ARUP

Department of Transport

Strategic Environmental Assessment of the Draft All-Island Strategic Rail Review

SEA Environmental Report

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Non-Technical Summary

Introduction

This Non-Technical Summary (NTS) has been prepared to support the Strategic Environmental Assessment (SEA) of the draft All-Island Strategic Rail Review (AISRR) (referred to hereafter as 'the draft AISRR'), established by the Minister for Transport for the Irish Government and the Minister for Infrastructure for the Northern Ireland Executive for the period to 2050. This document has been prepared in accordance with relevant EU and national legislation to summarise, in non-technical language, the Environmental Report for the SEA of the draft AISRR. It draws attention to the most important issues outlined in the SEA Environmental Report and describes the key outcomes. Further detail can be found in the Environmental Report.

Draft All-Island Strategic Rail Review

The draft AISRR examines how the Island's railways are currently used, what role rail could play in future, and how the Island's railway could better serve the people of both jurisdictions. Rail has the potential to deliver on accessibility, climate, connectivity, economic growth, environmental and regional development aims across the whole Island – both for passenger and freight flows. As one of the lowest emitters of carbon for passenger and freight trips, rail can help both jurisdictions deliver their commitments to achieving a net-zero transport system and economy.

The Review has focused on how the rail network across the Island could contribute to the decarbonisation of the Island's transport systems, promote sustainable connectivity into and between major cities, enhance regional accessibility, and support balanced regional development. The time horizon for this Plan covers the period from 2023 to 2050 to align with both jurisdictions' stated goals of achieving net zero carbon emissions by this milestone.

The visions, goals, and objectives for the draft AISRR are illustrated in Figure 1.

Vision Statement		
To deliver an accessible, efficient, safe and sustainable transport system that supports communities, households and businesses.		
Goals		**Objectives**
 **Goal 1** Decarbonisation	**Contribute to decarbonisation**	• Reduce the carbon emissions associated with rail's construction, operation, and maintenance
		• Reduce the carbon emissions from motor vehicle travel
 **Goal 2** Intercity	**Improve connectivity between the Island's major cities**	• Provide an attractive public transport choice for travel between the seven cities of Dublin, Belfast, Cork, Limerick, Derry~Londonderry, Galway, and Waterford
 **Goal 3** Regional and Rural	**Enhance regional and rural accessibility**	• Give people in rural and regional areas better access to economic opportunities, and public services
		• Improve inter-regional accessibility
 **Goal 4** Sustainable Cities	**Encourage sustainable mobility**	• Manage demand through compact growth and better integration of public transport with land use
		• Enhance the integration of rail with other transport modes
		• Minimise negative impacts on the environment
 **Goal 5** Freight and Economy	**Foster economic activity**	• Contribute to balanced economic growth between urban and regional areas
		• Support the efficient movement of goods and people between economic centres and international gateways
 **Goal 6** Economic Feasibility	**Achieve economic and financial feasibility**	• Plan investment in rail that is financially feasible
		• Access potential funding
		• Ensure investment in rail is considered alongside meeting objectives

Figure 1 Visions, Goals and Objectives for the draft AISRR | Source: All-Island Strategic Rail Review (DoT and DfI)

SEA Methodology

Directive 2001/42/EC of the European Parliament and of the Council on the Assessment of the Effects of Certain Plans and Programmes on the Environment, (also known as the Strategic Environmental Assessment (SEA) Directive), requires that an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment.

The objective of the SEA Directive is '*to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans … with a view to promoting sustainable development*' (Article 1 SEA Directive 2001).

It is a systematic, on-going process for evaluating, at the earliest possible stage, the environmental quality and consequences of implementing certain plans and programmes on the environment.

The methodology for this SEA is based on legislative requirements and guidance from the Environmental Protection Agency (EPA) to ensure compliance with the SEA Directive and associated national legislation.

Current State of the Environment

The SEA considers the current environmental conditions, hereafter referred to as the baseline environment. This description of the baseline considers the local level nature of the draft AISRR and is cognisant of the pressures and interrelationships between environmental topics within the Draft AISRR area.

The baseline environment is assessed under the following headings:

- Population and Human Health
- Biodiversity
- Land and Soil
- Water
- Air and Climate (note: the topic of Noise was not considered relevant and thus scoped out of this assessment)
- Archaeology, Architectural and Cultural Heritage
- Landscape and Visual
- Material Assets

The AISRR is an all-Island plan and, as such, the general state of the environment in Ireland and Northern Ireland was considered in order to inform the AISRR, any updates to the same over its lifetime, as well as this assessment. Consideration is given to whether the environmental effects, both positive and negative, of the the draft AISRR are likely to be significant. The SEA Directive requires that where the draft AISRR has potential for transboundary environmental effects these must be addressed within the SEA. As the draft AISRR encompasses both the Ireland and Northern Ireland and are both assessed in their entirety, no transboundary effects are predicted.

Population and Human Health

The population of Ireland has generally been rising since the 1960s as a result of declines in emigration, an increase in birth rate and declining death rates. Between 2016 and 2022, the population grew by an average of growth rate of 1.3%. Ireland's National Planning Framework projects that Ireland will be home to an additional one million people by 2040. These projected population increases will increase pressure on land-use and the requirement for development.

The population of Northern Ireland on the last census day (21 March 2021) was 1,903,175. The census is carried out every 10 years in Northern Ireland. This represents an increase of 5.1% (92,312) from 2011.

Health is influenced by many factors in the social and built environment including, housing, employment status, education, transport and access to fresh food and resources, as well as the impacts of air quality, water quality, flooding and access to green space. A key area of consideration of human health will be the interaction between environmental aspects such as water, landscape, biodiversity, air, and energy and human beings.

Availability of spatial data on human health in Ireland is limited. According to the Department of Health report 'Health in Ireland: Key Trends 2022', Ireland has the highest self-perceived health status in the EU, with 82.1% of people rating their health as good or very good. The number of people reporting a chronic illness or health problem is also better than the EU average, at approximately 20% of the population.

Like Ireland, availability of spatial data on human health is limited and health is influenced by the same factors outlined above. A Health Survey was carried out by the Department of Health in Northern Ireland for the period 2021-2022 and found that approximately 73% of respondents rated their general health as very good, or good while 10% rated their general health as bad or very bad.

Biodiversity

Biodiversity loss is a significant and pressing social, political and economic issue for Ireland and the global community. Approximately 95% of the land surface has been modified by activities such as urbanisation, agriculture, energy infrastructure and mining. As outlined in (the draft) Ireland's 4th National Biodiversity Action Plan, global trends of biodiversity loss are reflected in Irish land and waterscapes. Intensive agricultural and forestry practises, overfishing, invasive species, changes in land-use (particularly for residential, agricultural and commercial development) and the over-exploitation of resources such as peatland are the main drivers of biodiversity loss. Despite ongoing conservation and restoration efforts, Ireland's biodiversity is in a state of crisis and urgent impactful action is imperative to prevent the continued erosion of its natural heritage.

As outlined in the Department of Agriculture, Environment and Rural Affairs' report '*A Biodiversity Strategy for Northern Ireland to 2020*', Northern Ireland's biodiversity is internationally important with some 20,000 species found on the land, in the soil, in the air and in the waters. The Ramsar Convention is an intergovernmental treaty that provides the framework for "the conservation and wise use of all wetlands through local, regional and national actions and international co-operation as a contribution towards achieving sustainable development throughout the world". There are currently 21 Ramsar sites in Northern Ireland.

Land and Soil

In Ireland pastures, peatlands and wetlands are the second most widespread land cover type, covering almost one-fifth (18%) of the country, while forested areas cover 11% of the country. Ireland and Northern Ireland share a similar land cover for forestry, peatlands and agriculture, with farmland covering approximately 70% of the area in Northern Ireland.

The quality of soils in Ireland is considered generally good although there are pressures impacting on its long-term protection and maintenance particularly from land use changes, intensification of use, urbanisation, and contamination. The soils in Ireland are an immensely valuable, and finite, national resource, which forms and evolves slowly over very long periods of time and can easily be damaged and lost. In Northern Ireland, the primary soil functions include biomass production (grass and grain), regulation of nutrients and water in soils and maintenance and enhancement of soil carbon stocks.

Water

Nearly half of the surface waters in Ireland are failing to meet the legally binding water quality objectives set by the EU Water Framework Directive because of pollution and other human disturbance. Two of the main issues driving this deterioration are the excessive levels of nutrients and sediment entering water courses. Land management practices, where agriculture is seen to be the main pressure, amongst forestry and peat extraction, all contribute to this problem.

Overall, 91% of groundwater bodies are in good chemical status and nearly all are in good quantitative status. The south and southeast regions have the greatest proportion of sites with high and increasing nitrate

concentration. In 2015, 49 (65 %) of the 75 groundwater bodies in Northern Ireland achieved good overall status. In 2021, 51 (68 %) achieved good overall status.

Air and Climate

In order to protect human health, vegetation and ecosystems, EU Directives set down air quality standards in Ireland and the other Member States for a wide variety of pollutants. While air quality in Ireland has been considered to be generally good, new evidence from increased monitoring and modelling, coupled with new research on the health impacts at lower levels of exposure to particulate matter, raises questions about that status.

According to Met Eireann (2022) the general climatic conditions for Ireland as a country are dominated by the Atlantic Ocean and its air and oceanic currents. Consequently, the region does not suffer from extremes of temperature. The climate across Northern Ireland and Ireland is very similar and are both experiencing climactic warming due to global greenhouse gas emissions rising.

As outlined in the report 'Ireland's Provisional Greenhouse Gas Emissions 1990-2022', Ireland's GHG emissions are estimated to be 60.76 million tonnes carbon dioxide equivalent (Mt CO2eq) in 2022, which is 1.9% lower (or 1.19 Mt CO2 eq) than emissions in 2021 (61.95 Mt CO2 eq).

In 2019, Northern Ireland's total greenhouse gas emissions accounted for 5% of the UK total, higher than its population share of 3%. Since the base year (1990), Northern Ireland's total greenhouse gas emissions have decreased by 18% from 26.1 to 21.4 million tonnes of carbon dioxide equivalent (MtCO2e).

Archaeology, Architectural and Cultural Heritage

Ireland is particularly rich in archaeological sites and monuments which form a central component of Irish Heritage. Many of Ireland's archaeological or cultural heritage sites occur on forest land and peatlands.

Archaeological sites and monuments range from substantial above-ground structures to easily damaged subterranean traces of human activity. Northern Ireland has been legally protecting its historic monuments with legislative measures since 1869. The Northern Irish Historic Monuments and Archaeological Objects Order 1995 protects archaeological monuments or objects of significance by either taking them into State care or by scheduling and also places restrictions on searching for archaeological material.

Landscape and Visual

The Council of Europe Landscape Convention 20/10/2000 promotes the protection, management and planning of European landscapes and organises European co-operation on landscape issues. The National Landscape Strategy for Ireland 2015-2025 (Department of Housing, Local Government and Heritage, 2015) was produced in line with Ireland's obligations under the European Landscape Convention. The overall vision of the strategy is stated as: "*Our landscape reflects and embodies our cultural values and our shared natural heritage and contributes to the well-being of our society, environment and economy. We have an obligation to ourselves and to future generations to promote its sustainable protection, management and Planning*".

Northern Ireland abides by the Council of Europe Landscape Convention 20/10/2000[1]. In recognising the importance of sustaining local identity, the Northern Ireland Environment Agency (NIEA) commissioned Landscape Character Assessments of Northern Ireland which resulted in the identification of distinct character areas within Northern Ireland.

Material Assets

In terms of Material Assets, this Environmental Report will make reference to transportation, water supply, wastewater treatment and discharge, and waste management services.

Vehicular traffic is by far the most common mode of travel in Ireland. In 2021, the national vehicle fleet was made up of 2.86 million vehicles. Iarnród Éireann is responsible for maintenance of the heavy rail intercity

[1] Council of Europe (2016) Council of Europe Landscape Convention as amended by the 2016 Protocol. Available at: https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=176

and regional network in Ireland, which is used for both passengers and freight. The Northern Ireland Transport Holding Company (operating as Translink) is responsible for maintenance of the rail network in Northern Ireland.

The EPA in Ireland publishes an annual Public Supply Drinking Water Report which provides an overview of the quality of drinking water in public supplies. The reports are based on the assessment of monitoring results reported to the EPA by Uisce Éireann and the Local Authorities. Results from the 2021 Drinking Water Quality in Public Supplies Report show over 99.7% compliance with bacterial and chemical limits. However, a number of issues have been identified that need to be addressed including the increase in detections of Trihalomethanes (THM) limits.

Northern Ireland Water is a Government Owned Company, set up in 2007 to provide the water and sewerage services in Northern Ireland. According to Northern Ireland Water's Drinking Water Quality Annual Report 2021, overall drinking water quality compliance in 2021 was 99.88%, above the target of 99.79%.

Ireland's waste management practices, infrastructure and regulation have matured significantly over the last 20 years. This change has been driven by EU and national legislation, national policy and economic initiatives. Government policy focusses on waste as a resource and the virtual elimination of landfilling. The current and future focus is on circular economy - preventing waste, reuse, maximising recycling and using waste as a fuel in replacement of fossil fuels: all elements of the strategy to boost competitiveness, foster sustainable economic growth and generate new jobs.

Consideration of Reasonable Alternatives

The following alternatives were considered during the evolution of the draft AISRR:

Alternative A: Package 1 – Short Term and Decarbonisation

Alternative B: Package 2a – Intercity – Higher Speed

Alternative C: Package 2b – Intercity – High Speed

Alternative D: Package 3a – Regional and Rural – Northern Ireland

Alternative E: Package 3b – Regional and Rural – West Coast

Alternative F: Package 3c – Regional and Rural – South Coast

Alternative G: Package 3d – Regional and Rural – North Midlands

These alternatives were assessed under the relevant environmental criteria, with a likely positive impact on Population and Human Health, Air and Climate and Material Assets predicted. There is likely to be negative impacts arising where works are required on greenfield sites resulting in potential negative impacts on Biodiversity, Land and Soils, Archaeology and Architectural Heritage and Landscape and Visual. The preferred alternative is a mix of recommendations from each of the packages, with the exception of Alternative C.

Objectives, Targets, and Indicators

The SEA is designed to assess the potential environmental impact of the draft AISRR and its associated Actions, Measures and Interventions against the established baseline. The Actions, Measures and Interventions outlined in the draft AISRR are assessed against a range of established environmental objectives and targets.

Indicators recommended in this Environmental Report are utilised over the lifetime of the draft AISRR to quantify the level of impact that the policies and objectives may have on the environment.

Assessment of likely Significant Effects

The environmental effects of the draft AISRR's recommendations were assessed with respect to the existing environmental baseline. The environmental assessment outcomes are quite mixed between positives, negatives and neutrals.

In terms of Decarbonation, positive effects on population and human health, biodiversity, air quality and climate, and material assets are predicted. This is due to a reduction in harmful air emissions and greenhouse gases during the operational phase. It is important to note that a positive rating was assigned to material assets due to the provision of improved public transport, but also on the basis that the energy mix for the implementation of a decarbonised rail network is sourced primarily from renewable energy. Negative impacts are predicted on land and soils, water, archaeological, architectural and cultural heritage, and landscape and visual due to construction works required to implement an electrified intercity network.

In terms of Intercity, positive effects on population and human health, air quality and climate, and material assets are predicted. This is due to the provision of a more efficient railway system and subsequently encouraging a modal shift from private car to public transport during the operational phase. Negative impacts are predicted on land and soils, water, archaeological, architectural and cultural heritage, and landscape and visual due to construction works required to improve the intercity network.

In terms of sustainable cities, positive effects on population and human health, biodiversity, air quality and climate, and material assets are predicted. This will be due to the provision of a more efficient and more accessible railway system and subsequently encouraging a modal shift from private car to public transport during the operational phase.

In relation to biodiversity, both positive and negative effects are predicted. Positive impacts relate to the provision of a more efficient railway system and subsequently encouraging a modal shift from private car to public transport during the operational phase, reducing harmful air emissions which may be impact sensitive habitats/species. However, negative effects include disturbance to habitats/species during the construction phase and the potential for loss of habitats due to any required land-take.

In terms of freight, positive effects on population and human health, air quality and climate, and material assets are predicted. These effects will result from the improvement of freight infrastructure and therefore resulting in positive impacts on businesses.

By ensuring the allocation of future rolling stock to aid in the decarbonisation of the railway network, positive impacts are predicted due to future improvements in air quality.

Cumulative effects are those that arise when the effects of the implementation of a plan or project to occur in combination with those of other plans or projects. Cumulative effects can be described as the addition of many small impacts to create one larger, more significant, impact.

To implement the recommendations of the draft AISRR, a range of projects/schemes would be required. Each of these should be subject to cumulative assessment at project level, as necessary, to determine whether the subject project is likely to give rise to cumulative effects with other proposed or existing projects.

The two types of potential cumulative effects that have been considered throughout this assessment are:

- Potential Intra-Plan cumulative effects, which arise from the interactions between different types of potential environmental effects resulting from a plan, programme, or policy where there are elevated levels of environmental sensitivities.
- Potential Inter-Plan cumulative effects which arise when the effects of the implementation of one plan occur in combination with those of other plans, programmes, developments, etc.

Mitigation Measures

This Environmental Report has highlighted some potential negative environmental impacts that may arise from the implementation of the draft AISRR. A number of mitigation measures have been identified to prevent, reduce and as fully as possible offset any potential significant adverse impacts on the environment associated with the implementation of the draft AISRR. These are set out in the SEA Environmental Report.

It is envisaged that rail related developments in the plan area will be environmentally assessed at project level, where required, and specific mitigation proposed, where appropriate.

Monitoring Measures

Article 10 of the SEA Directive requires that monitoring should be carried out in order to identify at an early stage any unforeseen adverse impacts associated with the implementation of the plan or programme.

A monitoring programme is developed based on the indicators selected to track progress towards achieving strategic environmental objectives and reaching targets, enabling positive and negative impacts on the environment to be measured. As previously described, the environmental indicators have been developed to show changes that would be attributable to implementation of the draft AISRR.

The SEA carried out has ensured that any potential significant environmental impacts have been identified and given due consideration.

1. Introduction

1.1 Background

The draft All-Island Strategic Rail Review (the 'draft AISRR') aims to inform policy and future strategy for the railways in both jurisdictions on the Island of Ireland and was launched in April 2021 by the Minister for Transport for the Irish Government and the Minister for Infrastructure for the Northern Ireland Executive. The draft AISRR examines how the Island's railways are currently used, what role rail could play in future, and how the Island's railway could better serve the people of both jurisdictions.

The draft AISRR has focused on how the rail network across the Island could contribute to the decarbonisation of the Island's transport systems, promote sustainable connectivity into and between major cities, enhance regional accessibility, and support balanced regional development. It has also considered the interactions between proposed improvements and existing, or planned, commuter rail services. The time horizon for the Review covers the period from 2023 to 2050 to align with both jurisdictions' stated goals of achieving net zero carbon emissions by this milestone.

Rail has the potential to deliver on accessibility, climate, connectivity, economic growth, environmental and regional development aims across the whole Island – both for passenger and freight flows. It also has the potential to change the economic landscape of the Island by unlocking regeneration and growth opportunities, attracting investment, and supporting sustainable development.

As one of the lowest emitters of carbon for passenger and freight trips, rail can help both jurisdictions deliver their commitments to achieving a net-zero transport system and economy. As both jurisdictions plan to decarbonise while the Island's population continues to grow, rail can play a stronger role as the prominent 'backbone' of the public transport system in facilitating more compact development around transport hubs, enhancing connections between cities, and growing its share of travel.

There are several challenges currently preventing rail from realising its full potential on the Island of Ireland. These challenges are outlined below –

- There are significant gaps in the rail network's coverage;
- Service frequencies and speeds are relatively low compared to similar railways (such as those in Scotland and Denmark);
- Ireland has the lowest level of electrified railway in the European Union;
- The quality of service offered does not consistently meet customer expectations;
- Station access is inconsistent, and in some places, poor;
- No major Irish airport is currently served by passenger rail services;
- Integration across cities (notably Dublin), modes, and jurisdictions is inconsistent;
- Current infrastructure limits opportunities to deliver affordable and transformational improvements;
- Demographics on the Island are not particularly conducive to supporting high density, high frequency railway networks in many places; and
- The Island's natural assets present some constraints to future rail development on some corridors.

These challenges mean the railway is currently unable to achieve high passenger and freight modal share, which is contributing to undesirable socio-economic and environmental impacts across the Island.

Arup was commissioned by the Department of Transport (Ireland) in cooperation with the Department for Infrastructure (Northern Ireland) (referred to as 'the DoT' and 'the DfI') to carry out Strategic Environmental Assessment (SEA) screening for the draft AISRR. The screening exercised concluded that an SEA is required.

This SEA Environmental Report (ER) presents the findings of the environmental assessment of the likely significant effects on the environment as a result of implementing the draft AISRR. A Scoping Report was prepared which provided information to allow consultation with defined statutory bodies on the scope and level of detail to be considered in the environmental assessment. The purpose of this SEA ER – which should be read in conjunction with the draft AISRR – is to provide a clear understanding of the likely environmental consequences of decisions arising from the draft AISRR.

1.2 SEA Process and Legislative Context

1.2.1 Legislative Background

Directive 2001/42/EC of the European Parliament and of the Council on the Assessment of the Effects of Certain Plans and Programmes on the Environment, (also known as the SEA Directive), requires that an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment, in the following ten sectors:

- Agriculture;
- Forestry;
- Fisheries;
- Energy;
- Industry;
- Transport;
- Waste Management;
- Water Management;
- Telecommunications; and
- Tourism, Town and Country Planning or Land-use.

The objective of the SEA Directive is '*to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans … with a view to promoting sustainable development*' (Article 1 SEA Directive 2001).

It is a systematic, on-going process for evaluating, at the earliest possible stage, the environmental quality and consequences of implementing certain plans and programmes on the environment.

Ireland made the decision to transpose the SEA Directive into Irish law in 2004 through two separate statutory instruments or regulations, one specifically concerning specific listed town and country/land use plans (S.I. 436/2004) and one concerning all other sectors (S.I. 435/2004). The transposing regulations are as follows:

- European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations (S.I. 435/2004); and
- Planning and Development (Strategic Environmental Assessment) Regulations (S.I. 436/2004).

Both pieces of legislation were amended in 2011 through the following amendment regulations:

- European Communities (Environmental Assessment of Certain Plans and Programmes) Amendment Regulations (S.I. 200/2011); and
- Planning and Development (Strategic Environmental Assessment) Amendment Regulations (S.I. 201/2011).

The SEA Directive has also been given effect through other Irish legislation.

