tremie). Care should be exercised when slewing concrete skips or mobile concrete pump booms over open water.
- A concrete washdown area will be provided on site for trucks to use after delivery of concrete or on return to the batching plant. This area will be adequately bunded to mitigate the risk of contaminated runoff discharge to the water bodies. Concrete trucks are to be washed down within the concrete truck washdown area after delivery of concrete, prior to exiting the site. Washdown runoff will be appropriately treated prior to discharge;
- Wash-out areas on site will be properly designed with an impermeable line to contain all cement laden water. No wash-out of ready-mix concrete vehicles shall be located within 10 metres of any temporary or permanent drainage features. Signage shall be erected to clearly identify the wash-

out areas. Sufficient wash-out areas shall be provided to cater for all vehicles at peak delivery times;

- On-site batching of concrete is not envisaged, but ready to use mortar silos are often used. These systems involve the delivery and storage of dry cement and aggregates in silos, water is added at the point of delivery to make mortar or plaster. The following controls shall be put in place for the on-site batching of concrete, mortar and render:
    - The plant shall be maintained in good condition.
    - Delivery of cement shall be means of a sealed system to prevent escape of cement.
    - The plant shall be situated on a paved area at least 20m from any temporary or permanent drainage features.
    - Emergency procedures shall be in place to deal with accidental spillages of cement or mortar.

In circumstances where the mitigation measures are employed during construction operations, the potential impact to receiving water environment will be reduced to negligible thus reducing the significance of environmental effect to imperceptible.

10.7.1.4 General Construction Works

The risk of water quality impacts associated with works machinery, infrastructure and on-land operations (for example leakages/spillages of fuels, oils, other chemicals and waste water) will be controlled through good site management and the adherence to codes and practices which limit the risk to within acceptable levels. The following measures will be implemented during construction:

- A detailed works specific CEMP will be prepared during the planning submission and will be developed and implemented by the contractor and will include detail in respect of every aspect of the works in order to minimise potential impacts and maximise potential benefits associated with the works;
- Management and auditing procedures, including tool box talks to personnel, will be put in place to ensure that any works which have the potential to impact on the aquatic environment are being carried out in accordance with the contactors environmental controls, which will be consistent with an approved CEMP and any planning conditions;
- Existing surface water drainage and discharge points will be mapped on the Drainage layout. These will be noted on construction site plans and protected accordingly to ensure water bodies are not impacted from sediment and other pollutants using measures to intercept the pathway for such pollutants;
- Welfare facilities (canteens, toilets etc.) will be available within the construction compound and this will remain in place for the construction of the Proposed Scheme. The offices and site amenities will be required to have their own foul water collection.

The use of oils and chemicals on-site requires significant care and attention. The following procedures will be followed to reduce the potential risk from oils and chemicals:

- New metal gerry cans with proper pouring nozzles will be used to move fuel around the site for the purposes of refuelling items of small plant on site. Metal gerry cans and any other items of fuel containers will be stored in certified metal bunded cabinets.

- Drip trays will be used under items of small plant at all times. Any waste oils etc. contained in the drip trays or the bunded area will be emptied into a waste oil drum, which will be stored within the bund.
- Any gas bottles will be stored in a caged area at a secure location on the site. All will be properly secured at point of work.
- No bulk chemicals will be stored within the active construction areas. Temporary oil and fuel storage tanks may be kept in the material storage area in suitable containers and will be stored on appropriately bunded spill pallets as required. Any fuel and oil stored onsite shall be stored on bunded spill pallets approved under BS EN 1992-3:2006). All bunds will be impermeable and capable of retaining a volume of equal to or greater than 1.1 times (>10%) capacity of the containers stored on them. In the event of a filling spillage excess oil or fuel will be collected in the bund;
- Refuelling of vehicles and the addition of hydraulic oils or lubricants to vehicles will be undertaken offsite where possible. Where this is not possible, filling and maintenance will take place in a designated material storage compound, which is located at least 10 metres from any temporary or permanent drainage features. Spill protection equipment such as absorbent mats, socks and sand will be available to be used in the event of an accidental release. Training will be given to appropriate site workers in how to manage a spill event. A certified double skinned metal fuel tank will be situated in this secure bunded area on the construction site if applicable. This tank will be certified for lifting when full.
- Spill protection equipment such as absorbent mats, socks and sand will be available to be used in the event of an accidental release during refuelling. Training will be given to appropriate site workers in how to manage a spill event. A hazardous bin will also be available to contain any spent sand or soak pads.
- Contingency Planning: A project specific Pollution Incident Response Plan will be prepared by the contractor and will refer to PPG 21 Pollution Incident Response Planning. The contractor's Environmental Manager will be notified in a timely manner of all incidents where there has been a breach in agreed environmental management procedures. Suitable training will be provided by the contractor to relevant personnel detailed within the Pollution Incident Response Plan to ensure that appropriate and timely actions is taken.