An example being, the Planning and Development Act [PDA] 2000, as amended, which includes a specific requirement to carry out and facilitate SEA alongside the preparation of the Regional Spatial and Economic Strategies; and the Water Services Act 2007, as amended, requires that: *"The purpose for which this Act is enacted includes giving effect to so much of the following as relates to water services"* - listing specifically Directive 2001/42/EC (EPA, Good Practice Guidance on Screening, 2021).

Northern Ireland also made the decision to transpose the SEA Directive into law in 2004, this was done in through:

- The Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 No. 280.

Regulation 4 designated the Department of Environment (DOE) - now the Department of Agriculture, Environment and Rural Development (DAERA) - as the Consultation Body for the SEA process in Northern Ireland and Responsible Authorities should send their plans and programmes for consultation to their SEA Coordination Unit.

1.2.2 SEA Process

The SEA process is comprised of the following steps:

- Screening: decision on whether or not SEA of a Plan or Programme is required. This stage has been completed;
- Scoping: Consultation with the defined statutory bodies on the scope and level of detail to be considered in the assessment. This stage has been completed;
- Environmental Assessment: An assessment of the likely significant impacts on the environment as a result of the Plan or Programme. This is the current stage of the SEA process to which this report relates;
- Preparation of an Environmental Report (this report);
- Consultation on the Plan or Programme and associated Environmental Report;
- Evaluation of the submissions and observations made on the Plan or Programme and Environmental Report; and
- Issuance of an SEA Statement identifying how environmental considerations and consultation have been integrated into the Final Plan or Programme.

SEA is intended to inform decision-making and needs to 'test' systematically the performance of the plan as a whole and its individual objectives and policies against SEA criteria.

1.2.3 SEA Guidance

The SEA methodology for the draft AISRR is based on legislative requirements and Department of Environment, Heritage and Local Government (DoEHLG) / Environmental Protection Agency (EPA) guidance - as listed below. The EPA's SEA Pack (Version 28/01/2022) was also used as a source of information during the scoping process along with published EPA SEA Scoping Guidance. This guidance is relevant to Ireland.

UK-wide guidance (from the Office of the Deputy Prime Minister, Scottish Executive, Welsh Assembly Government, and Department of the Environment, Northern Ireland) was considered during the preparation of this SEA ER. In addition, it is important to note that Northern Ireland will be bringing forwards its own environmental legislation post-Brexit and regard will be given to any future provisions relevant to Northern Ireland.

1.2.3.1 Ireland (Irish Guidance)

- Strategic Environmental Assessment – Guidelines for Regional Assemblies and Planning Authorities.

- Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland (EPA, 2013);
- Implementation of SEA Directive (2001/42/EC): Assessment of the Effects of Certain Plans and Programmes on the Environment- Guidelines for Regional Authorities and Planning Authorities (Department of the Environment, Community and Local Government, 2004);
- Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment (European Commission, 2004);
- SEA Resource Manual for Local and Regional Planning Authorities (EPA, 2015);
- Integrating Climatic Factors into Strategic Environmental Assessment in Ireland - A Guidance Note (EPA, 2019);
- Synthesis Report on Developing a Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland (EPA, 2013); and
- Good Practice Guidance on SEA Screening (EPA, 2021).

1.2.3.2 Northern Ireland & United Kingdom Guidance

- A Practical Guide to Strategic Environmental Assessment Directive (Office of the Deputy Prime Minister, Scottish Executive, Welsh Assembly Government, Department of the Environment, Northern Ireland, 2005).
- Strategic Environmental Assessment – Consultation Bodies' Services and Standards for Responsible Authorities (Northern Ireland Environmental Agency, 2009)
- Strategic environmental assessment and climate change: guidance for practitioners (Environment Agency, 2011).
- Draft Environmental Outcomes Report: a new approach to environmental assessment (Department for Levelling Up, Housing, and Communities, 2023).

2. All-Island Strategic Rail Review

2.1 Introduction

The draft AISRR aims to inform policy and future strategy for the railways in both Ireland and Northern Ireland. It examines how the Island's railways are currently used, what role rail could play in the future and how the Island's railway could better serve the people of both jurisdictions.

The draft AISRR has focussed on how the rail network across the Island could contribute to the decarbonisation of the Island's transport systems, promote sustainable connectivity into and between major cities, enhance regional accessibility, and support balanced regional development.

2.2 Strategic Vision of the AISRR

The vision statement underpinning the goals and objectives of the draft AISRR is presented in Figure 2.1.

Vision Statement		
To deliver an accessible, efficient, safe and sustainable transport system that supports communities, households and businesses.		
Goals		**Objectives**
 **Goal 1** Decarbonisation	**Contribute to decarbonisation**	• Reduce the carbon emissions associated with rail's construction, operation, and maintenance
		• Reduce the carbon emissions from motor vehicle travel
 **Goal 2** Intercity	**Improve connectivity between the Island's major cities**	• Provide an attractive public transport choice for travel between the seven cities of Dublin, Belfast, Cork, Limerick, Derry~Londonderry, Galway, and Waterford
 **Goal 3** Regional and Rural	**Enhance regional and rural accessibility**	• Give people in rural and regional areas better access to economic opportunities, and public services
		• Improve inter-regional accessibility
 **Goal 4** Sustainable Cities	**Encourage sustainable mobility**	• Manage demand through compact growth and better integration of public transport with land use
		• Enhance the integration of rail with other transport modes
		• Minimise negative impacts on the environment
 **Goal 5** Freight and Economy	**Foster economic activity**	• Contribute to balanced economic growth between urban and regional areas
		• Support the efficient movement of goods and people between economic centres and international gateways
 **Goal 6** Economic Feasibility	**Achieve economic and financial feasibility**	• Plan investment in rail that is financially feasible
		• Access potential funding
		• Ensure investment in rail is considered alongside meeting objectives

Figure 2.1 Visions, Goals and Objectives for the draft AISRR | Source: All-Island Strategic Rail Review (DoT and DfI)

2.3 Benefits

If the draft AISRR's recommendations were implemented, it would:

- Deliver transformational improvements in the quality, speed and frequency of rail services across the Island. Many journey times would be significantly faster than car.
- Enable more direct services between the Island's cities, significantly improving connectivity from the northeast to the southwest of the Island, and on some routes potentially quadrupling service frequencies between key cities.
- Boost reliability and resilience, as there will be more capacity to absorb shocks, and more segregation between different services.
- Reduce carbon emissions while doubling demand through decarbonisation of rail operations and promoting modal shift.
- Provide much more access to the railway. The number of people living within 5km of a railway station could grow by over 700,000. This would represent a 25% growth from today's population catchment.
- Boost patronage and revenue for the railway – the number of passenger journeys and mode share undertaken on the Island's rail network could double from 3% to more than 6% of passenger kilometres (before additional demand management measures are delivered, which could increase mode share further).
- Support planned improvements to public transport connectivity in the Island's largest cities. Capacity would be unlocked for local services in Dublin, Belfast, Cork and Limerick, while journeys to, from and across Dublin City Centre would be significantly enhanced.
- Deliver direct airport rail links for Dublin, Belfast, and Shannon – over 90% of commercial aviation passengers would be able to access their airports by rail.
- Help the rail freight industry rebound by providing better routes between the Island's ports and cities, delivering inland facilities, and lowering the costs of rail freight.

2.4 Recommendations of the AISRR

This section presents the set of recommendations arising from the draft AISRR. The strategic themes of the recommendations are presented in Figure 2.2.

Figure 2.2: Strategic Themes | Source: All-Island Strategic Rail Review (DoT and DfI)

2.4.1 Decarbonisation

In summary, to achieve the decarbonisation goals and objectives of the draft AISRR, governments in both jurisdictions should:

1. **Develop and implement an All-Island Rail Decarbonisation Strategy that, as a minimum, includes an electrified intercity network.**

   This should determine which decarbonisation solutions should be adopted for each part of the railway, recommend a common set of standards to be applied across the whole Island, and provide a roadmap for decarbonising the railway by 2050.

   The map provided in Figure 4 provides a potential outcome that might be delivered by the draft AISRR, which assumes core intercity routes would be electrified with overhead line electrification (OHLE), while regional lines could be served by hybrid solutions, such as battery and/or hydrogen operated trains.

2. **Develop plans to invest in the skills, supply chains, and rolling stock to deliver decarbonisation.**

   This will help control the costs of what is likely to be a significant long-term investment in the Island's railways.

3. **Procure hybrid and electric rolling stock in the medium term.**

   Given the long lead in times for the procurement and delivery of rolling stock, and its relatively long operational life, it is recommended that planning for electric and hybrid traction across the Island should start soon.

Figure 2.3: Decarbonisation interventions | Source: All-Island Strategic Rail Review (DoT and DfI)

2.4.2 Intercity Spine

A map illustrating the interventions that are likely needed to deliver a fast, frequent, and high-quality all-Island intercity railway service is shown in **Figure 2.4**.

In summary, to deliver a world-class all-Island intercity railway that meets the goals and objectives of the draft AISRR, governments in both jurisdictions are recommended to develop plans to:

4. **Upgrade the cross-country rail network to a dual-track railway (and four-tracks in places) and increase intercity service frequencies.**

    a. This would involve dual-tracking the railway between Portarlington and Athlone, Kildare and Kilkenny, and Maynooth and Mullingar and four-tracking between Connolly/Spencer Dock and Clongriffin. In addition to enabling higher frequency intercity services on these corridors, these improvements would allow more commuter services to serve intermediate stations and therefore enable intercity services to deliver faster city-to-city journey times.

5. **Upgrade the core intercity railway network to 200km/h (125mph) by:**

    a. Upgrading the condition and strength of straight sections of track.

    b. Realigning some sections of the railway where steep curves and level crossings currently force trains to reduce speeds.

    c. Providing capacity to segregate intercity and regional services from other services on busier sections of the railway, which could include loops on busy sections to accommodate growth while longer term solutions are developed; and

    d. Upgrading signalling and rolling stock – which could be delivered incrementally as part of a wider renewals programme.

6. **Develop short sections of new railways on congested corridors.**

There are three sections of the network that are likely to require a four-tracking or new rail alignment solution to accommodate conflicting demands for capacity and deliver a 200 km/h railway. These are:

a. Belfast – Lisburn – Newry: The existing railway between Newry and Belfast has significant constraints due to its alignment, level crossings, and limited space to add capacity between Lisburn and Belfast. A new railway could deliver significant journey time and capacity benefits for this corridor.

b. Dublin – Drogheda: This railway is expected to become busier when the DART network is extended to Drogheda MacBride. While it is probably technically feasible to four track this railway, doing so would have a significant adverse impact on several Special Protection Areas and potentially the waterfronts of Malahide and Balbriggan. An alternative approach could be to build a new railway from Drogheda to Clongriffin following the M1 corridor. This railway would be shorter than a four-tracked solution, deliver faster journey times, require fewer significant crossings, require less land and property acquisition, generate less disruption to existing services during construction, and would have a lesser impact on the environment.

c. Portarlington/Kildare – Hazelhatch: This railway is also expected to become busy as the commuter market to the southwest of Dublin grows. It should be feasible to four-track the corridor as far as Portarlington but doing so would have some impact on towns on the route and would involve building tracks through the Curragh. An alternative option could be to build a new alignment from Hazelhatch to Portarlington (with a spur to the Waterford line) that avoids the Curragh altogether. This route would be shorter and could deliver faster journeys.

7. **Develop a cross-Dublin solution.**

    An east-west railway from Heuston to Spencer Dock could deliver transformational improvements in cross-Island connectivity if combined with improvements north of Connolly.

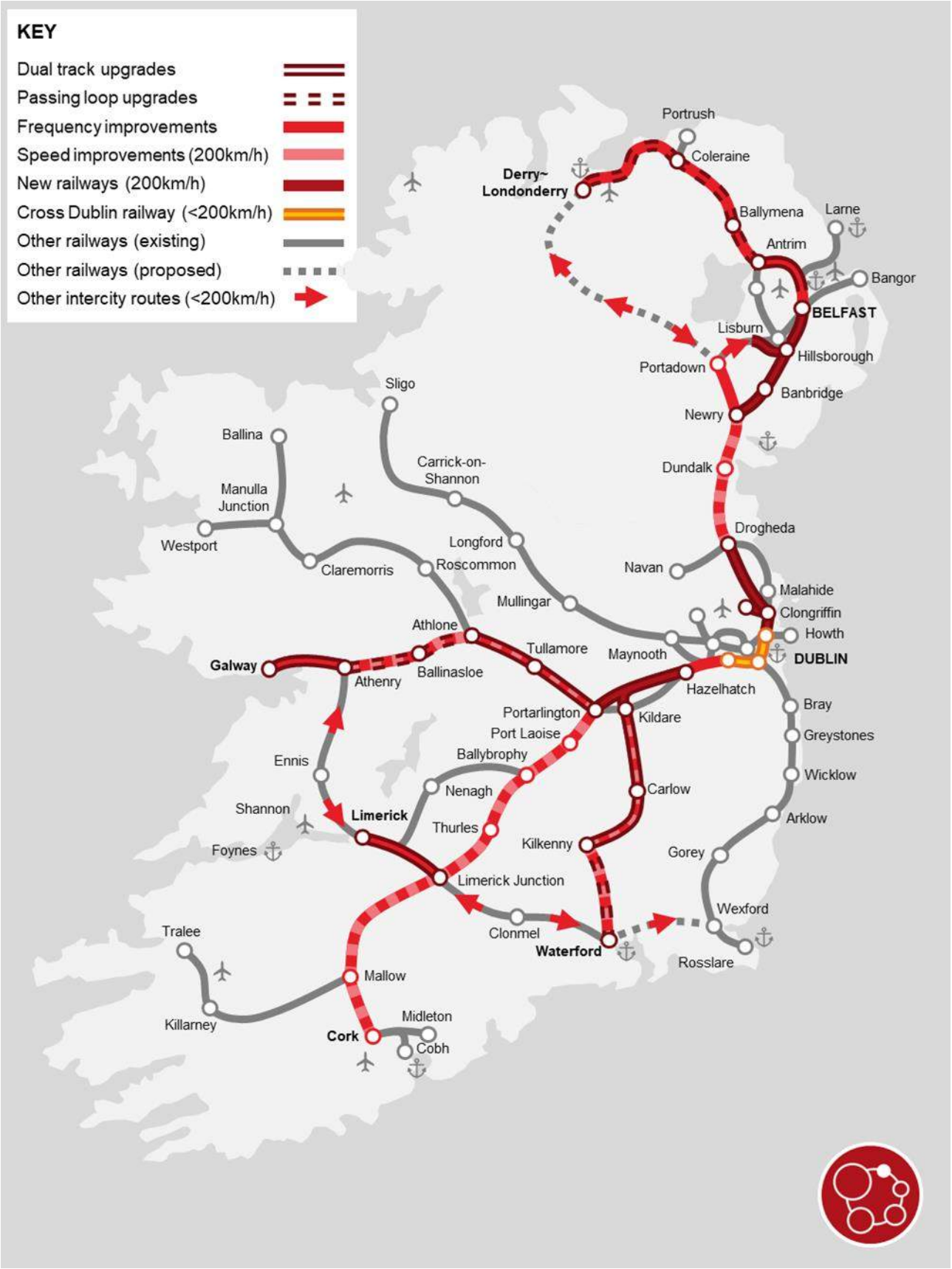

Figure 2.4: Intercity network interventions | Source: All-Island Strategic Rail Review (DoT and DfI)

2.4.3 Regional and Rural

To deliver the regional and rural goals and objectives of this Review, both governments are recommended to develop plans to develop the interventions shown in Figure 2.5 and listed below:

8. **Provide more direct services between Ireland's West and South Coasts**

   For example, between Galway, Limerick and Cork.

9. **Ensure regional and rural lines have at least one train per two hours (at regular times)**

   Including hourly services between Galway, Limerick, Cork and Waterford.

10. **Increase line speeds to at least 120km/h (75mph).**

    This would deliver significant benefits for communities across the Island.

11. **Upgrade Limerick Junction and the Limerick Junction – Waterford line**.

    This will support freight services between the South Coast ports, Foynes, and the northwest. With a chord Limerick Junction, it will support direct Cork – Waterford services.

12. **Reinstate the Western Rail Corridor railway between Claremorris and Athenry.**

    This will support freight and regional connectivity objectives in the West of Ireland.

13. **Extend the railway into Tyrone, Derry~Londonderry, and Donegal.**

    Reinstating the railway between Portadown, Dungannon, Omagh, Strabane, Derry~ Londonderry, and Letterkenny would connect the railway to many communities and support direct services between Dublin, Belfast, Derry~Londonderry, and Letterkenny.

14. **Reinstate the South Wexford Railway** to boost connectivity in the southeast.

15. **Develop the railway to boost connectivity in the North Midlands.**

    Reinstating the railway between Portadown, Cavan, Mullingar, and Athlone would address several regional connectivity gaps. Building a new link between Maynooth and Adamstown and dualling the railway to Mullingar would also add capacity to support services to this region.

16. **Integrate bus service and rail service timetables to connect communities where direct rail access is unviable.**

    Bus services can help new railways boost public transport connectivity to places like Donegal, Enniskillen, Cookstown, and Downpatrick.

Figure 2.5: Regional and rural interventions | Source: All-Island Strategic Rail Review (DoT and DfI)

2.4.4 Sustainable Cities

In support of wider policies and strategies for urban railways in the Island's largest cities, both jurisdictions should develop plans shown in Figure 2.6 and described below to:

17. Connect Dublin, Belfast and Shannon airports to the railway by:

a. Building a spur from Clongriffin to Dublin Airport. This intervention, which aims to complement the planned MetroLink project in Dublin, would enable intercity and other longer-distance services to directly access Ireland's busiest airport. With the proposed cross-Dublin tunnel, this intervention could connect places like Cork and Galway to Dublin Airport.

b. Reinstating the railway between Lisburn and Antrim. This would enable Belfast International Airport to be connected to the railway network.

c. Improving existing rail-airport connections at George Best Airport.

d. Building a spur from Sixmilebridge or Cratloe to Shannon Airport. This intervention could include developing new stations between the airport and Limerick to be served by a new urban rail service centred on Limerick.

18. Extend double tracking in the Belfast area.

The section of railway between Antrim and Monkstown would need to be dualled to enable more frequent local services to the North and East of Belfast.

19. Segregate long-distance/fast services from stopping services.

This can be achieved by delivering a four-track railway on the approaches to Dublin Heuston and Connolly, and potentially by diverting Sligo and Longford trains away from the Maynooth – Connolly corridor using a new link between Adamstown and Maynooth.

20. Explore the case for developing new stations in the Belfast, Cork, Derry~Londonderry (e.g., Limavady), and Limerick – Shannon city regions.

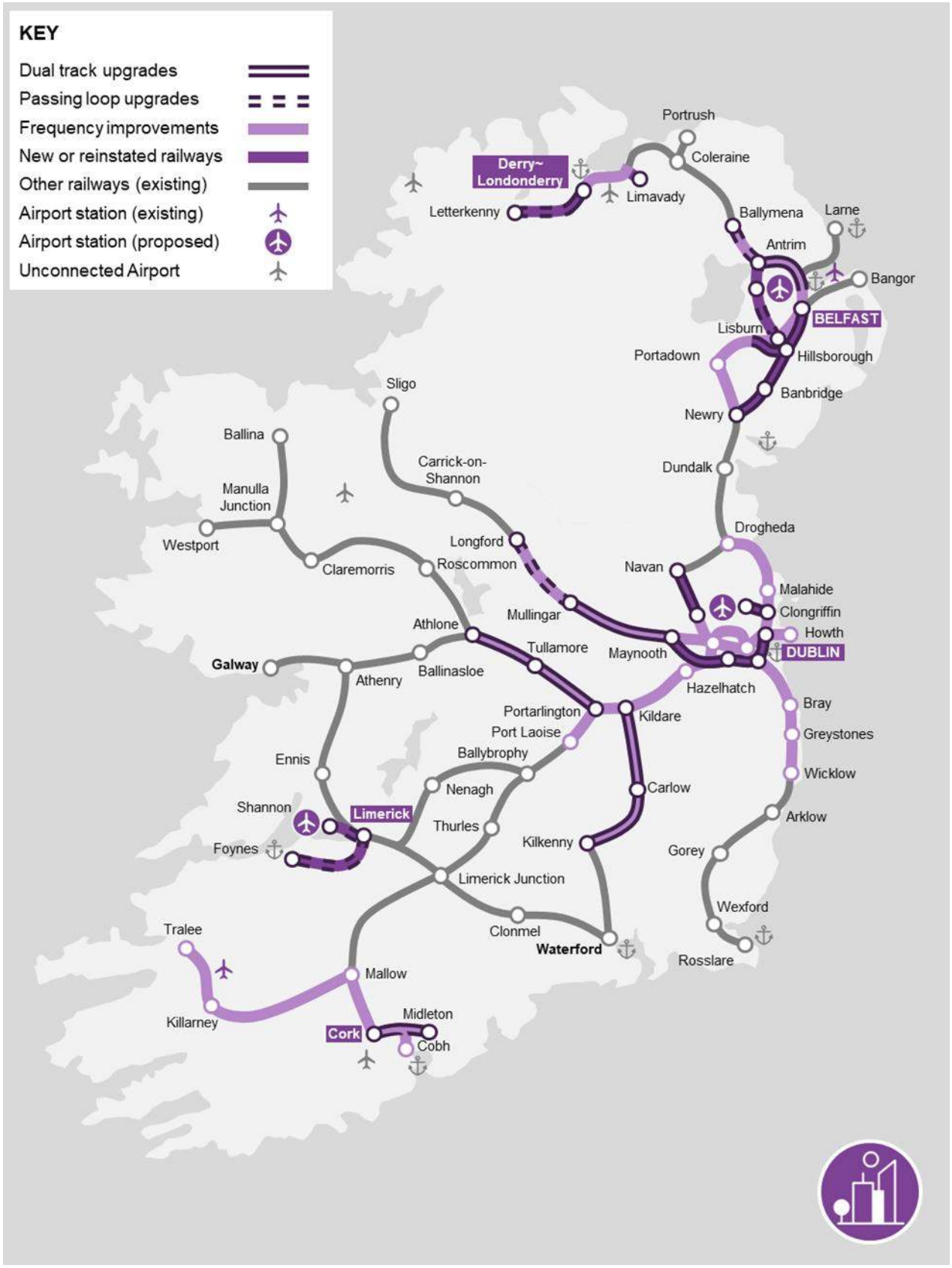

Figure 2.6: Sustainable cities heavy railway interventions | Source: All-Island Strategic Rail Review (DoT and DfI)

2.4.5 Freight

To grow the Island's rail freight industry and support the freight goals and objectives of AISRR, both jurisdictions are recommended to develop plans shown in Figure 2.7 to:

21. **Develop a sustainable solution for first-mile-last-mile rail freight access for Dublin Port**. Without this connection, there are limited options for growing rail freight.
22. **Reduce Track Access Charges for freight services.** These charges are very high compared to other European railways and but could be reduced through support/government subsidy to stimulate demand for rail freight.
23. **Strengthen rail connectivity to the Island's busiest ports where links are feasible and improve access to ports that currently are underserved by rail freight.** These include: Foynes for Limerick, Waterford (Belview), Marino Point for Cork, and Rosslare Europort (in the longer term, when Load on Load off operations are feasible here or, in the shorter-term following analysis of the feasibility of Roll on Roll off rail freight).
24. **Develop a network of inland terminals close to major cities on the rail network, especially where there is good access to major roads/motorways, limited impact on communities and passenger traffic, and good access to industrial clusters.** Potential locations for new terminals include the Upper Bann area for Northern Ireland, Limerick Junction, a location north of Cork, Athenry for Galway, Sligo, and west of Dublin.

These interventions will enable freight services to operate on routes that avoid many busy intercity routes, as shown in light blue in Figure 2.7.

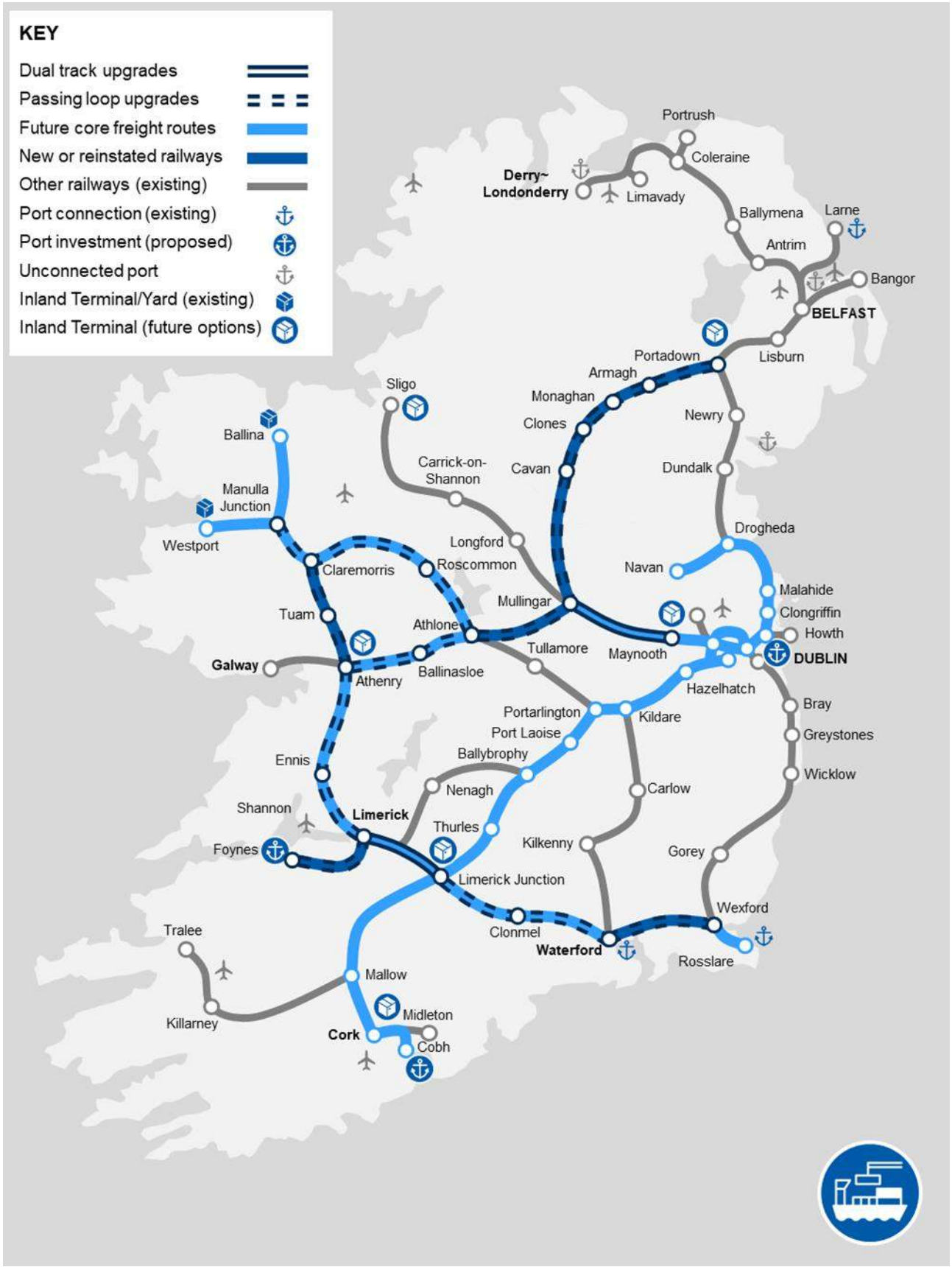

Figure 2.7: Rail freight interventions | Source: All-Island Strategic Rail Review (DoT and DfI)

2.4.6 Customer Experience

Both jurisdictions are recommended to:

25. **Continue to invest in initiatives that deliver a seamless customer journey** such as improving information provision and catering.
26. **Continue to benchmark and monitor service quality and deliver continuous improvement.** The Public Service Contracts provide a framework for holding operators to account for delivering high levels of service.
27. **Ensure future rolling stock specifications are aligned to the infrastructure-led interventions outlined in the draft AISRR.** This includes increasing the size and/or speed of the rolling stock fleet to deliver higher frequency service patterns and new services.
28. **Invest in improving integration within rail and between rail and other transport options –** and put in place appropriate forums to co-ordinate work across institutions.
29. **Deliver clock-face timetable calling patterns** that integrate with other services.
30. **Develop cross-border structures to improve the effectiveness of cross-border infrastructure and rail service planning.**

2.5 Extent of the Plan Area

The draft AISRR covers the entirety of both Ireland and Northern Ireland as indicated in Figure B1 of Appendix B.

2.6 Plan Period

The time horizon for the AISRR covers the period from 2023 to 2050 to align with both jurisdictions stated goals of achieving net zero carbon emissions by this milestone.

3. Relationship with Other Relevant Plans and Programmes

3.1 Introduction

According to Article 5(1) of Annex 1 of the SEA Directive, the environmental assessment must identify "*the environmental protection objectives, established at International, European Union or national level, which are relevant to the plan or programme, or modification to the plan or programme, and the way those objectives and any environmental considerations have been taken into account during its preparation*".

The wide range of plans, policies and programmes which are considered to be of relevance to the draft AISRR are outlined in Table A1 below.

A number of these plans policies and programmes have been identified as being key with regards interaction with the Draft AISRR - these are described in Section 3.2.

3.2 Key Policy, Plans and Programmes of Relevance

It was recommended by the EPA, in their response to the SEA Scoping Report for the draft AISRR, that it would be useful for the SEA Environmental Report to identify the key policy, plans and programmes and to show how these are interlinked with the draft AISRR, and that a schematic showing these relationships would be useful to set the context for the draft AISRR.

Requirements to meet national and international commitments on climate change, sustainability and low carbon development are becoming increasingly important strategic drivers of rail infrastructure development. The Paris Agreement (2015), European Green Deal (2019), UN Sustainability Goals (2015), EU Effort Sharing Regulation Agreement 2021-2030, and the Trans European Transport Network (TEN-T) Policy (2013) all put a focus on improving the rail networks around Europe, including Ireland. In Ireland and Northern Ireland these requirements are reflected in the Climate Action and Low Carbon Development (Amendment) Act (2021), the New Decade, New Approach (2020), Decarbonising Transport – A Better, Greener Britain (2021) and in the Climate Action Plan (2023).

A schematic showing the key plans and programmes of relevance to the draft AISRR, and how they are interlinked with the draft AISRR is included in Figure 3.1 below.

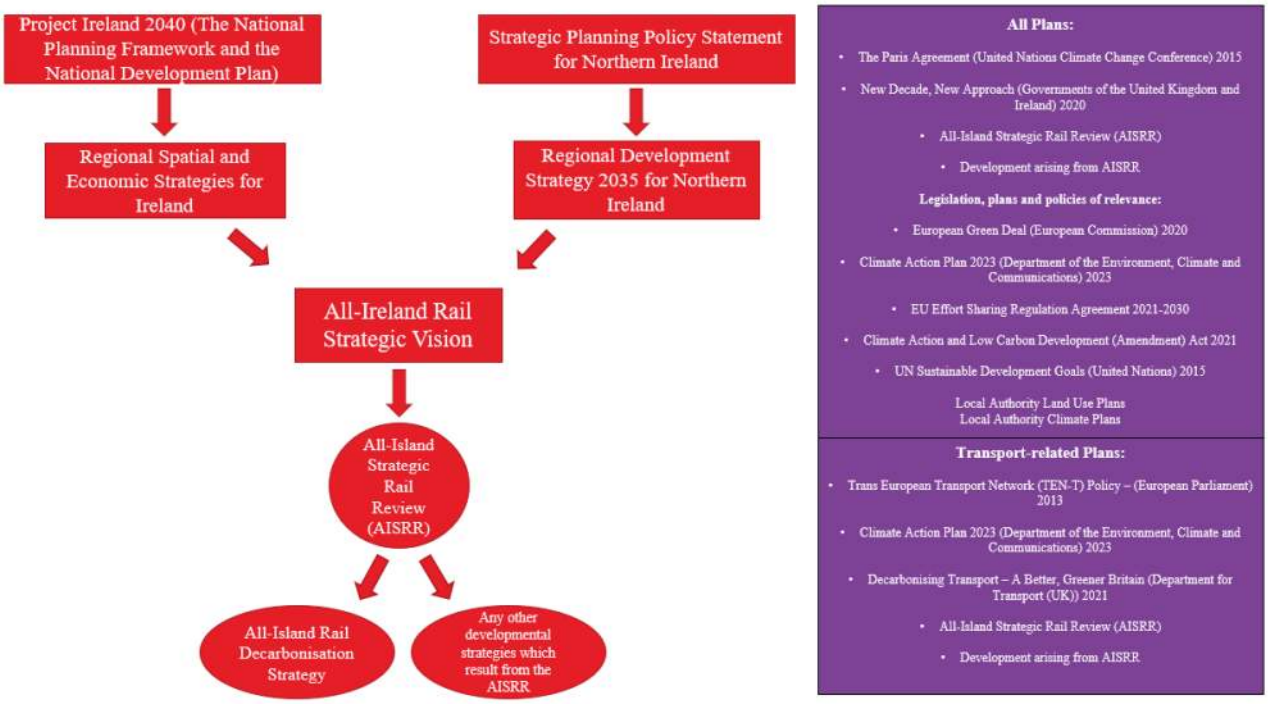

Figure 3.1 Key policy, Plans and Programmes and Interaction with draft AISRR

The Paris Agreement

A legally binding international treaty on climate change. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.

The European Green Deal

The deal sets out how to make Europe the first climate-neutral continent by 2050, boosting the economy, improving people's quality of life, caring for nature and leaving no one behind.

The European Green Deal includes key policies aimed at ambitiously cutting emissions, preserving Europe's natural environment and investing in cutting-edge research and innovation to tackle climate change.

It sets out an achievable roadmap to ensure the EU's economy becomes sustainable by turning climate and environmental challenges into opportunities across all policy areas that will result in economic growth and jobs.

The Green Deal commits Europe to becoming a climate-neutral continent by 2050 while also transforming the EU into a modern, resource-efficient and competitive circular economy that's fair and inclusive for every individual and region.

UN Sustainability Goals

17 interlinked global goals designed to be a "blueprint to achieve a better and more sustainable future for all", with the aim to end poverty and other deprivations alongside strategies that improve health and education, reduce inequality, and facilitate economic growth – while also tackling climate change and working to preserve oceans and forests.

EU Effort Sharing Regulation Agreement

This is a regulation (EU) of the European Parliament and of the Council amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement, and Regulation (EU) 2018/1999. The new regulation sets an EU-level greenhouse gas emission reduction target of 40% by 2030, compared to 2005, for the sectors that it covers. The revised regulation assigns each Member State an increased national target and adjusts the way member states can use existing flexibilities to meet their targets.

Trans European Transport Network (TEN-T) Policy

A policy to address the implementation and development of a Europe-wide network of railway lines, roads, inland waterways, maritime shipping routes, ports, airports and railroad terminals.

Aim: 'To close gaps, remove bottlenecks and technical barriers, as well as to strengthen social, economic and territorial cohesion in the EU.'

Climate Action and Low Carbon Development (Amendment) Act

This Act embeds the process of setting binding and ambitious emissions-reductions targets into Irish law. The Act provides for a national climate objective, which commits to pursue and achieve no later than 2050, the transition to a climate resilient, biodiversity-rich, environmentally sustainable and climate-neutral economy. The Act provides that the first two five-year carbon budgets proposed by the Climate Change Advisory Council should equate to a total reduction of 51% over the period to 2030, relative to a baseline of 2018.

Under this Act, the Irish Government must adopt carbon budgets that are consistent with the Paris agreement and other international obligations. All forms of greenhouse gas emissions including biogenic methane will be included in the carbon budgets, and carbon removals will be taken into account in setting budgets. However, it is up to government to decide on the trajectories for different sectors.

The Irish Government will determine, following consultation, how to apply the carbon budget across the relevant sectors, and what each sector will contribute in a given five-year period.

Actions for each sector will be detailed in the Climate Action Plan which must be updated annually.

The Climate Change Act (Northern Ireland) 2022

The Climate Change Act (Northern Ireland) 2022 (Act) sets a target of an at least 100% reduction in net zero greenhouse gas (GHG) emissions by 2050 (i.e., net zero emissions by 2050) for Northern Ireland compared to baseline, along with interim targets including an at least 48% reduction in net emissions by 2030.

Section 23 of the Act requires regulations that set carbon budgets to be made. The first budgetary period is 2023-2027 and every five years thereafter. The first three carbon budgets for Northern Ireland (2023-2027, 2028-2032 and 2033-2037) must be set by the end of December 2023 and each subsequent budget must be set a minimum of 12 years in advance of the budgetary period commencing. Carbon budgets must be set at a level that is consistent with meeting the 2030, 2040 and 2050 emissions reduction targets.

5-year climate action plans (CAP) will be produced to set out the policies and proposals that Northern Ireland departments will implement to meet the corresponding carbon budget as well as set out how the emissions reduction targets will be achieved.

New Decade, New Approach

A deal to restore devolved government in Northern Ireland, with a focus on better public services, a stronger economy and a fairer society. It includes a commitment to investigate the feasibility of a high-speed rail connection between Belfast, Dublin and Cork, creating a spine of connectivity on the Island.

Decarbonising Transport – A Better, Greener Britain

A plan on how emission reductions to net zero will be delivered by 2050 and the associated benefits that will be realised across the UK.

Climate Action Plan

The Climate Action Plan 2023 (CAP 2023) is the second annual update to the Ireland's Climate Action Plan 2019. This plan is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings. The CAP 2023 implements the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action to halve emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government.

The CAP 2023 also sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development. In relation to the transport sector, the CAP details a 50% reduction in emissions by transforming how people travel. It aims to drive policies to reduce transport emissions by improving town, city and rural planning, and by adopting the Avoid-Shift-Improve approach: reducing or avoiding the need for travel, shifting to public transport, walking and cycling and improving the energy efficiency of vehicles.

4. SEA Methodology

4.1 Introduction

This section highlights how the SEA has been undertaken for the draft AISRR. The SEA methodology is based on legislative requirements and relevant Environmental Protection Agency (EPA) guidance and will ensure compliance with the SEA Directive and associated legislation. The EPA's SEA Pack (Version 28/01/2022) was also used as a source of information during the scoping process. Regard was had to the UK-wide guidance 'A Practical Guide to Strategic Environmental Assessment Directive' throughout the process.

The draft AISRR (DoT and DfI), the SEA Environmental Report and the Appropriate Assessment (Arup) were prepared in an iterative manner whereby multiple revisions of each document were prepared, each informing subsequent iterations of the others. To facilitate this iterative approach, numerous discussions were held between DoT and DfI and Arup.

The key stages outlined in Figure 4.1 were identified and are discussed in the following sections.

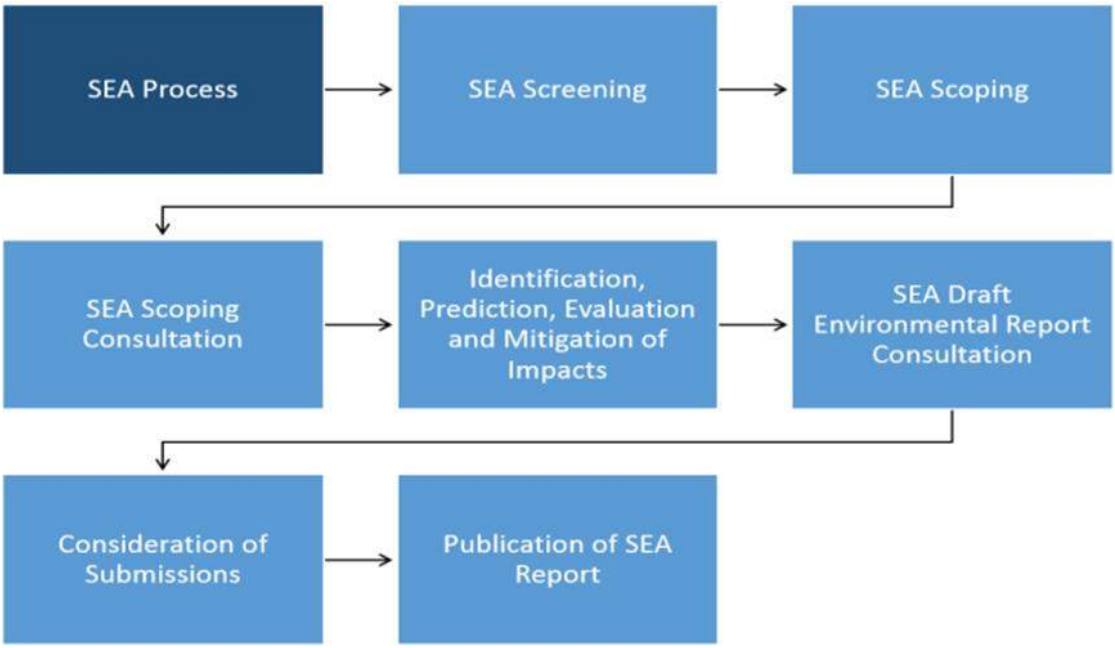

Figure 4.1: Key Stages of the SEA Process

4.2 Screening

Screening is the process for deciding whether a particular plan would warrant SEA at the earliest possible opportunity. It also facilitates the assessment findings so that they can be factored into the plan development process.

The screening determination for the draft AISRR was determined to be mandatory as the AISRR is of a type of Plan/Programme (P/P) which falls within the remit of the SEA Directive/SEA Regulations in that:

- The draft AISRR is considered to be a document prepared by 'an authority' at a national level;
- The draft AISRR is considered to constitute a P/P that is required by legislative/administrative provisions;
- The draft AISRR is not considered to be exempt as the sole purpose of the draft AISRR is not to serve national deference or civil emergency, and the draft Review is not a financial budget, or co-financed by the current Structural Funds and Regional Development Funds programme; and
- The draft AISRR is a P/P prepared for the transport sector and has the potential to set a framework for the development consent for projects listed in the EIA Directive.

4.3 Scoping

The main objective of the Scoping Stage is to identify the key environmental issues that may arise as a result of the draft AISRR, so they may be addressed appropriately in the ER. There are a number of tasks at this stage:

- Determine the key elements of the draft AISRR to be assessed;
- Determine the environmental issues to be assessed;
- Collect and report on relevant international, national and local plans, objectives and environmental standards that may influence or impact on the draft AISRR;
- Develop draft environmental objectives, indicators and targets to allow the evaluation of impacts; and
- Identify reasonable alternative means of achieving the strategic goals of the draft AISRR.

A Scoping Report was prepared in June 2023 in relation to the draft AISRR, which provided information to allow consultation with defined statutory bodies on the scope and level of detail to be considered in the environmental assessment.

The draft AISRR was issued to the statutory consultees and the consultees were given a period of four weeks to respond with any observations or submissions on the content of the SEA Scoping Report.

The SEA Scoping Report was emailed to the SEA Teams in the Department of the Environment, Climate and Communications (RoI), Environmental Protection Agency (RoI), Department of Agriculture, Food and the Marine (RoI), National Parks and Wildlife Service (RoI) and Department of Agriculture, Environment and Rural Affairs (NI) and . All responses received are described in Table 4.1 with a response provided where relevant.