The following mitigation measures will be taken at the construction site in order to prevent any spillages to ground of fuels during machinery activities and prevent any resulting soil and/or groundwater quality impacts:

- Refuelling will be undertaken off site where possible;
- Where mobile fuel bowsers are used the following measures will be taken:
    - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
    - The pump or valve will be fitted with a lock and will be secured when not in use;
    - All bowsers to carry a spill kit and operatives must have spill response training; and
    - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

Avoidance of in-stream works between 1st October and 30th April will provide some mitigation. Where there is a need to install temporary culvert to enable site access over watercourses, or for the installation of more permanent culverts and bridges, the design and siting within the channel should follow the UK's CIRIA guidelines for maintaining passage at culverts (see Balkham et al. 2010) and IFI guidance for

fisheries protection during development works (IFI, 2016); the following key points are relevant to maintaining fish passage;

- The avoidance of a significant drop in water level at the inlet or outlet;
- Provision of adequate flow depth for fish passage
- Provision of a natural bed
- The avoidance of a local increase in flow velocities

Therefore, any temporary structure should be installed so that gradient, water depth and flow velocities are as similar as possible to the original channel, as agreed with the relevant fisheries jurisdiction (i.e. IFI).

Provided these mitigation measures are employed during construction operations, the potential impact to receiving water environment will be reduced to negligible thus reducing the significance of environmental effect will be reduced to imperceptible.

10.7.2 Operational Phase Mitigation Measures

The operational phase impacts associated with the project represent general water quality issues associated with maintenance and hydromorphological impacts. It is therefore imperative that hydromorphological impacts do not prevent the water bodies from achieving their WFD objectives. Additionally, consideration must be taken to ensure that mitigation proposed during the operational phase of the Proposed Scheme in relation to maintenance is adhered to.

10.7.2.1 Maintenance

Upon completion of the construction of the Proposed Scheme, little will be required in terms of maintenance. Any impact from such maintenance works associated with this new proposal can be considered negligible/imperceptible.

As the potential impact from maintenance is considered negligible, no further mitigation is proposed.

10.7.2.2 Hydromorphological Changes

The overall conclusion of the WFD Assessment, based on the baseline information, the relevant impact assessments and mitigation strategies proposed, is that there will be no risk of deterioration in the existing status of the Burnfoot_020, Skeoge_010 and Inch Lough water bodies.

Therefore, the Proposed Scheme will not result in an overall deterioration in the ecological status at the water bodies status, i.e. the structures would not pose a risk to the supporting hydromorphological supporting conditions of the waterbody causing a risk of a deterioration in ecological status. Additional detail of the assessment is included in Volume III Appendix 10.1.

Given the localised nature and small absolute magnitude of any predicted changes in velocity, it is unlikely that there will be any significant change in net scouring or deposition of sediments within the water bodies. The risk of impact is determined to be negligible and no mitigation is required. The

Proposed Scheme is therefore not expected to have a significant effect on river processes or make a significant change to the existing morphology.

10.7.3 Residual Impacts

Where the appropriate mitigation measures are fully implemented during the construction and operational phases of the Proposed Scheme as outlined in the previous section, the impact of the project on the water quality in the area will be imperceptible as indicated in Table 10.16.

Accordingly, the Proposed Scheme will not have a significant effect on the water quality of the receiving waters.

It can therefore be concluded that the proposed works are compliant with the requirements and environmental objectives of the EU Water Framework Directive and the other relevant water quality objectives for these water bodies.

Table 10.16: Residual Impacts (with mitigation)

Significance of Environmental Impact	
CONSTRUCTION PHASE	
Suspended sediments / sedimentation	Imperceptible
Concrete and cement pollution	Imperceptible
Impacts associated with general construction works	Imperceptible
OPERATIONAL PHASE	
Maintenance	Imperceptible
Hydromorphology	Imperceptible

10.8 Future Monitoring

10.8.1 Construction Phase

The CEMP includes emergency response procedures to mitigate against contamination to water systems, in particular in relation to oil spillage, uncontrolled silt discharge and sewage spill. The CEMP will also have procedures for monitoring the performance and effectiveness of mitigation measures employed during construction to ensure they are operating as intended and are providing the necessary protection to the receiving environment.

Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items, and that all storage is located at least 10m from surface water receptors. A regular log of inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not reoccur.

10.8.2 Operational Phase

During the operational phase of the works, it is not anticipated that monitoring will be required other than that necessary for the ongoing maintenance of the FRS.

10.9 Summary of Effects & Conclusion

The key issues in relation to water quality throughout the construction phase is associated with the physical disturbance in the aquatic environment in respect to instream works during the culvert, bridge and temporary bridge construction. These works have the potential to impact the waterbodies through increased sedimentation, concrete/cement pollution and thus impact on the sensitive receptors within the water bodies. Additional pressures with regards to the potential for oil/ fuel spillages both during the construction and operation phases of the Proposed Scheme have been assessed. The use of oils and chemicals on-site requires significant care and attention and will adhere to the requirements of the Water Environment (Controlled Activities) (Scotland) Regulations 2011 and GPP2, Above Ground Oil Storage.

There are no key issues in relation to the water environment throughout the operational phase of the Proposed Scheme as the WSIA has confirmed that the Proposed Scheme will not cause a deterioration in the WFD status of the water bodies concerned.

The Proposed Scheme is therefore not expected to have a significant effect on water quality or the ability of the waterbody to continue to achieve its WFD objectives

10.10 Limitations to the Assessment

The assessment currently assumes that the high standard of construction phase mitigation will ensure that potential impact will be reduced to negligible /minor.

Based on this assumption there are no other limitations that would affect the robustness of the assessment for EIA purposes.