Table 4.1 Scoping Responses

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
Environmental Protection Agency	It would be useful for the SEA Environmental Report to identify the key relevant plans and programmes and to show how these are interlinked with the Plan. A schematic showing these relationships would be useful to set the context for the Plan.	Refer to Figure 3.1.
	We recommend including a schematic of the relevant transport planning hierarchy (including any proposed new plans, that may arise out of the Plan). This will help inform the level and type of engagement with other stakeholders in their own sectoral planning and land management.	Refer to Figure 3.1.
	Include an additional column in Table 1 to summarise the relevance of the plans and programmes listed to the Plan. Various legislation, plans, programmes and research resources for consideration are listed in the EPA Scoping Response Document.	Additional column added to Table A1 in Appendix A.
	Consider improving the sensitivity weighting associated with high status water bodies (rivers/lakes/coastal/estuarine) from 5 to 10, to reflect their importance.	The sensitivity weighting has been increased from 5 to 10.
	Recommended that both opportunities and key issues for each of the environmental criteria are scoped into the process of sensitivity mapping. To help in the assessment of the Plan objectives and what mitigation measures or monitoring may be required.	The datasets used to create the sensitivity mapping reflect the key issues and opportunities identified in the SEA Scoping Report.
	The SEA and Plan should take account of the latest GHG projections. Found at https://www.epa.ie/publications/monitoring--assessment/climate-change/air- emissions/irelands-greenhouse-gas-emissions-projections-2022-2040.php .	Cognisance has been given to Ireland's Greenhouse Gas Emissions Projections 2022-2040. Reference is made to this report in Section 5.6.2.1.
	Section 5.8 - Landscape and visual aspects: May be useful to consider EPA's new guidance note on SEA and Landscape during Q3 2023 once available, and EPA – RELAVENT (Reframe Landscape Character Assessment), in preparing the draft Plan and associated SEA Environmental Report.	This guidance note was not available at the time of preparing this Environmental Report. Any subsequent plans or projects arising from the implementation of the AISRR will consider these guidance documents. This has been added as a mitigation measure in Section 9.1.
	Figure A1: consider clarifying the area covered by the Plan. Highlighting the existing rail (and associated infrastructure) covered by the Plan would be useful to help inform the scope of the environmental assessments.	Figure 1 of the draft All-Island Strategic Rail Review outlines the existing rail network.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
	The SEA environmental report should clearly set out the scope, remit and implementation-related elements of the Plan. It is important to note that where it is envisaged that measures proposed in the Plan will be implemented via strategies and plans, which themselves have been or may be subject to SEA, this should be explained in the SEA Environmental Report and taken into account in the assessment. Where specific measures will be implemented directly, further detail should be provided in the Environmental Report and Plan on the relevant environmental assessments to be carried out at lower-level planning and project stages and relevant mitigation measures to be applied, as appropriate.	The recommendations of the draft AISRR are outlined in Section 2.4 of this report. It is stated in this Environmental Report that any plans/projects arising from the implementation of the AISRR will be subject to appropriate feasibility, options and environmental assessment where required.
	Table 5: More appropriate to split these objectives into a smaller number of higher-level environmental protection objectives (EPOs) which seek to address the key environmental objectives, supported by sub-objectives for more specific elements. Where possible, the EPOs should also be made more specific to the Plan and assessment being carried out.	Table 6.1 has been amended to split the objectives into higher level objectives (EPOs), supported by sub-objectives, where relevant.
	The assessment of the EPOs against the Plan objectives could be done, taking account of the higher-level EPOs. The assessment for each environmental theme, could also include summary text of any aspects identified requiring mitigation, further assessment, policy wording changes/additions etc.	Where mitigation measures or further assessment is required this is outlined in Table 9.1. In relation to policy wording changes/additions, the following text has been added to the draft AISRR ‘A Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) of the All-Island Strategic Rail Review have been carried out to ensure environmental considerations have been incorporated into the Review. Any new projects or plans arising from the implementation of this Review shall be subject to appropriate feasibility, options and environmental assessments where required. All mitigation measures outlined in the accompanying SEA Environmental Report and Appropriate Assessment Report. The relevant mitigation measures should be adhered to in full during the implementation of this Review.’
	Where possible, monitoring indicators should take into account the potential impacts of the Plan and which monitoring indicators may be best placed to take these into account over the lifetime of the Plan. Using broader environmental monitoring, will make it more difficult to differentiate whether and changes in environmental quality relate to implementation of the Plan (needing to be mitigated) or relating to wider environmental changes not linked to the Plan.	Due to the nature and scale of the draft AISRR, only broader environmental monitoring measures can be included at this time. Any plans/projects arising from the implementation of the AISRR will include more specific monitoring measures (as outlined in Table 9.2).

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
Historic Environment Division, Department for Communities (Northern Ireland)	Section 1.2.3.2: HED advise guidance-on-sustainability-appraisal-and-strategic-environmental-assessment-for- the-historic-environment	It is deemed that this guidance is not relevant to the draft AISRR.
	Section 3.3.3: HED recommends reference to cultural heritage designations in the first bullet. e.g. UNESCO World Heritage sites at the international level. National cultural heritage designations may also be likely to interface with connectivity opportunities.	UNESCO World Heritage Sites have been referenced in Section 5.7 of this Environmental Report and mapped in Figure B18.
	Section 4: HED advise that some of the reference material at the end of the report (e.g., – The European Landscape Convention) and in the body of text for each theme, (e.g., The Historic Monuments and Archaeological Objects (NI) Order 1995) ought to be considered in the context of the table. Various Plans are mentioned for consideration.	Plans not considered relevant.
	HED advise that it may be beneficial to consider in progressing this strategy, historic environment has been taken into account with regard to the HS2 scheme – and attach the following for information purposes only. Archaeology – HS2 HS2 Phase One Historic Environment Research and Delivery Strategy - GOV.UK (www.gov.uk)	Plans not considered relevant.
	Section 5.7: HED advise with regard to this section generally that cognisance of the international conventions which apply to archaeological and architectural heritage in both jurisdictions would be appropriate (i.e. Valletta and Granada Conventions)	Section 9.1 has been updated to include these conventions.
	Section 5.7: The Baseline account should also reference the legislative protection for Northern Irelands architectural heritage; The Planning Act (NI) 2011, which provides protection for Listed Buildings and Conservation Areas of special architectural and historic interest. Appendix A should be augmented to include these heritage assets.	Section 5.7 has been updated to include reference to the Planning Act (NI) 2011. Section 9.1 has also been updated to include reference to this legislative protection. Due to the geographical scale of the draft AISRR, it is not deemed necessary to include detailed information on these assets at this time. Any plans/projects arising from the implementation of the AISRR will have cognisance of these assets.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
	Section 5.7: Quite a heavy focus on archaeological remains, and while impacts on archaeology and new discovery can be specific concerns with regard to new development HED advise that our own wider Historic Environment Record contains an array of assets that have protections under the Regional and local planning policies in Northern Ireland, including Historic (and Listed) Buildings, designated Areas of Significant Archaeological Interest (ASAI), Historic Parks, Gardens and Demesnes, Defence and Industrial Heritage, and shipwrecks and maritime heritage.	Any plans/projects arising from the implementation of the AISRR will have regard to these assets. Section 9.1 has been updated to have regard to this.
	Section 5.7: heritage considerations should also factor in aspects of heritage not fully covered by those held on formal records -e.g. the wealth of vernacular heritage, particularly across the rural landscape, historic routeways, boundaries, and townland and parish boundaries.	Table 9.1 has been updated to reflect this.
	Section 5.7.2: HED consider that the first bullet point could be broadened to consider the wider array of known and unknown heritage assets, and importantly, impacts on their setting as well.	The scoping report listed a number of key issues and opportunities that may arise due to the implementation of the plan. The SEA environmental report assesses under each environmental discipline, the likely environmental impacts due to the implementation of all elements of the AISRR. On that basis, it is not necessary to revise the key issues and opportunities as they are not relevant when the actual plan is assessed as part of the environmental report.
	Section 5.7.2: HED welcome the reference and consideration of industrial and architectural heritage in the second bullet, and advise that certain aspects will have statutory protections, sometimes with specific consenting regimes outside the planning process	The scoping report listed a number of key issues and opportunities that may arise due to the implementation of the plan. The SEA environmental report assesses under each environmental discipline, the likely environmental impacts due to the implementation of all elements of the AISRR. On that basis, it is not necessary to revise the key issues and opportunities as they are not relevant when the actual plan is assessed as part of the environmental report.
	Section 5.7.2: Other issues relevant to cultural heritage include the climate crisis, the impacts it creates for some heritage assets, and the opportunities that the historic environment and some heritage assets present in helping address the climate agenda.	The scoping report listed a number of key issues and opportunities that may arise due to the implementation of the plan. The SEA environmental report assesses under each environmental discipline, the likely environmental impacts due to the implementation of all elements of the AISRR. On that basis, it is not necessary to revise the key issues and opportunities as they are not relevant when the actual plan is assessed as part of the environmental report.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
	Table 3: HED advise of the need to consider the full suite of historic environment evidence bases beyond recorded monuments, to include other key areas of cultural heritage sensitivity e.g. Listed buildings, Conservation Areas, ASAI's and Historic Parks, Gardens and Demesnes.	Table 9.1 has been updated to reflect this.
	Table 5: HED advise that the objective for Archaeological, Architectural and Cultural Heritage should be amended along the lines of "protect, conserve and where appropriate enhance heritage assets and their settings"	This objective has been updated to read 'Protect, conserve and where appropriate enhance places, features, buildings and landscapes of cultural, archaeological or architectural heritage (including heritage assets and their settings'.
	Table 5: In terms of targets for this theme HED would advise that alongside landscape the historic environment and archaeological considerations should be factored in, in the design phases enabling the objective to be better achieved.	The target under landscape and visual has been amended to include the following 'Any construction works and structures associated will be planned having cognisance to the historic environment and archaeological considerations'.
	Table 5: In terms of indicators HED advise that condition of assets near or associated with railway infrastructure might be an appropriate indicator of some successes.	This indicator has been added to Table 6.1.
Natural Environmental Division, Northern Ireland Environment Agency (Department of Agriculture, Environment and Rural Areas)	Table 1: NED advises that the table would benefit from the inclusion of a number of additional plans and programs. These are provided at the end of the NED response.	These plans and programmes have been reviewed and are included if deemed relevant.
	NED advise that details on any relevant conflicts and/or synergies between this plan's objectives and the objectives of other plans and programs should be identified and described within the Environmental Report.	Table A1 of Appendix A has been updated to include this information.
	Chapter 6: NED notes within Chapter 6 a description of sensitivity mapping. NED has concerns with this approach. Section 6.2: States that the weights are subjective in nature, NED would be more confident in an approach which is evidence based. Table 3 & 4: It is unclear as to how each weighting point (column 4 within Table 3) has been allocated and within Table 4 how the overlay results are related to significance of impacts against the environment Table 4: NED is concerned that should a site for example contain only an SAC and therefore a weighting of 10 that as per Table 4 this would be categorised as "low-sensitivity areas". Areas such as priority habitats which are not within designated sites have also not been included.	The methodology and weighting system applied is adopted from the EPA report 'GISEA Manual Improving the Evidence Base in SEA' and based on feedback from the scoping consultation process.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
	Chapter 5: Flora and Fauna have not been listed, it is unclear if they are included within the biodiversity section or have been omitted NED advise that this should be made clearer in the Environmental Report and advise that flora and fauna should be clearly included within biodiversity or have their own section.	Biodiversity is addressed in Section 5.3 of this report. Due to the geographical scale of the draft AISRR, detailed information on flora and fauna is not provided at this time. Any plans/projects arising from the implementation of the AISRR will be subject to appropriate environmental assessments which will include details on the baseline ecology of the plan/project area.
	Section 5.3.1.2: No details have been provided on designated sites within Northern Ireland, this should be included as part of the Environmental Report.	Due to the geographical scale of the draft AISRR, detailed information on designated sites is not provided in the Environmental Report at this time. However, designated sites are mapped on Figure A2. Details on the potential adverse effects on Natura 2000 sites as a result of the implementation of the AISRR are discussed in the accompanying Natura Impact Statement.
	NED also recommend that a section on how the existing environment without the implementation of the plan should be included within each topic area in the Environmental Report.	This information has been included under each environment topic in Section 5 of this Environmental Report.
	Chapter 5: No section on interrelationships have been provided, this should be included in the Environmental Report.	Section 8.4.1 addresses intra-plan cumulative effects.
	Table 5: A number of the targets have not been provided with clear figures and thresholds. NED recommend that clear measurable figures and thresholds should be used for targets and indicators were appropriate to provide clear goals.	Due to the geographical scale and high-level nature of the draft AISRR, no specific figures and thresholds can be provided at this time.
	Table 5: Under biodiversity indicators it states that “Conservation status/habitat quality for all sites and species located near railway infrastructure”, “near” is a very subjective term and a clearer measurable definition should be used, with perhaps a measurable Zone of Influence.	Due to the geographical scale and high-level nature of the draft AISRR, no specific zones of influence can be established at this time. Any plans/programmes arising from the implementation of the AISRR, will establish a project/plan specific Zone of Influence, where relevant.
	NED advise that impacts can occur at a distance from the construction and operational phases of the project. Impacts must also result in non-significant impacts on the environment, and this must be made clear in the Environmental Report. As discussed above interrelationships should also be included.	Due to the geographical scale and high-level nature of the draft AISRR, no specific effects can be established at this time. Details on the potential adverse effects on Natura 2000 sites as a result of the implementation of the AISRR are discussed in the accompanying Natura Impact Statement.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
		Any plans or projects arising from the implementation of the AISRR will be subject to appropriate environmental assessments to determine the potential effects.
	NED also advise that impacts may not just result from air quality and be positive in nature, therefore sites other than those related to air quality should be included and the potential impacts both positive and negative indicators included.	Details on the potential adverse effects on Natura 2000 sites as a result of the implementation of the AISRR are discussed in the accompanying Natura Impact Statement. Any plans or projects arising from the implementation of the AISRR will be subject to appropriate environmental assessments to determine the potential effects.
	The indicators should also focus on any biodiversity loss both within or outwith designated sites as well as gain as a result of this plan. Furthermore, NED advise that details of where the indicators data will be sourced from should be included at the Environmental Report stage.	Objectives and mitigation measures relating to no net biodiversity loss and biodiversity net gain are included in this Environmental Report. Table 9.2 provides details on where indicators data will be sourced from.
	Table 5: A target is to “Prevent the introduction of new invasive or alien species. Control/manage new invasive species”. Removal of current areas of invasive species should be included and NED advise that disturbance from works can potentially result in the spreading of non-native invasive species.	Details on the management of invasive species are outlined in Table 9.1.
	NED note that high level steps including sifts have taken place in respect of selecting alternatives but as of yet no specific alternatives have been provided. NED looks forward to reviewing these as part of the Environmental Report.	Details on alternatives are provided in Section 7 of this Environmental Report.
	NED notes that an AA (Appropriate Assessment) screening has been carried out with the conclusion that an AA is to be undertaken. NED would welcome the opportunity to review the completed AA when this has been completed.	A Natura Impact Statement (NIS) has been prepared for the SEA of the AISRR. NED will have the opportunity to comment on the NIS during the consultation period.
	Various legislations and plans are listed for consideration relating to the “National Site Network”	Table 9.1 has been updated to reflect this information.
	The 'Shared Horizons' is the Department's Statement of Policy on Protected Landscapes. https://www.daera-ni.gov.uk/articles/shared-horizons should be considered.	Table 9.1 has been updated to reflect this information.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
	The report should consider the Northern Ireland Seascape along with Landscape. Additional information on seascapehttps://www.daera-ni.gov.uk/publications/northern-ireland-regional-seascape-character-assessment	Due to the nature of the draft AISRR, seascape is not considered relevant.
	Seascape should be considered where relevant and could be included with Landscape.	Due to the natureof the draft AISRR, seascape is not considered relevant.
	Consideration of The Giant’s Causeway and Causeway Coast World Heritage Site (WHS). Additional information on the Giant’s Causeway and Causeway Coast WHS https://www.daera-ni.gov.uk/articles/giants-causeway-world-heritage-site Cuilcagh Lakelands UNESCO Global Geopark, and Mournes, the Ring of Gullion, and Strangford Lough and Lecale Global Geopark, in Northern Ireland are areas of internationally important rocks and landscapes, and could maybe be considered within the SEA Environmental Statement.	Reference to UNESCO world heritage sites has been added to Section 5.7 of this report and mapped on Figure B18.
	The Northern Ireland Landscape Character Assessment 2000 (NILCA 2000) and NI Regional Landscape Character Assessment can be consulted for impacts in broader areas. Link is provided for more information on these.	Reference to these character assessments is made in Section 5.8 of this Environmental Report.
	Waste Management: The SEA should consider all issues in relation to the aquatic environment during all aspects / phases in relation to the implementation of All-Island Strategic Rail Review (AISRR). This includes (but not limited to) the potential disturbance to/impact on NI/RoI migratory/mobile species such as salmon. Such species rely on, and can be impacted by, water quality and water resource issues.	Potential impacts on the aquatic environment have been considered fully in Section 8 of this Environmental Report under both the Biodiversity and Water headings. In addition, refer to the Natura Impact Statement accompanying this report.
	Assessment should consider all potential impacts both direct and indirect. After consideration, the SEA should clearly state whether, or not, any potential impacts to the aquatic environment have been identified and the nature of those impacts.	Potential impacts on the aquatic environment have been considered fully in Section 8 of this Environmental Report under both the Biodiversity and Water headings. In addition, refer to the Natura Impact Statement accompanying this report.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
	Essential that the relevant River Basin Management Plans are given due recognition during the SEA process. Draft River Basin Management Plan 2021-2027, DAERA should also be considered as part of the assessment.	Due regard has been given to River Basin Management Plans in Section 5.5, Section 6 and Section 9.
	Section 5.5.2: Water Management Unit notes, and is broadly supportive of, the potential issues for consideration that have been identified in relation to the water topic in section 5.5.2 of the document. While these are potential direct impacts it is important that the potential for indirect impacts are not overlooked during the SEA process.	Section 8 of this Environmental Report identifies the potential effects on various environmental aspects, including water. Any plans or projects arising from the implementation of the AISRR will be subject to appropriate environmental assessments to determine the potential effects.
	Where adverse impacts on the aquatic environment are identified during the SEA process, relevant and appropriate mitigation measures should be proposed. In addition, monitoring regimes should be identified (including where feasible, consideration of the frequency of monitoring, appropriate analysis, and reporting) to ensure both the efficacy of those mitigation measures and identify any unforeseen impacts to the aquatic environment that may arise from implementation of AISRR.	Mitigation and monitoring measures are outlined in Section 9 of this Environmental Report under the Biodiversity and Water headings.
	Air Quality: AQBU would like to advice that aerial emissions from construction works should also be considered in relation to the line; "If construction works take place within or in proximity to ecologically sensitive sites, there is the potential for negative impacts to arise due to water run-off or dust deposition."	Section 8 of this report has taken aerial emissions from construction works into consideration.
	Marine and Fisheries Division: It is suggested that marine policy, legislation, plans and programmes be included within this section, given rail infrastructure is located along coastlines, and could impact on the marine area and its environment, especially during construction.	All relevant legislation will be adhered to in full during the implementation of the AISRR.
	It is suggested that further reference be made to marine biodiversity within the sections on 'state of biodiversity' for both Ireland and Northern Ireland.	Additional information has been provided in Section 5.3.2.
	Key Issues and Opportunities Section: In addition, it is advised the potential for negative impacts on ecologically sensitive sites and the habitat removal or degradation in coastal and marine areas should be highlighted under the Key Issues and Opportunities.	The scoping report listed a number of key issues and opportunities that may arise due to the implementation of the plan. The SEA environmental report assesses under each environmental discipline, the likely environmental impacts due to the implementation of all elements of the AISRR.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
		On that basis, it is not necessary to revise the key issues and opportunities as they are not relevant when the actual plan is assessed as part of the environmental report.
	Key Issues and Opportunities Section: include specific reference to negative effects on and pollution of coastal and marine waters. This would support any future conclusions regarding likely significant transboundary marine effects.	The scoping report listed a number of key issues and opportunities that may arise due to the implementation of the plan. The SEA environmental report assesses under each environmental discipline, the likely environmental impacts due to the implementation of all elements of the AISRR. On that basis, it is not necessary to revise the key issues and opportunities as they are not relevant when the actual plan is assessed as part of the environmental report.
	Archaeology, Architectural and Cultural Heritage Section: It is suggested reference should be made to the marine historic environment.	Section 9.1 of this report references underwater archaeological sites in riverine, intertidal and sub-tidal locations.
	Key Issues and Opportunities Section: Construction works along coastal areas may have the potential to impact on marine heritage in both jurisdictions and should be highlighted.	Due to the high-level nature of the AISRR, no definitive works have been decided. Any plans arising from the implementation of the AISRR will be subject to appropriate feasibility, constraints and route options assessments and will be cognisant of the value of coastal areas.
	Landscape and Visual section: The Northern Ireland Seascape Character Assessment Northern Ireland Regional Seascape Character Assessment | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) should be included.	Section 5.8 of this Environmental Report references the Northern Ireland Regional Seascape Character Assessment. Due to the nature of the AISRR, seascape is not considered relevant.
	Key Issues and Opportunities section: It is recommended that potential impacts on seascapes, seascape character and /or ecological components of the seascape should be recognised.	Due to the nature of the AISRR, seascape is not considered relevant.
	Environmental Sensitivity Mapping: Consideration should be given to including Marine Protected Areas; MSFD environmental status for transitional and coastal waters; and sensitive landscapes / seascapes	Marine Protected Areas have been included in Appendix A. No publicly available data on MSFD environmental status for transitional and coastal waters could be sourced. Due to the nature of the AISRR, seascape is not considered relevant. Any plans or projects arising from the implementation of the AISRR will be subject to appropriate environmental assessments to determine the potential effects on sensitive landscapes.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
	Biodiversity Section: recommended that specific reference is made to marine habitats and species within the first SE Objective; Marine Protected Areas are included within the second SE Objective and "including those in the marine area" is added to the end of the third SE Objective. This should be carried across into the relevant targets and indicators.	Table 6.1 has been updated to reflect this response.
	Biodiversity Section: It is recommended reference is made to marine and coastal/transitional water bodies in the first SE Objective and Indicator in the Water component. Within the second SE Objective, it is suggested that cognisance should be given to the requirements of MSFD / Marine Strategy. The achievement of MSFD / Marine Strategy objectives should also be considered for inclusion in the target for this component.	Table 6.1 has been updated.
	Archaeology, Architecture and Cultural Heritage Section: Is its suggested 'marine heritage' is included within the SE Objective, Target and Indicator for Archaeology, Architecture and Cultural Heritage.	Table 6.1 has been updated.
	It is recommended that seascape is considered within the draft SEA objectives, targets and indications for Landscape and Visual.	Due to the nature of the AISRR, seascape is not considered relevant.
	Table 1: Relationship with other relevant plans and programmes, we advise that the SPPS is dated 2015 not 2017.	This has been corrected.
	Where infrastructure is planned for the coastline of Northern Ireland or at sites hydrologically linked to the marine environment, policies listed in the scoping response should be considered.	All relevant legislation will be adhered to during the implementation of the AISRR.
	We recommend adding DAERA as a source for marine SACs, SPAs, Ramsar Sites and Areas of Special Scientific Interest. In addition, marine Conservation Zones and Seascape should be considered with DAERA as a source.	Marine SACs and SPAs have been included in Figure AB2 of Appendix B. RAMSAR sites are included in Figure B2 of Appendix B. Areas of Special Scientific Interest are included in B6 of Appendix B. Marine Conservation Zones have been included in Figure B2 of Appendix AB. Due to the nature of the AISRR, seascape is not deemed relevant.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
	In Section 3.3 Environment and Engineering, we recommend also considering whether a site is in the present day and climate change sea flood plain boundaries and whether it is in close proximity to a coastline identified as having a high or moderate risk of coastal erosion.	Refer to the Strategic Flood Risk Assessment which has been prepared.
	In Section 5.3.1.2 the State of Biodiversity in Ireland and Northern Ireland, we advise there is an updated Northern Ireland Priority Species list - https://www.daera-ni.gov.uk/publications/list-northern- ireland-priority-species-2023	Noted. This list will be referred to where necessary.
	In Section 5.3.2 Key Issues and Opportunities, we recommend considering Invasive Non-Native species, as they are easily spread along train infrastructure corridors as well as the pollution, disturbance and litter from construction works.	The management of invasive species is covered in Section 9.1.
	In Section 5.5.1.3 Flood Risk, we advise that coastal flooding should also be considered where relevant.	Refer to the Strategic Flood Risk Assessment which has been prepared.
	In Section 5.8 Landscape and Visual, we advise that Seascape should be considered where relevant. Northern Ireland Regional Seascape Character Assessment.	Due to the nature of the AISRR, seascape is not considered relevant.
	Table 5: we recommend considering Seascape.	Due to the nature of the AISRR, seascape is not considered relevant.
	DAERA Inland Fisheries would advise that any such Assessments consider the following points if not already considered. With regards to legislation which should be taken into account within the DAERA jurisdiction this should include reference to - The Fisheries Act (NI) 1966 (as amended). With particular consideration where appropriate to the sections as follows – Section 47, Section 48, Section 54, Sections 58 and 59	All relevant legislation will be adhered to in full during the implementation of the AISRR.
	In relation to transboundary catchments Inland fisheries would recommend that any SEA/AA be cognisant of the North Atlantic Salmon Conservation Organisation (NASCO), Convention for the Conservation of Salmon in the North Atlantic Implementation Plan for the period 2019 – 2024, this an international commitment for Northern Ireland (as part of the UK; ROI through the EU is also a signatory) and should be included in any policy has the potential to impact this species and the goals of this plan.	All relevant legislation will be adhered to in full during the implementation of the AISRR.

Consultee/Stakeholder	SEA Scoping Response	SEA Actions
	If any transboundary watercourses within DAERA Inland Fisheries jurisdiction are impacted by the policy or plan should be considered in any SEA, should include non-designated sites and the assessment should consider Priority Fish Species and their Priority Habitats as listed by NIEA. An SEA should also consider fish migration, habitat fragmentation and degradation.	Potential impacts on non-designated sites, priority fish species and priority habitats have been considered in full in Section 8 of this Environmental Report under the Biodiversity and Water headings.
	The Loughs Agency is the lead body for provision of advice regarding impacts to salmonid and inland fisheries interests within the catchments of Lough Foyle and Carlingford Lough. Consequently, said agency should also be consulted in relation to any impacts to salmon and inland fisheries within their jurisdiction.	All relevant stakeholders will be consulted with during the implementation of the AISRR.

4.4 Baseline Data

Gathering relevant information relating to the state of the environment for a plan area is an integral part of the SEA process. The SEA Directive requires that certain information relating to the relevant environmental baseline is presented in order to help test the performance of the plan's implementation, as well as helping establish how the environment would change if the plan were not to implemented. Baseline information has been collected from readily available sources. A Geographical Information System (GIS) was used to graphically present relevant information. The baseline information is reported in Section 5 of this report.

4.5 Considerations of Alternatives

The SEA Directive requires that reasonable alternatives be assessed in order to demonstrate how the preferred strategy performs against other forms of action. Alternatives must be developed, described and assessed within the SEA process, with the results presented in the ER. Section Error! Reference source not f ound. of this report identifies, describes and evaluates different scenarios for the draft AISRR, taking into account national planning policy, economic development policy, and the Strategic Environmental Objectives (SEOs) identified in Section 6.

4.6 SEA Sensitivity Mapping

Environmental Sensitivity Mapping was prepared in order to provide relevant information on environmental constraints so that environmental issues could be taken into consideration from the earliest possible stages of the SEA. The Environmental Sensitivity Mapping has been used to inform the environmental baseline description provided in Section 5 of this Report and certain mitigation measures identified in Section 9**.**

4.7 Environmental Assessment of the draft All-Island Strategic Rail Review

The environmental assessment process ran in parallel to the development and preparation of the draft AISRR. The environmental assessment process was undertaken in accordance with best practice SEA principles and guidance. This included desk reviews of all of the available GIS data, specialist investigation into the likely effects associated with the draft AISRR and recommendations for suitable mitigation measures along with monitoring.

4.8 SEA Statement

On adoption of the AISRR, the SEA Statement will be made public and will include information on how environmental considerations were integrated into the AISRR.

It will highlight the following:

- Main changes to the AISRR which resulted from the SEA process;
- How the Environmental Report and consultations were taken into account;
- Summary of the key issues raised in consultations and in the Environmental Report indicating what action was taken in response; and
- The reasons for choosing the AISRR in the light of the other alternatives, identifying the other alternatives considered, commenting on their potential effects and explaining why the AISRR was selected.

4.9 Consultations

Further to the SEA Scoping consultation outlined in Section Error! Reference source not found., this SEA E nvironmental Report will be issued to the relevant statutory stakeholders for comment. The responses received will be addressed in the finalisation of the Environmental Report. An outline of the responses received will be included in the SEA Statement.

4.10 Technical Difficulties Encountered

No major technical difficulties were encountered during the preparation of this Environmental Report.

Data relating to land cover on the Island of Ireland was taken from the European Environmental Agency (EEA) CORINE (Coordination of Information on the Environment) land cover data series, which is an EU-wide inventory of land cover in 44 classes categorised from satellite photography. The new national land cover map prepared by the National Mapping Division of Tailte Éireann, was considered too detailed for a national level plan.

5. Current State of the Environment

5.1 Introduction

An assessment of the current state of the environment and key environmental issues across Ireland and Northern Ireland was conducted within the All-Island Strategic Rail Review SEA Scoping Report. GIS is used extensively to provide national information.

Where data gaps are found for particular aspects of the environment, the significance of these data gaps are evaluated and clearly stated. It will also be stated whether these gaps can be addressed during the SEA process.

The baseline environment is assessed under the following headings:

- Population and Human Health;
- Biodiversity;
- Land and Soil;
- Water;
- Air and Climate (note: the topic of Noise was not considered relevant and thus scoped out of this assessment);
- Archaeology, Architectural and Cultural Heritage;
- Landscape and Visual; and
- Material Assets.

In accordance with S.I. 436 of 2004 (as amended) consideration will be given to whether the environmental effects, both positive and negative, of the Plan are likely to be significant.

Figures relating to this Section are contained in Appendix B, as extracted from the SEA Scoping Report, unless otherwise stated.

The SEA Directive requires that where the draft AISRR has potential for transboundary environmental effects these must be addressed within the SEA. As the draft AISRR encompasses both Ireland and Northern Ireland and are both assessed in their entirety, no transboundary effects are predicted.

5.1.1 Overview of Rail

5.1.1.1 Passenger Rail

The Island of Ireland currently has approximately 2,300km (1,438 miles) of public rail lines. Iarnród Éireann (Irish Rail), the state-owned railway company in Ireland, operates 1,944km (1,215 miles) of the rail network, and Translink (Northern Ireland Railways), the state-owned transport company in Northern Ireland, operates another 357km (223 miles) in Northern Ireland.

Most rail corridors radiate from Dublin and Belfast, with several branches off the main routes to these cities. The route from Waterford to Athenry/Galway via Limerick is the only significant cross-country link that does not radiate from Dublin or Belfast. Apart from the mainlines from Dublin to Cork and Belfast and some short stretches of suburban lines around these cities, most of the rail network is a single-track railway, which severely limits service frequencies.

The only electrified sections of the railway are those used by the Dublin Area Rapid Transit service (DART) – a suburban service operating along the coast of the Dublin area from Greystones to Malahide and Howth. All other services are powered by diesel traction.

The maximum speed permitted on the rail network is 160km/h (100mph) along the lines from Dublin to Cork, Kilkenny, and Athlone. The maximum speed on Northern Ireland's network is 145km/h (90mph) between Belfast and Dublin and on parts of the Belfast to Derry~Londonderry route. Numerous speeds restrictions apply on these routes and across the wider network.

At the time of writing there were 199 passenger rail stations on the Island of Ireland. Each of the seven major cities serves as a terminus for rail services. Dublin, Belfast, and Cork each have a suburban rail network, although some only serves a limited number of areas within these cities, while the other cities (Limerick, Derry~Londonderry, Galway, and Waterford) only have one station each.

Dublin has multiple terminus stations, the busiest of which are Connolly, Heuston, and Pearse. While it is possible to travel between Connolly and Pearse by rail, Heuston and Connolly are not currently connected by passenger rail services. For the latter, connections via the Luas tram are possible, and future DART services through the Phoenix Park Tunnel are planned. This presents wider challenges for the Island's rail network, as it makes it difficult to operate direct passenger services between towns and cities in the north and east and those in the south and west.

Service frequencies are currently relatively low, especially on the intercity network and in regional and rural areas, where many routes are served by one train per two hours, and some only have two services per day. Service frequencies are significantly higher on the DART (e.g., Malahide – Greystones) and Dublin commuter networks and on suburban services in the Belfast area (e.g., Bangor – Lisburn).

5.1.1.2 Freight

Some rail lines in Ireland are also used for freight. These connect Ballina, Westport, and Navan to the ports of Waterford and Dublin. The freight lines from Mayo share track with passenger services between Mayo and Dublin, along with the corridor from Kildare to Waterford. Freight services to Navan share track with passenger services between Dublin and Drogheda before continuing to Navan on a freight only line. There are currently no rail freight operations in Northern Ireland.

5.2 Population and Human Health

5.2.1 Population

5.2.1.1 Ireland

This section summarises some key preliminary results of the 2022 Census for Ireland which, at the time of writing, is the most recent Census.

The 2022 Census results outline a population of 5,149,139 for Ireland, making it the first year since 1851 to have a population greater than 5 million. This is an increase of 8.1%, almost twice the increase rate on the 2016 Census (4,761,865).

The population of Ireland has generally been rising since the 1960s as a result of declines in emigration, an increase in birth rate and declining death rates. Between 2016 and 2022, the population grew by an average of growth rate of 1.3%.

At 11 people per 1,000 of the population between 2016 and 2022, Fingal recorded the highest annual average natural increase in population. The next highest were Kildare, South Dublin and Meath, all recording 9 people per 1,000. Kerry and Mayo had the lowest annual average natural increase with 3 people per 1,000.

The highest average annual net inward migration was recorded for Longford at 17 people per 1,000 of the population from 2016 to 2022. The counties with the lowest annual average net migration include Kilkenny and Tipperary, both at 4 people per 1,000.

The average age of the population increased from 37.4 years in 2016 to 38.8 years in 2022. In the 11 years between 2011 and 2022, the average age increased by 2.7 years and by 3.7 years since 2002. Figure 5.1 shows the population change since 2016 by County (%).

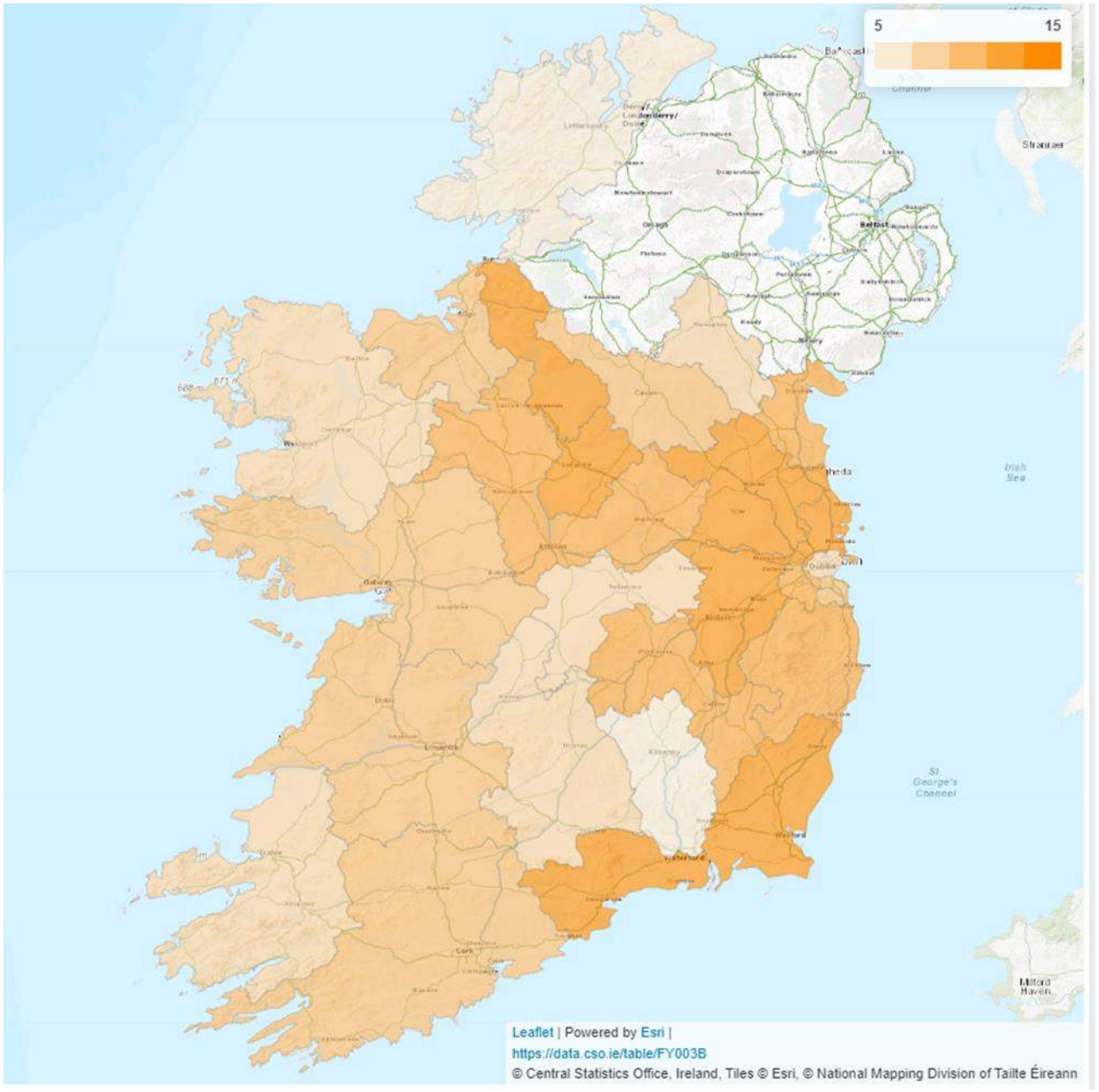

Figure 5.1: Population Change since 2016 (%) (Source: CSO, 2022)

Ireland's National Planning Framework projects that Ireland will be home to an additional one million people by 2040. These projected population increases will increase pressure on land-use and the requirement for development.

5.2.1.2 Northern Ireland

The population of Northern Ireland on the last census day (21 March 2021) was 1,903,175. The census is carried out every 10 years in Northern Ireland. This represents an increase of 5.1% (92,312) from 2011.

Population increase was greatest in the older age groups. The number of people aged 65 or more rose by over 60,000, to nearly one-third of a million people in Census 2021 – a near 25% increase on 2011 and demonstrates the scale of population change due to ageing. On census day, there were 365,200 children aged 0 to 14, a 10,500-increase compared to the 354,700 in 2011. The proportion of children is now only marginally greater than the proportion of older adults.

Belfast remains the largest Local Government District by population with 345,400 people in 2021 and Fermanagh and Omagh remains the smallest Local Government District by population with 116,800 people. Population growth was proportionately greatest in Lisburn and Castlereagh with 149,100 people in 2021, (an increase of 10.6% from 2011).

The percentage share of the population in Northern Ireland is shown in Figure 5.2.

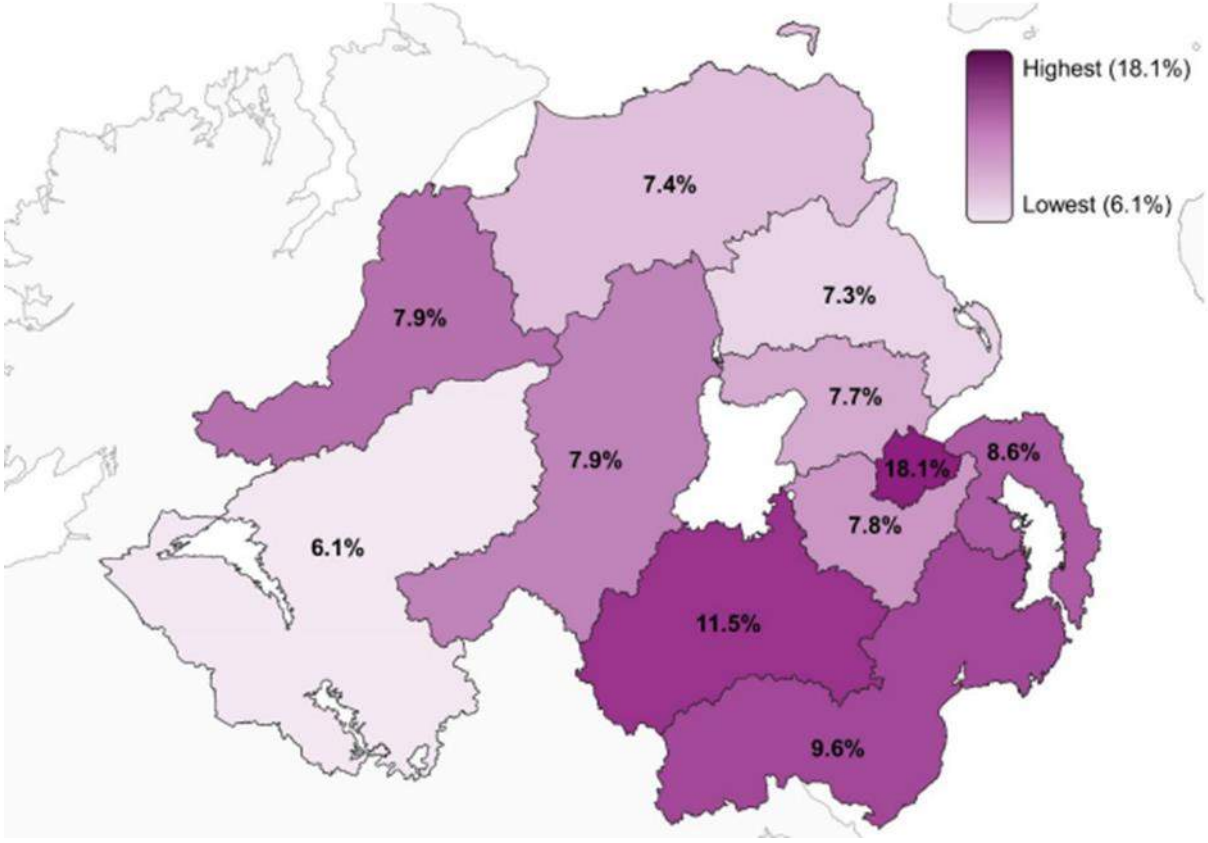

Figure 5.2: Percentage share of Northern Ireland Population by Local Government District (Source: NISRA, 2022)

5.2.2 Human Health

5.2.2.1 Ireland

Availability of spatial data on human health is limited. A key area of consideration of human health will be the interaction between environmental aspects such as water, landscape, biodiversity, air, and energy and human beings.

According to the Department of Health report 'Health in Ireland: Key Trends 2022', Ireland has the highest self-perceived health status in the EU, with 82.1% of people rating their health as good or very good.

The number of people reporting a chronic illness or health problem is also better than the EU average, at approximately 20% of the population.

Health is influenced by many factors in the social and built environment including, housing, employment status, education, transport and access to fresh food and resources, as well as the impacts of air quality, water quality, flooding and access to green space.

5.2.2.2 Northern Ireland

Like Ireland, availability of spatial data on human health is limited and health is influenced by the same factors outlined above.

A Health Survey was carried out by the Department of Health in Northern Ireland for the period 2021-2022. Approximately 73% of respondents rated their general health as very good, or good while 10% rated their general health as bad or very bad.

5.2.3 Likely Evolution of the Baseline Environment in the Absence of the draft AISRR

In the absence of the draft AISRR, the Population & Human Health baseline environment is likely to evolve as follows:

- Ireland's National Planning Framework projects that Ireland will be home to an additional one million people by 2040, projected population increases will increase pressure on land use;
- There will be an increased pressure on existing rail services due to the projected population increase. Negative impacts may arise for the population if rail services were to stay constant, as the growing demand for rail services could not be sustained.
- The extent of potential health benefits correlated with reduced emissions and improved air quality due to the decarbonisation of the rail sector may not be realised.
- The extent of potential health benefits correlated with reduced emissions and improved air quality due to the modal shift away from private car may not be realised.
- The potential for economic growth aided by improved rail connectivity would be limited.

5.3 Biodiversity

5.3.1 Biodiversity Overview

The Convention on Biological Diversity defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part". This includes sites, habitats, species and networks of importance at the international, national or local level.

Biodiversity loss is a significant and pressing social, political and economic issue for Ireland and the global community. Approximately 95% of the land surface has been modified by activities such as urbanisation, agriculture, energy infrastructure and mining. These anthropic activities have had detrimental impacts on natural habitats and species, resulting in an extinction rate hundreds of times higher than in the past 10 million years and which continues to accelerate. Species decline and extinction are beginning to affect the ecosystem services that communities rely on, such as the production of food and water, pollination, flood control, soil formation and nutrient cycling.

In growing recognition of the importance of reversing biodiversity decline caused by unsustainable development, land use change and pollution, the UN Convention on Biological Diversity (CBD) adopted the "Kunming-Montreal Global Biodiversity Framework" at the 15th Conference of Parties on the 19th of December 2022. The adoption of the ambitious Biodiversity Framework included the launch of the Accelerated Partnership to help countries fast track and upscale the implementation of their National Biodiversity Strategies and Actions Plans (NBSAPs). The Partnership will contribute to the achievement of the newly adopted global biodiversity goals and targets and, ultimately, the global vision of living in harmony with nature by 2050.

The four long-term goals for 2050 set out by the Kunming-Montreal Framework include:

- Maintaining, enhancing, or restoring the integrity, connectivity and resilience of all ecosystems;
- Halting human-induced extinction of threatened species and reducing the extinction rate and risk of all species;
- Maintaining genetic diversity within populations of wild and domesticated species; and
- Sustainably using and managing biodiversity and valuing nature's contributions to people.

The global trends of biodiversity loss are equally as problematic in Ireland, where the draft of the most recent National Biodiversity Action Plan referred to the 2019 conservation status assessments, required under Article 17 of the EU Habitats Directive, where 15% of EU protected species demonstrated ongoing declines over a 12-year period. Of those threatened species it was reported that half of all bee species have undergone substantial decline in population and 63% of bird species are declining at alarming rates. The decline of these species can be a result of many factors, mainly the deterioration of a species natural habitat. For example, half of the rivers in Ireland were recorded to have an unhealthy ecological status, putting freshwater species at risk. In the case of rivers, the deterioration of the habitat is mainly owing to nutrient inputs from wastewater, acidification caused by afforestation of Sitka Spruce and agriculture. Further agricultural intensification and use of fertiliser, and increased volumes of wastewater caused by population growth is expected to worsen the status of biological diversity in Ireland.

5.3.2 The State of Biodiversity in Ireland and Northern Ireland

5.3.2.1 Ireland

As outlined in (the draft) Ireland's 4th National Biodiversity Action Plan, global trends of biodiversity loss are reflected in Irish land and waterscapes. Intensive agricultural and forestry practises, overfishing, invasive species, changes in land-use (particularly for residential, agricultural and commercial development) and the over-exploitation of resources such as peatland are the main drivers of biodiversity loss. Figure B2 of Appendix B shows the distribution of designated sites across Ireland and Northern Ireland.

The latest review of birds of conservation concern from Bird Watch Ireland states that 63% of species including previously common birds such as house sparrows and starlings are declining at alarming rates (Gilbert et al., 2021). Article 12 reporting, under the EU Birds Directive, on the long- term status and trends of Ireland's bird species shows population declines of 9% and 24% respectively for breeding and wintering taxa (www.eea.europa.eu). Iconic species such as the curlew and corncrake are considered to be under threat of extinction.

The 2019 conservation status assessments required under Article 17 of the EU Habitats Directive reported that 46% of EU protected habitats and 15% of EU protected species demonstrated ongoing declines over a 12 year (NPWS, 2019), with freshwater species most at risk. However, many mammal species such as seals, dolphins, as well as several whale and bat species were assessed favourably.

About half of Ireland's rivers and lakes are in unhealthy ecological state mainly owing to nutrient inputs from wastewater and agriculture. The number of pristine river sites has dropped from 500 to 20 over the past 40 years (EPA, 2019). These water quality declines have major consequences for many freshwater species such as the Freshwater Pearl Mussel (*Margaritifera margaritifera*), Ireland's longest living animal, which is under threat owing to water quality issues in addition to changes to river flow and hydrology.

Despite ongoing conservation and restoration efforts, Ireland's biodiversity is in a state of crisis and urgent impactful action is imperative to prevent the continued erosion of its natural heritage.

As outlined in Ireland's Environment, An Integrated Assessment 2020, Ireland's marine territory is one of the largest in Europe and the recent Marine Strategy Framework assessment of environmental status indicates that Ireland's nearshore coastal and offshore marine waters are predominantly clean, healthy and biologically diverse. Recent assessments show that 80% of Ireland's coastal waterbodies and 38% of transitional waterbodies have a high or good ecological status.

5.3.2.2 Northern Ireland

As outlined in the Department of the Environment's report '*A Biodiversity Strategy for Northern Ireland to 2020*', Northern Ireland's biodiversity is internationally important with some 20,000 species found on the land, in the soil, in the air and in the waters. This important biodiversity is a reflection of Northern Ireland's remarkable geological diversity.

Peaty soils cover almost 13% (206,400 hectares) of Northern Ireland's land, including most of the uplands. Of this total area, 165,000 hectares consists of either semi-natural blanket bog, lowland raised bog or fen vegetation each with a high biodiversity value. Approximately 70% of land in Northern Ireland is devoted to agricultural activities.

Two of the main ecosystem categories are primarily managed by agriculture – enclosed farmland covering about 44% of Northern Ireland, and semi-natural grassland, a much-threatened habitat covering 18.5% of the land.

Northern Ireland has approximately 111,000 hectares of forest and woodland (approximately 10% of land cover) of which 62,000 hectares, or 56% is managed by the Forest Service, an executive agency of the Department of Agriculture, Environment and Rural Affairs. The remainder is predominantly privately owned and managed by a wide range of land managers.

Semi-natural grasslands cover approximately 18.5% of Northern Ireland. These areas are used for low intensity grazing and are valuable for carbon storage especially in areas of permanent grassland. This habitat is also important for scenery and tourism.

Wetlands, including lakes, fens and flooded grassland, cover around 7% of Northern Ireland. There are more than 1,600 lakes ranging in size from small ponds to Lough Neagh, the largest freshwater lake in the UK. Most lakes are fringed by fen, marsh and swamp. However, this broad habitat also frequently occurs in low-lying wet ground or poorly drained marginal land. Many have been highly modified over the years by drainage and nutrient enrichment from surrounding farmland and urban waste water. A high proportion of such wetlands are eutrophic with resultant negative impacts on biodiversity.

The Ramsar Convention is an intergovernmental treaty that provides the framework for "the conservation and wise use of all wetlands through local, regional and national actions and international co-operation as a contribution towards achieving sustainable development throughout the world". There are currently 21 Ramsar sites in Northern Ireland.

As noted in the 'A Second Assessment of the State of Northern Ireland's Environment', the overall quality of the marine environment around Northern Ireland's shores, including bathing water quality and beaches is improving, assisted by improvements to wastewater treatment. It notes that implementing the Marine Strategy Framework Directive will be a challenge, with just one third of Northern Ireland's marine bodies meeting objectives.

5.3.3 Likely Evolution of the Baseline Environment in the Absence of the draft AISRR

In the absence of the draft AISRR, the biodiversity baseline environment is likely to evolve as follows:

- Potential impacts may arise through climate change and pollution that may alter species and habitat ranges which may be mitigated by the implementation of the draft AISRR.

5.4 Land and Soils

5.4.1 ThiLand-Use

5.4.1.1 Ireland

According to data from Eurostat, and as described in the report 'Climate Change and Land Use in Ireland' (EPA, 2018), land use in Ireland is markedly different from the average across the Member States of the European Union (EU). The main differences are in the proportions of land devoted to agriculture, which in Ireland is 18.8% higher than the average in the EU-28 (EU-28 is the abbreviation of European Union (EU) which consists of a group of 28 countries). In 2018 the EU-28 average was 39.1%.

Also, the proportions of land devoted to forestry in Ireland is 23.3% lower than in the EU-28. The EU-28 average in 2018 was 35.9%. Since this report was published, the United Kingdom have since left the EU.

According to the same EPA report, the main source of national scale information on land cover in Ireland is the European Environment Agency (EEA) CORINE (Coordination of Information on the Environment) land cover data series, which is an EU-wide inventory of land cover in 44 classes categorised from satellite photography. According to 2018 CORINE data, the main land cover type in Ireland is agricultural land, which accounts for approximately two-thirds (67%) of the national landmass. The new national land cover map prepared by the National Mapping Division of Tailte Éireann, was considered too detailed for a national level plan.

Most of this is permanent grassland pastures. Peatlands and wetlands are the second most widespread land cover type, covering almost one-fifth (18%) of the country, while forested areas cover 11% of the country.

5.4.1.2 Northern Ireland

Ireland and Northern Ireland share a similar land cover for forestry, peatlands and agriculture, with farmland covering approximately 70% of the area in Northern Ireland.

The landcover type for both Ireland and Northern Ireland is presented in Figure B3 of Appendix B.

5.4.2 Soil

5.4.2.1 Ireland

The quality of soils in Ireland is considered generally good although there are pressures impacting on its long-term protection and maintenance particularly from land use changes, intensification of use, urbanisation, and contamination.

The soils of Ireland, mapped in Figure B4 of Appendix B, are an immensely valuable, and finite, national resource, which forms and evolves slowly over very long periods of time and can easily be damaged and lost. The long process of soil formation extends to the process of soil restoration after pollution or deterioration. The EPA report states that there are six overarching degradation processes that can impact on soils. These processes include compaction, erosion, organic matter decline, salination, landslides and soil sealing which is where soils are closed off from the surface of the land, e.g., road and building developments. The bedrock underlying these soils greatly influence soil formation and soil chemistry, as such, a map of the bedrock type distribution of Ireland can be found in Figure B5 of Appendix B.

Geological Heritage Sites are presented in Figure B6 of Appendix B.

5.4.2.2 Northern Ireland

In Northern Ireland, the primary soil functions include biomass production (grass and grain), regulation of nutrients and water in soils and maintenance and enhancement of soil carbon stocks.

The Sustainable Agricultural Land Management Strategy Report in 2016 stated that 98% of soils in Northern Ireland are inadequately analysed every year and that 82% of soils are below optimum fertility. Consequently, the Agri-Food and Biosciences Institute started a four-year Department of Agriculture, Environment and Rural Affairs funded project on soil health that will measure key soil chemical, physical and biological characteristics in soils.

Soil erosion is also of concern in Northern Ireland. In the temperate region of Northern Ireland, recent studies have highlighted the off-site issue of soil erosion by water in the present day, and projected that the problem may become more widespread and serious in a changing climate.

For a small area, Northern Ireland is known to have exceptional geological biodiversity. The bedrock geology of Northern Ireland is presented in Figure B5 of Appendix B.

Areas of Special Scientific Interest are presented on Figure B6 of Appendix B.

5.4.3 Likely Evolution of the Baseline Environment in the Absence of the draft AISRR

In the absence of the draft AISRR, the land and soils baseline environment is likely to evolve as follows:

- The land that is currently occupied by unused rail lines would remain in place without reinstatement.

5.5 Water Resources

5.5.1 Surface Water

5.5.1.1 Ireland

Nearly half of the surface waters in Ireland are failing to meet the legally binding water quality objectives set by the EU Water Framework Directive because of pollution and other human disturbance. Surface water features and their status' across Ireland have been illustrated in Figures B7, B8, B9, B10, B11, and B12 in Appendix B.

The EPA's report 'Water Quality in 2020' found that out of the 1,836 (out of 2,355) river waterbodies assessed in 2019 and 2020, 345 improved in water quality and 230 declined, resulting in a net improvement in quality in 115 river waterbodies. A summary of the key issues recorded in 2020 is contained in Figure 5.3 below.

Two of the main issues driving this deterioration are the excessive levels of nutrients and sediment entering water courses. Land management practices, where agriculture is seen to be the main pressure, amongst forestry and peat extraction, all contribute to this problem.

Based on the Water Framework Directive monitoring programme, that assesses the biological quality of rivers into five categories; high, good, moderate, poor, and bad, it was found that 57% (1,336) of the river water bodies assessed over the period 2017 to 2020 were in 'high' or 'good' biological quality. The remaining 43 % (1,019) were in 'moderate', 'poor' or 'bad' quality. The number of river water bodies in bad condition has reduced to two. This means that nearly half of the surface water bodies in Ireland are failing to meet the objectives set by the EU Water Framework Directive (2000/60/ EC) because of pollution and other human disturbance. Indicators as taken from the EPA's report 'Water Quality in 2020' have shown that nutrient levels in many of Ireland's waters are too high and high levels of nitrates have predominantly been found across rivers, groundwaters, and estuaries in the south and southeast of the country, also in areas with intensive agriculture over freely draining soils.

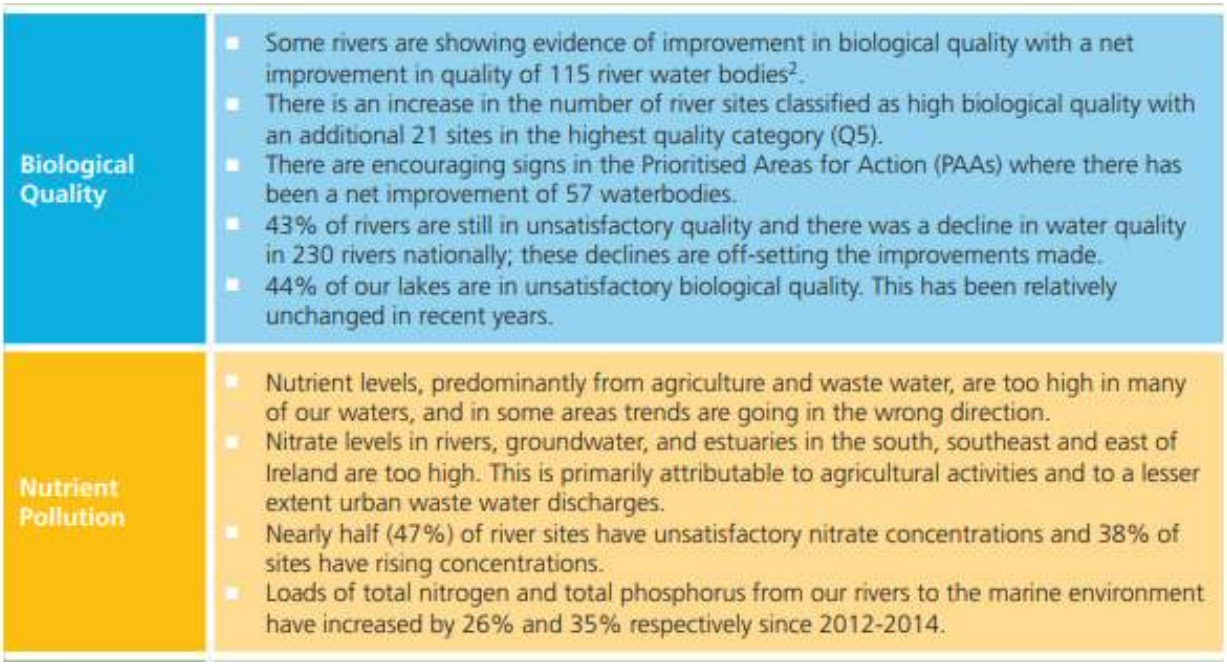

Figure 5.3 Water Quality in Ireland Key Indicators (Source: EPA, 2020)

According to the EPA, Ireland's surface waters are being damaged by pressures arising from various human activities. The most significant pressures, those considered to put a water body at risk of not meeting its environmental objectives, were identified and reported in the Draft River Basin Management Plan 2022-2027, following a comprehensive assessment by the EPA of various human activities and their potential impact on the aquatic environment. The complete breakdown is shown in Figure 5.4 below.

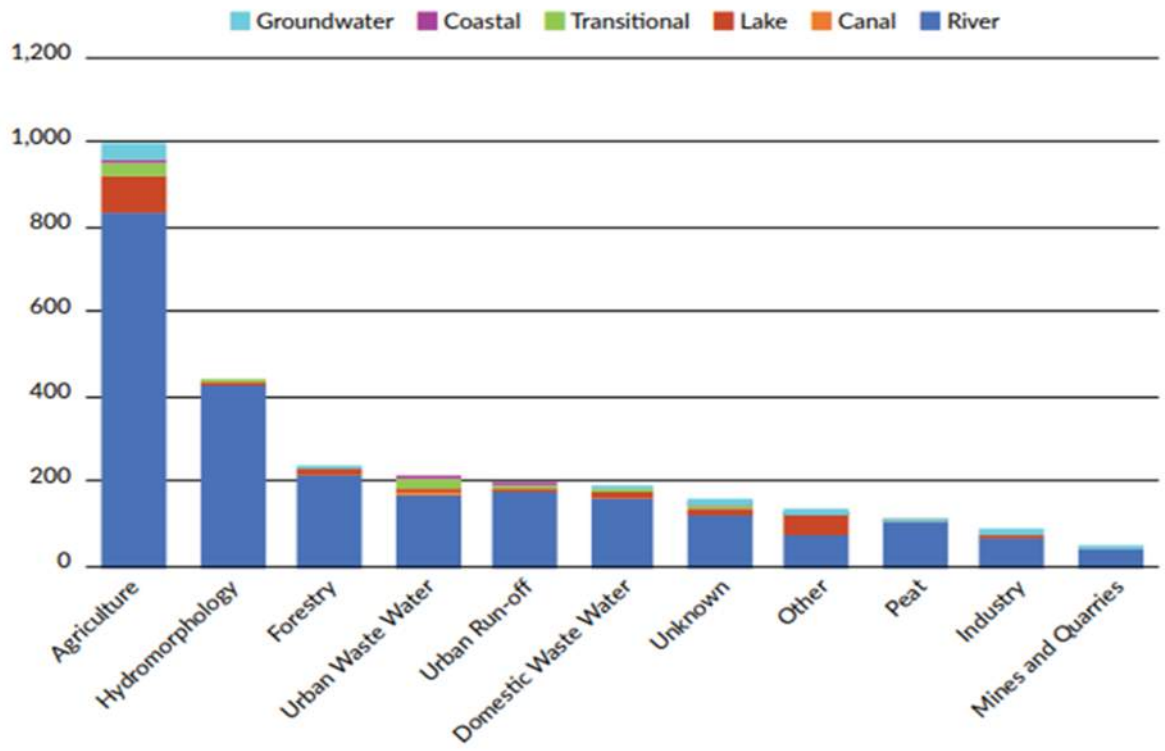

Figure 5.4 Representation of significant pressures in the rivers monitoring programme (Source: DHLGH, 2022)

5.5.1.2 Northern Ireland

The Water Framework Directive Statistics Report published in December 2021 by the Northern Ireland Environmental Agency presents the statistics on the state of the water environment in Northern Ireland.

The report states that there have been significant changes in monitoring and overall classification for rivers, lakes, transitional & coastal water bodies since the last publication. In 2018, new priority substances were introduced to the monitoring programme. For the first time the presence of ubiquitous, persistent, bioaccumulative, toxic (uPBT) substances, so-called 'forever' chemicals, have been assessed as part of chemical status. Due to their bioaccumulative and persistent nature, uPBT substances have been detected at all monitored stations and resulted in failures of all of those stations.

It is therefore reasonable to presume that uPBT substances would cause more failures if additional stations were monitored. For this reason, the uPBT failures have been extrapolated to all surface water bodies across Northern Ireland, meaning that none of its rivers, lakes, transitional & coastal water bodies will meet overall good status (when ecological and chemical status are combined).

Surface water features and their status' across Northern Ireland have been illustrated in Figures B7, B8, B9, B10, B11, and B12 in Appendix B.

Overall River Water Body Status

In 2015, 147 (33 %) of the 450 river water bodies in Northern Ireland were classified as good or high overall status. In 2018, 141 (31 %) of river water bodies were classified as good or high overall status. In 2021, no river water bodies achieved good or high overall status.

Overall Lake Status

In 2015 and 2018, 5 (24 %) of the 21 lake water bodies in Northern Ireland were classified as good overall status. In 2021, no lakes achieved good overall status.

Overall Transitional & Coastal Water Body Status

In 2015, 8 (32 %) of the 25 transitional & coastal water bodies in Northern Ireland achieved good overall status and 1 (4 %) achieved high overall status. In 2018, 10 (40 %) water bodies achieved good overall status. In 2021, no water bodies achieved good overall status.

The Draft 3rd cycle River Basin Management Plan (RBMP) 2021-2027 for Northern Ireland found that the overall status of waterbodies at 'good or better' status in the draft plan remains unchanged from 2015. The aim of the 2nd RBMP was to improve the status of waterbodies, so that 70% of all waterbodies would be at good status by 2021. The results of the draft plan classification means that Northern Ireland will not achieve that objective.

5.5.2 Groundwater

Groundwater features and their status' in Ireland and Northern Ireland have been illustrated in Figures B13, B14 and B15 of Appendix B.

5.5.2.1 Ireland

Overall, 91% of groundwater bodies are in good chemical status and nearly all are in good quantitative status. The south and southeast regions have the greatest proportion of sites with high and increasing nitrate concentration. There has been a slight decline of 0.8% (four waterbodies) in the number of groundwater bodies at good status since the last assessment.

5.5.2.2 Northern Ireland

In 2015, 49 (65 %) of the 75 groundwater bodies in Northern Ireland achieved good overall status. In 2021, 51 (68 %) achieved good overall status.

5.5.3 Flood Risk

Figure B16 of Appendix B illustrates the flood risk across both Ireland and Northern Ireland. The information presented is divided into three categories:

- Fluvial Flood Depth Annual Exceedance Probability 10%;
- Fluvial Flood Depth Annual Exceedance Probability 1%; and
- Fluvial Flood Depth Annual Exceedance Probability 0.1%.

A Strategic Flood Risk Assessment has been prepared for the draft AISRR and accompanies this report.

5.5.4 Likely Evolution of the Baseline Environment in the Absence of the draft AISRR

In the absence of the draft AISRR, the water baseline environment is likely to evolve as follows:

- Potential impacts may arise through climate change and pollution that may impact water quality and flooding which may be mitigated by the implementation of the draft AISRR.

5.6 Air and Climate

5.6.1 Air Quality

In order to protect human health, vegetation and ecosystems, EU Directives set down air quality standards in Ireland and the other Member States for a wide variety of pollutants. These pollutants are generated through fuel combustion, in space heating, traffic, electricity generation and industry and, in sufficient amounts, could affect the well-being of the area's inhabitants. The EU Directives include details regarding how ambient air quality should be monitored, assessed and managed.

5.6.1.1 Ireland

The EPA measures the levels of a number of atmospheric pollutants throughout Ireland in order to measure compliance with Air Quality Standards Regulations, 2022 (S.I. No. 739 of 2022). For the purposes of monitoring in Ireland, four zones are defined in the Regulations:

- **Zone A:** Dublin Conurbation;
- **Zone B:** Cork Conurbation;
- **Zone C:** Other Cities and Large Towns; and
- **Zone D:** Rural Ireland which is the remainder of the State excluding Zones A, B and C.

While air quality in Ireland has been considered to be generally good, new evidence from increased monitoring and modelling, coupled with new research on the health impacts at lower levels of exposure to particulate matter, raises questions about that status.

The Irish Ambient Air Quality Standards Regulations (2022) are informed by the EU Air quality standards which set the annual limits for each parameter in Table 5.1. These annual limits must not be exceeded in order to protect human health and environmental quality across Ireland.

Table 5.1 Air Quality Standards (Source: Government of Ireland, 2022)

Parameter	Air quality standard (µg/m^3)
NO_2	40
SO_2	20
CO	10,000
PM_{10}	40
$PM_{2.5}$	25
Benzene	5

The EPA manages the National Ambient Air Quality Network. This network sets legislative limits and target values for the protection of human health and vegetation.

According to the 'Air Quality in Ireland Report 2021', monitoring carried out by the EPA in 2021 continues to highlight the need for action on the two key issues that have a negative impact on air quality in Ireland: emissions from the burning of solid fuels in homes and transport emissions from vehicles in urban areas. Ireland was compliant with EU legal limits in 2021, however, monitored levels were above the WHO air quality guideline values for most pollutants in almost all air quality monitoring stations**Error! Bookmark not defined.** m ainly due to the two key issues identified above.

5.6.1.2 Northern Ireland

In 2021, Northern Ireland had 22 Air Quality Monitoring Stations operational. The main sources of air pollution in Northern Ireland are presented in Figure 5.5 below.

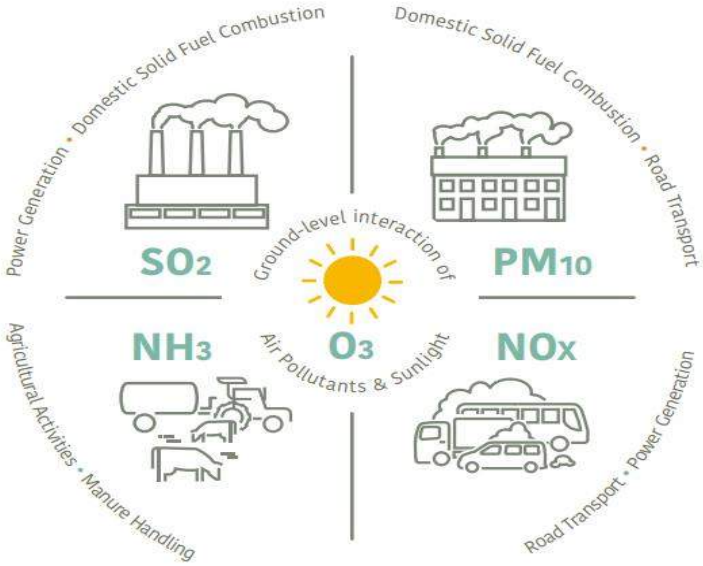

Figure 5.5: Main sources of air pollution in Northern Ireland | Source: Department of Agriculture, Environment and Rural Affairs – Air Pollution in Northern Ireland 2021

Ambient air quality in Northern Ireland is regulated by the Air Quality Standards Regulations (Northern Ireland) 2010 and their subsequent 2016 amendment. These regulations transposed the following European Commission Directives:

- Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe (the Air Quality Directive), which relates to sulphur dioxide, oxides of nitrogen, particulate matter, lead, carbon monoxide, benzene and ozone in ambient air; and
- Directive 2004/107/EC (the Fourth Daughter Directive) relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons (PAH) in ambient air.

These Directives came into operation while the UK was a member state of the European Union (EU). The provisions of the Directives were required to be incorporated (or 'transposed') into Northern Ireland's own legislation, and the Regulations were the means by which this was done.

The full provisions of the above Directives therefore remain part of Northern Ireland's own legislation, even after the UK's departure from the EU in early 2020.

The Air Pollution in Northern Ireland 2021 report revealed that the regulation limit values, target values and corresponding AQS objectives have been met for the following pollutants in Northern Ireland:

- Particulate matter at PM_{10}
- Particulate matter as $PM_{2.5}$
- Nitrogen dioxide
- Ozone
- Carbon monoxide
- Benzene
- Sulphur dioxide
- The elements lead, arsenic, cadmium and nickel.

All three sites where benzo[a]pyrene is monitored exceeded the AQS objective of $0.25ngm^{-3}$ in 2021.

5.6.2 Climate

5.6.2.1 Ireland

Climate

According to Met Eireann (2022) the general climatic conditions for Ireland as a country are dominated by the Atlantic Ocean and its air and oceanic currents. Consequently, the region does not suffer from extremes of temperature. According to Met Eireann, average annual temperature is about 9°C. Average rainfall varies between about 800 and 2,800mm. Rainfall accumulation tends to be highest in winter and lowest in early summer.

Winters tend to be cool and windy, while summers, when the depression track is further north and depressions less deep, are mostly mild and less windy.

In line with the global picture, Ireland's average temperature has increased by about 0.7°C over the last 100 years, and the rate of increase has been higher in the last couple of decades, as reported by the EPA (2022).

Greenhouse Gases

A carbon budget represents the total amount of emissions that may be emitted in Ireland during a five-year period, measured in tonnes of carbon dioxide equivalent. It is calculated on an economy-wide basis.

The Climate Change Advisory Council is responsible for proposing three five-year economy-wide carbon budgets, covering the periods 2021-2025, 2026-2030 and 2031-2035, to assist the State in achieving its national climate objectives and greenhouse gas emissions targets agreed by the European Union.

The first three carbon budgets cover the following five-year periods: 2021 to 2025, 2026 to 2030, and 2031 to 2035 (although the budget for the third period is provisional). All greenhouse gas emissions and all relevant sectors are included in the carbon budgets.

They are as follows:

- **2021-2025:** 295 Mt CO_2 eq. an average of -4.8% for the first budget period.
- **2026-2030:** 200 Mt CO_2 eq. an average of -8.3% for the second budget period.
- **2031-2035:** 151 Mt CO_2 eq. an average of -3.5% for the third provisional budget.

As outlined in the report ‘Ireland’s Provisional Greenhouse Gas Emissions 1990-2022’, Ireland’s GHG emissions are estimated to be 60.76 million tonnes carbon dioxide equivalent (Mt CO_2eq) in 2022, which is 1.9% lower (or 1.19 Mt CO_2 eq) than emissions in 2021 (61.95 Mt CO_2 eq).

As reported in Ireland’s Greenhouse Gas Emissions Projections 2022-2040 report, Ireland is not on track to meet the 51% emissions reduction target (by 2030 compared to 2018) based on these projections which include most 2023 Climate Action Plan measures. Further measures will still need to be identified and implemented to achieve this goal.

The first two carbon budgets (2021-2030) which aim to support achievement of the 51% emissions reduction goal, are projected to be exceeded by a significant margin of between 24 and 34%.

5.6.2.2 Northern Ireland

Climate

The climate across Northern Ireland and Ireland is very similar and are both experiencing climactic warming due to global greenhouse gas emissions rising.

The mean annual temperature for Northern Ireland has been calculated from the Armagh Observatory temperature records. The ten-year moving average trend line shows that the mean annual temperature reached a low towards the end of the 19th century and has been steadily increasing since.

By the end of the 20th century, the ten-year moving average temperature had risen to its highest levels since the temperature records began.

The lowest mean annual temperature (7.35°C) was recorded in 1879. The highest mean annual temperature (10.64°C) was recorded in 2017. The 2021 mean annual temperature (10.48°C) was 0.24°C higher than the 10.24°C recorded in 2020.

The amount of annual rainfall from 1853 to 2021 has been calculated from the Armagh Observatory temperature records. Since 1853 the ten-year moving average has remained between 748 millimetres and 901 millimetres of rain per year. 2002 saw the highest level (1,065 millimetres) of annual rainfall over the time series, whilst the lowest level of annual rainfall was recorded in 1933 at 550 millimetres.

Greenhouse Gases

In May 2023, the Climate Change Committee (CCC) in Northern Ireland published its advice for the first three carbon budgets, the first of which will cover the period 2023-2027.

The CCC advice is that the carbon budget for Northern Ireland from 2023-2027 is set at levels that have an average reduction of 33% on 1990 levels over the carbon reduction period. CCC also advises that that interim targets for 2030 and 2040 should be set at reductions of 48% and 77% respectively.

In 2019, Northern Ireland's total greenhouse gas emissions accounted for 5% of the UK total, higher than its population share of 3%. Since the base year (1990), Northern Ireland's total greenhouse gas emissions have decreased by 18% from 26.1 to 21.4 million tonnes of carbon dioxide equivalent (MtCO2e). The largest sectors in terms of emissions in 2019 were agriculture (26%), transport (20%) and residential (14%). Most sectors showed a decreasing trend since the base year.

The largest decreases, in terms of tonnes of carbon dioxide equivalent, were in the energy supply, waste management and residential sectors.

These were driven by improvements in energy efficiency, fuel switching from coal to natural gas, which became available in the late 1990s, and the introduction of methane capture and oxidation systems in landfill management.

5.6.3 Likely Evolution of the Baseline Environment in the Absence of the draft AISRR

In the absence of the draft AISRR, the Air Quality & Climate baseline environment is likely to evolve as follows:

- Potential improvements on local air quality are likely to be facilitated as reductions in vehicular transport related emissions are likely to be reduced as a result of implementation of the draft AISRR and the associated rail transport uptake;
- In the absence of the draft AISRR, there would potentially be less increase in use of machinery and or construction, compared to existing trends which has potential to result in positive impacts to air quality; and
- In the absence of the draft AISRR, mitigation of the impacts of climate change through the facilitation of decarbonising vehicular transport in Ireland may be reduced potentially impacting on achievement of carbon reduction targets.

5.7 Archaeological, Architectural and Cultural Heritage

5.7.1 Ireland

The sites and features considered as part of the cultural heritage baseline for Ireland include those listed on the following:

- Record of Monuments and Places (RMP), which is the statutory list of all known archaeological monuments in Ireland as compiled by the Archaeological Survey of Ireland, part of the Department of Housing, Local Government and Heritage; and
- National Inventory of Architectural Heritage (NIAH), which identifies, records and evaluates the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage.

NIAH surveys provide the basis for the recommendations of the Minister for Housing, Local Government and Heritage [previously the Minister for Housing, Planning and Local Government] to the planning authorities for the inclusion of particular structures in their Record of Protected Structures; and United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage List, which includes cultural and natural heritage sites around the world considered to be of outstanding value to humanity.

Ireland is particularly rich in archaeological sites and monuments which form a central component of Irish Heritage. Many of Ireland's archaeological or cultural heritage sites occur on forest land and peatlands. Archaeological sites and monuments range from substantial above-ground structures to easily damaged subterranean traces of human activity. Types of monuments vary greatly and include ecclesiastical ruins, ancient trackways, standing stones, fortifications, megalithic tombs, earthwork mounds and cairns.

Figure B17 of Appendix B presents the Recorded Monuments across Ireland and Northern Ireland.

Geological Heritage Sites in Ireland are illustrated in Figure B6 in Appendix B.

UNESCO and World Heritage Sites are illustrated in Figure B18 of Appendix B.

5.7.2 Northern Ireland

Northern Ireland has been legally protecting its historic monuments with legislative measures since 1869. The Northern Irish Historic Monuments and Archaeological Objects Order 1995 protects archaeological monuments or objects of significance by either taking them into State care or by scheduling and also places restrictions on searching for archaeological material. Their sites of interest are registered on a government database which gives them protection from development. In addition, The Planning Act (NI) 2011 provides protection for Listed Buildings and Conservation Areas of special architectural and historic interest.

Figure B17 of Appendix B presents the Recorded Monuments across Ireland and Northern Ireland.

UNESCO World Heritage Sites are illustrated in Figure B18 of Appendix B.

5.7.3 Likely Evolution of the Baseline Environment in the Absence of the draft AISRR

No variation in the likely evolution of the baseline in the absence of the draft AISRR on, the archaeological, architectural and cultural heritage baseline environment is envisaged.

5.8 Landscape and Visual

5.8.1 Ireland

The Council of Europe Landscape Convention 20/10/2000 promotes the protection, management and planning of European landscapes and organises European co-operation on landscape issues. It defines "landscape" as an area perceived by people, whose character is the result of the action and interaction of natural and/ or human factors. This holistic definition incorporates all aspects of an area and in doing so can be useful when considering development in that area. Ireland's National Landscape Strategy is the country's way of meeting its obligations and delivering on the objectives set by the European Landscape Convention.

The Landscape Character Guidelines for Ireland (Mosart, 2016) classify Ireland's landscape into four distinct character types, which vary considerably in regard to both landform and landcover. The four landscape character types include:

- Rolling moorland;
- Rolling fertile farmland;
- Drumlins; and
- Mountain and farmland complex.

The following outlines landscape planning and design for the four distinct landscape character types commonly found in Ireland, according to the Landscape Character Guidelines for Ireland (Mosart).

- **Rolling Moorland Landscape interpretation**: Many mountain slopes in Ireland are sweeping and extend as open, expansive and undulating moorland. Existing conifer plantation forests in such areas have tended to be angular in nature, because of their straight boundaries. Due to poor site conditions and exposure, they have inclined to be of limited species and age diversity, resulting in a severe visual impact on the landscape;
- **Rolling Fertile Farmland Landscape interpretation**: This landscape type is a man-made 'working landscape'. The rolling hills are characterised by a patchwork of clearly defined fields with farmsteads and houses, copses and shelterbelts scattered throughout. These fields are typically under pasture or tillage. The scale of the landscape is usually relatively enclosed. Soil fertility should allow broadleaf plantations, with a potential for silvicultural systems other than clear-felling;
- **Drumlins Landscape interpretation**: The typical continuity of small rolling hills with wet inter-drumlin flats, combined with a close network of fields and hedgerows, creates a small scale, intimate and visually complex landscape. Many fields have reverted to rush and scrub in recent years. Soils on drumlins are typically gleyed and thus limit species choice;
- **Mountain and Farmland Complex Landscape interpretation**: Landscapes comprising mountain moorland on upper ground falling through marginal land and on to farmland at lower levels, are very common in Ireland.

  The farmland will usually comprise either rolling hills or a plane of patchwork fields which sweeps up forming a continuum with the open mountainside. The strip of marginal land running between these two landcovers is typically identified by bracken, rush and scrub.

The National Landscape Strategy for Ireland 2015-2025 (Department of Housing, Local Government and Heritage, 2015) was produced in line with Ireland's obligations under the European Landscape Convention. The overall vision of the strategy is stated as: "*Our landscape reflects and embodies our cultural values and our shared natural heritage and contributes to the well-being of our society, environment and economy. We have an obligation to ourselves and to future generations to promote its sustainable protection, management and Planning*".

In the absence of a national landscape character assessment, the CORINE Land Cover Map is used as a proxy for the purposes of landscape, refer to Figure B3 in Appendix B.

In terms of landscape and visual amenity, local authorities in Ireland conserve and protect scenic value as Areas of High Amenity, Areas of Outstanding Natural Beauty and Protected Views. Each local authority is responsible for the designation of these within their individual jurisdictions, with each County Development Plan providing objectives to protect such views.

5.8.2 Northern Ireland

Northern Ireland abides by the Council of Europe Landscape Convention 20/10/2000. In recognising the importance of sustaining local identity, the Northern Ireland Environment Agency (NIEA) commissioned Landscape Character Assessments of Northern Ireland which resulted in the identification of distinct character areas within Northern Ireland.

The Northern Ireland Regional Landscape Character Assessment provides a strategic overview of the landscape in Northern Ireland and subdivides the countryside into 26 Regional Landscape Character Areas based upon information on people and place and the combinations of nature, culture and perception which make each part of Northern Ireland unique.

The Northern Ireland Landscape Character Assessment subdivided the countryside into 130 Landscape Character Areas (LCAs), each based upon local patterns of geology, landform, land use, cultural and ecological features. For each LCA, the key characteristics were described and an analysis of landscape condition and its sensitivity to change was made.

Areas of Outstanding Natural Beauty in Northern Ireland are presented in Figure B19 of Appendix B.

5.8.3 Likely Evolution of the Baseline Environment in the Absence of the draft AISRR

In the absence of the draft AISRR, the Landscape & Visual baseline environment is likely to evolve as follows:

- The reinstatement of existing obsolete rail lines may not occur which may result in improvement in the landscape and visual baseline.

5.9 Material Assets

5.9.1 Ireland

5.9.1.1 Transportation

Roads

In 2020, the longest road type in Ireland was "other roads" with a measured length of 80,548 km. Secondary or regional roads had a total length of 13,120 km. Motorways was the road type with the shortest length, at a measure of 995 km. Transport Infrastructure Ireland (TII) operates, maintains and improves the national primary and secondary road network in Ireland, while local authorities manage the urban and remote sections of dual carriageway, regional and local roads.

Vehicular traffic is by far the most common mode of travel in Ireland. In 2021, the national vehicle fleet was made up of 2.86 million vehicles.

Rail

Iarnród Éireann (Irish Rail), the state-owned railway company in Ireland, operates 1,944km (1,215 miles) of the rail network. Iarnród Éireann is responsible for maintenance of the heavy rail intercity and regional network, which is used for both passengers and freight. Transport Infrastructure Ireland is responsible for the light rail Luas networks based in Dublin.

Airports

There are 10 main airports across Ireland: Cork Airport, Donegal Airport, Dublin Airport, Weston Airport, Galway Airport, Kerry (Farranfore) Airport, Ireland West Airport Knock, Shannon Airport, Sligo Airport and Waterford Airport. Cork, Dublin and Shannon are international airports.

Seaports

Twenty commercial ports exist nationwide; international ports include Shannon Foynes, Cork, Dublin Port and Drogheda. In addition, there are 15 international ferry ports, 99 local ferry ports and 48 fishing ports.

Public Transport

The 2022 census provides statistics on how people travel to their place of work, school, college and childcare. The number of people who drove to work increased by 4% to 1.2 million between 2016 and 2022. There were 4% fewer people commuting to work by train, LUAS or DART. However, there was a big increase recorded in the number of people who work mainly at or from home, up 173% to nearly 260,000.

Fewer third level students commuted to their place of education on foot or by bike, but more used public transport and cars.

5.9.1.2 Water Supply

Uisce Eireann (formerly Irish Water) is the national water utility, as set up in July 2013, under the Water Services Act 2013. Uisce Éireann is responsible for the production, distribution and monitoring of drinking water from Ireland’s public water supplies.

Uisce Éireann is responsible for the monitoring of public water supplies and Local Authorities are responsible for monitoring of group water schemes and regulated small private supplies.

The EPA publishes an annual Public Supply Drinking Water Report which provides an overview of the quality of drinking water in public supplies. The reports are based on the assessment of monitoring results reported to the EPA by Uisce Éireann and the Local Authorities.

Results from the 2021 Drinking Water Quality in Public Supplies Report show over 99.7% compliance with bacterial and chemical limits. However, a number of issues have been identified that need to be addressed including the increase in detections of Trihalomethanes (THM) limits (found in 58 supplies when compared to 35 in 2020).

Although these results show that the majority of public water supplies are safe, there are still a number of public water supplies which are in need of upgrade, replacement or improved operational control. At the end of 2021, 52 public water supplies were listed on the Remedial Action List.

5.9.1.3 Wastewater Treatment and Discharge

Uisce Éireann operates a network of wastewater treatment plants across Ireland. Uisce Éireann has sole responsibility for operating and maintaining the public sewer network. The wastewater treatment plants vary in size according to the population of the area they serve. Despite the variation in size, the processes used to treat wastewater are generally the same.

The EPA Report 'Urban Waste Water Treatment in 2021', provides an overview of urban waste water treatment in Ireland during 2021.

It focuses on the most important issues that Uisce Éireann needs to address to protect the Irish environment from the harmful effects of waste water discharges. 12 large urban areas that did not meet European Union treatment standards in 2021 require improvements to comply with these standards. 32 towns and villages which have been discharging raw sewage into the environment every day. 38 priority areas require improvements to protect rivers, lakes, estuaries and coastal waters that are adversely impacted by wastewater. 12 areas need improvements in waste water treatment to protect endangered freshwater pearl mussels.

5.9.1.4 Waste Management Services

Ireland's waste management practices, infrastructure and regulation have matured significantly over the last 20 years. This change has been driven by EU and national legislation, national policy and economic initiatives. Government policy focusses on waste as a resource and the virtual elimination of landfilling.

The current and future focus is on circular economy - preventing waste, reuse, maximising recycling and using waste as a fuel in replacement of fossil fuels: all elements of the strategy to boost competitiveness, foster sustainable economic growth and generate new jobs.

More residual waste is now used as a fuel (energy recovery) than disposed to landfill.

Segregation and separate collection of food waste from households has been legislated for since 2013 and municipal waste recycling at composting and anaerobic digestion facilities has increased as a result. Ireland is reliant on export markets for the treatment of residual and recyclable and hazardous wastes.

In 2023, only three landfills are accepting municipal waste in Ireland. Between 2019 and 2020 municipal waste increased by 4% to 3.2m tonnes. Waste generation in Ireland continues to be closely linked with economic activity indicating limited progress towards a circular economy. Construction and demolition waste decreased by 0.6m tonnes to 8.2m. However, this correlates with a decrease in construction activity nationally due to Covid-19.

5.9.2 Northern Ireland

5.9.2.1 Transportation

Roads

DfI is responsible for the maintenance of over 25,000km of public roads in Northern Ireland.

Rail

Translink (Northern Ireland Railways), the state-owned transport company in Northern Ireland, operates approximately 357km of public rail lines (223 miles).

Airports

There are three main airports in Northern Ireland – Belfast International Airport, George Best Belfast City Airport and City of Derry Airport.

Seaports

There are five commercial ports in Northern Ireland (Belfast, Larne, Londonderry, Warrenpoint and Coleraine).

Public Transport

According to the Northern Ireland Transport Statistics 2020-2021 report, there was a total of 3.3 million rail passenger journeys during that time period. This is a decrease of 78% from the period 2019-2020 (37.9 million). This decrease was as a result of the Covid-19 pandemic.

5.9.2.2 Water Supply

Northern Ireland Water is an Arms-Length Body of DfI, set up in 2007 to provide the water and sewerage services in Northern Ireland.

According to Northern Ireland Water's Drinking Water Quality Annual Report 2021, overall drinking water quality compliance in 2021 was 99.88%, above the target of 99.79%.

5.9.2.3 Wastewater Treatment and Discharge

Northern Ireland Water is also responsible for providing the sewerage services in Northern Ireland.

An issue facing the management of wastewater in Northern Ireland is the discharge of untreated effluent in Northern Ireland seas and rivers.

5.9.2.4 Waste Management Services

The Northern Ireland Waste Management Strategy – Delivering Resource Efficiency covers the period 2013 up to 2020 when Northern Ireland was still part of the European Union.

A new waste management strategy is expected to be published by the end of 2023.

The most recent strategy was developed in the context of the relevant EU Environmental Directives and the direction of EU policy towards life cycle thinking and a resource efficient Europe.

Northern Ireland's councils collected 1,034,637 tonnes of waste during 2021/22 which was similar to the amount collected in 2020/21. During 2021/22, 49.7% of waste collected by councils was sent for recycling which was also similar to the recycling rate in 2020/21 (50.0%).

The landfill rate for waste collected by councils was 24.9% in 2021/22, 2.1 percentage points higher than 22.8% in 2020/21 which was the lowest rate recorded. Northern Ireland is currently facing challenges in relation to landfill capacity.

5.9.3 Likely Evolution of the Baseline Environment in the Absence of the draft AISRR

The reinstatement of existing obsolete rail lines may not occur which may result in improvement in the material assets baseline.

5.10 Transboundary Issues

As the draft AISRR encompasses both Ireland and Northern Ireland and are both assessed in their entirety, no transboundary further effects are predicted.

6. SEA Objectives, Targets and Indicators

6.1 Introduction

The SEA is designed to assess the potential environmental effect of the policies of the draft AISRR against the environmental baselines established.

The policies and associated recommendations are assessed against a range of established environmental objectives and targets. Indicators that are recommended in the SEA are utilised over the lifetime of the draft AISRR to quantify the level of impact that the recommendations have on the environment.

6.2 SEA Objectives and Targets

Strategic Environmental Objectives (SEOs) are methodological measures against which the environmental effects of the draft AISRR can be assessed. If complied with in full, SEOs would result in an environmentally positive, or neutral impact from realisation of the draft AISRR.

The SEOs are set out under a range of topics and are used as standards against which the provisions of the draft AISRR can be evaluated in order to help identify areas in which potential significant adverse impacts may occur. SEOs are distinct from the objectives of the draft AISRR and are developed from international and national policies which generally govern environmental protection objectives. Such policies include those of various European Directives which have been transposed into Irish law and Northern Irish law and which are intended to be implemented across the country.

The SEA Directive requires that the evaluation of the draft AISRR be focused upon the relevant aspects of the environmental characteristics of areas likely to be significantly affected. In compliance with this requirement the SEA will focus upon the most relevant aspects of the environmental characteristics. The SEOs are linked to indicators which can facilitate monitoring the environmental effects of the draft AISRR as well identifying targets which the draft AISRR can help work towards.

6.3 SEA Indicators

The assessment of aims and commitments with respect to the Environmental Objectives and Targets is required to be measurable. The Environmental Indicators need to be capable of the following:

- Describing trends in the baseline environment.
- Demonstrating the likely significant effect of the implementation of the draft AISRR.
- Being used in a monitoring programme.
- Providing an early warning of significant unforeseen adverse effects.
- Prioritising key environmental effects.
- Ensuring the number and range of environmental indicators are manageable in terms of time and resources.

SEA Objectives, Indicators and Targets are as described in Table 6.1.

Table 6.1: SEA Objectives, Indicators and Targets

Environmental Component	Strategic Environmental Objectives	Targets	Indicators
Population and Human Health	**Environmental Protection Objective (EPO):** **Protect, enhance, and improve human health and wellbeing.** The Department of Transport and the Department for Infrastructure aims to ensure the following is carried out with respect to Population and Human Health: Protect and enhance human health and well-being. Provide improved public transport	No deterioration in human health as a result of environmental factors.	Improved accessibility/proximity to rail transport Mode share of rail transport (passenger and freight) Improvement in air quality due to modal shift Reduction in GHG emissions from rail transport and due to modal shift Status and quality of waterbodies near railway infrastructure
Biodiversity	**Environmental Protection Objective (EPO):** **Support achievement of the conservation objectives and requirements of the Birds and Habitat Directives, and other sites of nature conservation value.** The Department of Transport and the Department for Infrastructure proposes to take the following measures with respect to Biodiversity: Protect, conserve, enhance where possible and avoid loss of diversity and integrity of the broad range of habitats, species and wildlife corridors (including marine habitats and species) To achieve the conservation objectives of European Sites (SACs and SPAs) and other sites of nature conservation (including Marine Protected Areas) Conserve and protect other sites of nature conservation including NHAs, pNHAs, National Parks, Nature Reserves, Wildlife Sanctuaries as well as protected species outside these areas as covered by the Wildlife Act (including those in the marine area).	Siting of development of infrastructure installation on non-sensitive sites. Maintenance of favourable conservation status for all habitats and species protected under the Habitats Directive. No loss of protected habitats and species during the lifetime of the Plan. Improve/maintain protection for protected sites and species. Improve/maintain protection for important wildlife sites, particularly urban wildlife corridors. Prevent the introduction of new invasive or alien species. Control/manage new invasive species.	Conservation status/habitat quality for all sites and species located near railway infrastructure. Conservation status/habitat quality for all sites and species positively impacted by an improvement in air quality due to modal shift and/or decarbonisation of rail. Level of biodiversity gain achieved as a result of the implementation of the draft AISRR. Level of biodiversity lost as a result of the implementation of the draft AISRR.

Environmental Component	Strategic Environmental Objectives	Targets	Indicators
	To minimise and, where possible, eliminate threats to biodiversity including invasive species. No net biodiversity loss.		
Land and Soils	**Environmental Protection Objective (EPO):** **Protect and enhance soil quality, function, and fertility.** The Department of Transport and the Department for Infrastructure aims to ensure the following is carried out with respect to Land and Soils: Protect soils against pollution. Minimise the excavation and movement of soils within site works. Minimise the consumption of non-renewable deposits on site. Minimise the amount of waste to landfill from the site. Conserve, protect and avoid loss of diversity and integrity of designated habitats, geological features, species or their sustaining resources in designated ecological sites.	Prevent pollution of soil through adoption of appropriate environmental protection procedures during any construction or maintenance works. No incidences of soil contamination Ensure appropriate management of existing contaminated soil in accordance with the requirements of current waste legislation. Limit the amount of excavation in sensitive locations. Minimise the consumption of non-renewable sand, gravel and rock deposits. Preference for development on brownfield site over greenfield sites.	Incidences of soil contamination near railway infrastructure Rates of re-use/recycling of construction waste related to implementation of AISRR Rates of brownfield site and contaminated land re-use and development near railway infrastructure Rates of greenfield development near railway infrastructure
Water	**Environmental Protection Objective (EPO):** **Support achievement of the objectives of the Water Framework Directive.** The Department of Transport and the Department for Infrastructure aims to ensure the following is carried out with respect to Water: Ensure that the status of water bodies is protected, restored and no deterioration will be seen (including marine and coastal/transitional waterbodies where relevant). Cognisance will be given to the requirements of the Water Framework Directive and the	All waters within the plan area to achieve the objectives of the Water Framework Directive, the relevant River Basin Management Plan by 2027 and the Marine Strategy Framework Directive/Marine Strategy.	Status and quality of waterbodies near railway infrastructure. Number of significant pollution events recorded as a result of the implementation of the draft AISRR.

Environmental Component	Strategic Environmental Objectives	Targets	Indicators
	Marine Strategy Framework Directive/Marine Strategy.		
Air Quality and Climate	**Environmental Protection Objective (EPO):** **Continue to comply with air quality standards to prevent or reduce harmful effects on human health and the environment; and** **Seek to reduce Ireland's transport-related greenhouse gas emissions to help in achieving Ireland's net zero commitments by 2050.** The Department of Transport and the Department for Infrastructure proposes to take the following measures with respect to Air Quality and Climate: To avoid, prevent or reduce harmful effects on human health resulting from the emissions to air from rail fleet and construction vehicles. Maintain and promote continuing improvement in air quality and climate through the reduction of emissions and promotion of a decarbonised fleet. Meet the relevant Air Quality Standards for the protection of human health and vegetation including nitrogen deposition. Minimise the use of high-embodied carbon during construction.	Improvement in Air Quality trends, particularly in relation to machinery related emissions of NOx and particulate matter. Contribute towards transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy. Meet EU/ Irish and NI carbon budgets and commitments.	General air quality results in Ireland and Northern Ireland. The level of GHG emission from rail transport changes over the plan period. Mode share of rail transport (passenger and freight)
Archaeological, Architectural and Cultural Heritage	**Environmental Protection Objective (EPO):** **Protect, conserve, and enhance the cultural heritage and historic environment.** The Department of Transport and the Department for Infrastructure aims to carry out the following with respect of archaeological, architectural and cultural heritage: Protect, conserve and where appropriate enhance places, features, buildings and	Minimise the deterioration of features of archaeological/ architectural/ cultural significance (including marine heritage) as a result of the implementation of the AISRR.	No deterioration of features of archaeological/ architectural/ cultural significance (including marine heritage) as a result of the implementation of the draft AISRR. Condition of assets near or associated with railway infrastructure.

Environmental Component	Strategic Environmental Objectives	Targets	Indicators
	landscapes of cultural, archaeological or architectural heritage, including heritage assets and their settings and also marine heritage.		
Landscape and Visual	**Environmental Protection Objective (EPO):** **Conserve, protect and enhance valued natural, cultural and built landscapes, seascape, views of local value and features.** The Department of Transport and the Department for Infrastructure aims to carry out the following with respect Landscape and Visual: To implement the identification, assessment, protection, management and planning of landscapes.	Any construction works and structures should be planned with cognisance of landscape sensitive areas and protected views/ prospects. Any construction works and structures associated will be planned having cognisance to the historic environment and archaeological considerations.	No deterioration of landscape or areas with scenic value e.g. Areas of High Amenity, Areas of Outstanding Natural Beauty and Protected Views as a result of the implementation of the draft AISRR
Material Assets	**Environmental Protection Objective (EPO):** **Support the development of Irish rail infrastructure while making efforts to reduce the carbon emissions and waste produced by the industry.** The Department of Transport and the Department for Infrastructure aims to carry out the following with respect to Material Assets: Provide improved public transport and freight transport infrastructure. Re-use of excavated material generated during any construction works insofar as possible. Reduce the carbon emissions associated with the rail industry through an electrified intercity network and through the procurement of hybrid and electric rolling stock in the short-term.	Preference for development on brownfield site over greenfield sites. Contribute towards transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy.	Statistics relating to rail usage (including number of passengers and journey times). Economic growth statistics – particularly those relating to transport (rail). Mode share of rail transport (passenger and freight)

7. Alternatives Considered

7.1 Introduction

Article 5.1 of the SEA Directive requires the Environmental Report to consider "*reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme*". Annex 1(h) of the SEA Directive, as replicated in paragraph (h) of Schedule 2B of the Planning and Development Regulations 2001, as amended, requires "*an outline of the reasons for selecting the alternatives*". This suggests that there are two stages to the consideration of alternatives:

1. Identify reasonable alternatives; (Refer to Section 7.2)
2. Evaluate and compare the alternatives; (Refer to Section 7.3)

7.2 Identification of Reasonable Alternatives

Following the options assessment and sifting process three work packages were refined to create the following seven packages.

7.2.1 Package 1 – Short Term and Decarbonisation

Package 1 focused on service improvements along existing rail lines to improve frequencies, enhance interchange, directly connect more destinations, increase electrification, and provide some new services on relatively short sections of disused or new rail routes.

The main features of this package are:

- Electrification of intercity and commuter services between Belfast-Bangor, Belfast-Drogheda, Dublin-Cork, Portarlington-Galway, Limerick Junction-Limerick, and Kildare-Waterford.
- Speed upgrades to maximum of 160km/h on core and some regional intercity lines, improving journey times across the Island.
- One train per hour on intercity routes between Dublin and Belfast, Cork, Limerick, Galway, and Waterford.
- One train per two hours on regional routes including Galway-Limerick, Limerick-Cork, Limerick-Ballybrophy, Dublin-Sligo, Dublin-Westport/Ballina, and Greystones-Rosslare Europort.
- Through services between Cork and Galway via Limerick with modifications to track and platforms at Limerick Junction to allow more through movements Cork-Limerick and Limerick-Waterford.
- Direct services between Belfast and Portrush.
- New passenger services on the Limerick-Foynes line together with a new line to Shannon Airport.
- Restored passenger services on the Lisburn-Antrim line and a new station at Belfast International Airport.

7.2.2 Package 2 – Intercity

Package 2 focused on improving connections between the seven major cities. There are two packages within this, with the first of these (Package 2a) centred on a higher-speed network with maximum speeds of 200km/h (125mph), and the second (Package 2b) centred on a high-speed network with maximum speeds of 300km/h (186mph). These packages also included the interventions in Package 1.

The main features of each package are described below.

- **Package 2a – Higher Speed**
  - Upgraded track, including realignments, to deliver up to 200km/h (125mph) line speed on intercity routes between Dublin and Belfast, Galway, Limerick, Cork, and Waterford.
  - A new rail route between Drogheda and Inchicore, partially in tunnels, to allow for direct trains between Belfast and the major cities in the south and west via Dublin. Includes new stations at Drogheda East, Dublin Airport, and Glasnevin to connect with MetroLink, DART, and the airport.
  - New stations on mainlines to/from Dublin.
  - Dual tracking between Galway and Athenry.
- **Package 2b – High Speed**
  - A new 300km/h (186mph) electrified rail alignment between Belfast and Cork via Dublin and Limerick, acting as a spine for the Island's rail network.
  - Upgrades to the Portarlington-Galway and Kildare-Waterford lines to 200km/h (125mph), with both lines having through connections to the Belfast-Dublin-Cork spine.
  - Electrification of the Maynooth-Longford line including a realignment bypassing Enfield for express services.
  - A new link between Hazelhatch and Kilcock, allowing trains from Sligo to travel directly to Heuston. This both separates longer distance trains from the DART network and enables trains from Sligo to travel directly to Dublin Airport and onwards towards Belfast.
  - A restored the Mullingar-Athlone link, allowing services between Dublin and Galway and Mayo to alternate between routing via Portarlington and via Mullingar.

7.2.3 Package 3 – Regional and Rural

Package 3 focused on improving the connections of different regions both to each other and to the major cities and international gateways. It addresses gaps in the existing railway network, particularly in the northwest but also in the west and the southeast. There are four packages within Package 3, each focused on a particular geographic region of the Island. These packages also incorporate the interventions in Package 1 and Package 2a. The main features of each package are described below.

- **Package 3a – Northern Ireland**
  - A new 160km/h (100mph) electrified double-tracked line between Portadown and Derry-Londonderry via Omagh, providing direct connections between Derry-Londonderry and both Belfast and Dublin on an hourly basis.
  - A new 120km/h (75mph) single-track unelectrified line between Omagh and Enniskillen with an hourly service.
  - Enhanced suburban rail around Derry-Londonderry, with extra track capacity, new stations on the line to Coleraine, and a new spur to Limavady.
  - Additional stations and capacity enhancements (e.g., passing loops) on the existing Derry-Londonderry-Belfast line including new stations on this corridor, all with at least hourly service.
- **Package 3b – West Coast**
  - A new 120km/h (75mph) electrified line between Derry-Londonderry and Sligo, double-tracked between Derry-Londonderry and Letterkenny and single-track between Letterkenny and Sligo. Hourly services along the whole line and two trains per hour between Letterkenny and Derry-Londonderry.
  - A new 120km/h (75mph) electrified single-track line between and Sligo and Athenry, with hourly Sligo-Galway services.

- Electrification and speed upgrades, including limited realignment, between Athenry and Sixmilebridge to enable hourly services between Limerick and Galway.

- **Package 3c – South Coast**
  - Electrification and speed and capacity enhancements along the Limerick Junction-Waterford line to enable 120km/h (75mph) running.
  - A new 120km/h (75mph) electrified double-tracked line between Waterford and Wexford via New Ross, with interventions to deconflict rail movements in Wexford Town.
  - A new 120km/h (75mph) electrified single-track line between Midleton and Waterford along the South Coast with an hourly service.
  - Direct services between Rosslare Europort and both Limerick and Cork. Intercity trains to/from Waterford (with origin/destination in Belfast/Derry-Londonderry via Dublin) continue to Rosslare Europort.
  - Existing Dublin-Rosslare Europort service is replaced with hourly Greystones-Wexford service, connecting with the DART at Greystones.

- **Package 3d -**
  - A new 120km/h (75mph) electrified double-tracked line between Portadown and Clones via Armagh and Monaghan.
  - A new 120km/h (75mph) electrified single-track line between Clones, Enniskillen, and Collooney.
  - A new 120km/h (75mph) electrified single-track line between Clones and Mullingar via Cavan, Ballyjamesduff, and Oldcastle (later amended to follow the alignment for the former railway, which avoids these towns).
  - Restoring the Mullingar-Athlone link, allowing direct services between Belfast and Galway via Cavan.
  - Hourly services between Belfast and Sligo via Enniskillen, one train per two hours between Belfast and Dublin via Cavan, and one train per two hours between Belfast and Galway via Cavan.
  - One train per two hours between Dublin and Galway via Mullingar and Athlone.

7.3 Evaluation and Comparison of Alternatives

7.3.1 Introduction

This section provides a detailed description and assessment of those alternatives outlined in Section 7.2.

The assessment process categorised environmental impacts using the ratings outlined in Table 7.1 which is based on the impact assessment criteria defined by the EPA for environmental impact assessment.

Table 7.1: Impact Ratings

Significance of Effects	
	Neutral
	Positive
	Negative
	Uncertain (Unknown or both positive and negative effects likely)

Table 7.2 identified the likely unmitigated impacts associated with each of the alternatives considered.

Table 7.2: High Level Environmental Assessment of Alternatives

Alternative Number	Description of Alternative Scenario:	P&HH	Bio	L&S	Wat	AQ&C	AA&CH	L&V	MA
Alternative A	Package 1 – Short Term and Decarbonisation								
Alternative B	Package 2a – Intercity – Higher Speed								
Alternative C	Package 2b – Intercity – High Speed								
Alternative D	Package 3a – Regional and Rural – Northern Ireland								
Alternative E	Package 3b – Regional and Rural – West Coast								
Alternative F	Package 3c – Regional and Rural – South Coast								
Alternative G	Package 3d – Regional and Rural – North Midlands								

Alternative A is likely to result in a generally positive environmental effect overall, particularly in relation to population and human health, air quality and climate, and material assets. This will be as a result of the implementation of measures which encourage a modal shift from private transport to public transport, an improvement in existing services and through the decarbonisation of the rail network which will have a positive effect on air quality and climate. However, negative effects on the aforementioned environmental aspects as well as biodiversity, land and soils, water, cultural heritage, and landscape and visual may arise due to any construction works required to implement any of these alternatives.

Alternative B is likely to result in a generally positive environmental effect overall, particularly in relation to population and human health, air quality and climate, and material assets. This will be as a result of the implementation of measures which encourage a modal shift from private transport to public transport through the improvement of existing services (i.e. through higher speeds on a number of intercity routes, new stations on the mainlines to and from Dublin and a new rail route between Drogheda and Inchicore). Alternative B is also likely to result in negative effects as a result of construction works associated with the aforementioned improvements. Potential negative effects as a result of the implementation of Alternative B are likely to be of a greater scale than those associated with Alternative A, as more intrusive works are required (Alternative A predominantly focusses on providing additional, regular and direct services which utilises the existing network).

Alternative C is likely to result in a generally positive environmental effect overall, particularly in relation to population and human health, air quality and climate, and material assets. This will be as a result of the implementation of measures which encourage a modal shift from private transport to public transport through the improvement of existing services (i.e. through the provision of a high-speed rail network on a number of routes). Alternative C may result in negative effects on biodiversity, land and soils, water, cultural heritage and water as a result of construction works associated with the aforementioned improvements. Potential negative effects as a result of the implementation of Alternative C are likely to be of a greater scale than those associated with Alternative B, as more intrusive works would be required to facilitate high speed rail networks along with the requirement for more extension infrastructure (i.e. substations to facilitate an electrified network). For this reason, Alternative C was not brought forward for further consideration.

Alternatives D, E, F and G are similar in nature and are likely to result in a generally positive environmental effect overall, particularly in relation to population and human health, air quality and climate, and material assets. This will be as a result of the implementation of measures which encourage a modal shift from private transport to public transport through the improvement of existing services (i.e through increased line speeds, through the provision of additional and direct services, and the development of new lines).These alternatives may result in negative effects on biodiversity, land and soils, cultural heritage and water as a result of construction works required, particularly in relation to the development of new lines (which are proposed in each Alternative).

The preferred alternative is a mix of recommendations from each of the packages, with the exception of Alternative C.

8. Assessment of Significant Effects

8.1 Introduction

The approach used for assessing likely significant effects was objectives led. The assessment was primarily qualitative in nature, with some assessment based on expert judgement. This qualitative assessment compares the likely effects against the Strategic Environmental Objectives to see which recommendations of the draft AISRR meet the Strategic Environmental Objectives and which, if any, contradict these.

Particular reference was made to the potential for cumulative effects in association with other relevant plans and programmes.

8.2 Assessment of Environmental Effects

The environmental effects of the draft AISRR's recommendations were assessed with respect to the existing environmental baseline as outlined in Section 5 and the environmental objectives listed in Section **Error! Reference source not found.**. The assessment process categorises environmental effects using the ratings outlined in Table 8.2 which is based on the impact assessment criteria defined by the EPA for environmental impact assessment.

Table 8.1: SEA Objectives, Indicators and Targets

Significance of Effects	
	Neutral
	Positive
	Negative
	Uncertain (Unknown or both positive and negative effects likely)

The potential environmental impact is assessed under the following headings:

- Population and Human Health (P&HH);
- Biodiversity (Bio);
- Land and Soil (L&S);
- Water (Wat);
- Air and Climate (note: the topic of Noise was not considered relevant and thus scoped out of this assessment) (AQ&C);
- Archaeology, Architectural and Cultural Heritage (AA&CH);
- Landscape and Visual (L&V); and
- Material Assets (MA).

8.3 Principal Environmental Effects

Table 8.2: Environmental Assessment of draft AISRR - Recommendations

No.	Recommendations	P&HH	Bio	L&S	Wat	AQ&C	AA&CH	L&V	MA
Decarbonisation									
1	**Develop and implement an All-Island Rail Decarbonisation Strategy that includes an electrified intercity network.** This should determine which decarbonisation solutions should be adopted for each part of the railway, recommend a common set of standards to be applied across the whole Island, and provide a roadmap for decarbonising the railway by 2050. The map provided in Figure 2.3 above provides a potential outcome that might be delivered by the draft AISRR, which assumes core intercity routes would be electrified with overhead line electrification (OHLE), while regional lines could be served by hybrid solutions, such as battery and/or hydrogen operated trains.								
2	**Develop plans to invest in the skills, supply chains, and rolling stock to deliver decarbonisation.** This will help control the costs of what is likely to be a significant long-term investment in the Island's railways.								
3	**Procure hybrid and electric rolling stock in the medium term.** Given the long lead in times for the procurement and delivery of rolling stock, and its relatively long operational life, it is recommended that planning for electric and hybrid traction across the Island should start soon.								
SEA Comments: Positive effects on population and human health, air quality and climate and material assets are predicted as a result of the decarbonisation recommendations. This will be due to a reduction in harmful air emissions including greenhouse gases during the operational phase. However, there is a potential for negative effects on these environmental aspects during any construction works required to implement the draft AISRR. However, a positive rating was assigned as it is predicted that the predominant effect is positive during the operational phase. It is important to note that a positive rating was assigned to material assets due to the provision of improved public transport, but also on the basis that the energy mix for the implementation of a decarbonised rail network is sourced primarily from renewable energy. Negative impacts are predicted on land and soils, water, archaeological, architectural and cultural heritage and landscape and visual due to construction works required to implement an electrified intercity network. An uncertain rating is assigned to biodiversity for Recommendation 1 as there are likely to be positive (due to emission reductions) and negative (due to construction) impacts arising. The scale of the construction works is not likely to be extensive for this Recommendation. Refer to Section 9 Mitigation and Monitoring for details of relevant mitigation and monitoring measures.								
Intercity									
4	**Upgrade the cross-country rail network to a dual-track railway (and four-track in places) and increase service frequencies.** This would involve dual-tracking the railway between Portarlington and Athlone, Kildare and Kilkenny, and Maynooth and Mullingar and four-tracking between Connolly/Spencer Dock and Clongriffin. In addition to enabling higher frequency intercity services on these corridors, these improvements would allow more commuter services to serve intermediate stations and therefore enable intercity services to deliver faster city-to-city journey times.								
5	**Upgrade the core intercity railway network to top speeds of 200km/h (125mph).** Upgrading the condition and strength of straight sections of track. Realigning some sections of the railway where steep curves and level crossings currently force trains to reduce speeds.								

No.	Recommendations	P&HH	Bio	L&S	Wat	AQ&C	AA&CH	L&V	MA
	Providing capacity to segregate intercity and regional services from other services on busier sections of the railway, which could include loops on busy sections to accommodate growth while longer term solutions are developed; and Upgrading signalling and rolling stock – which could be delivered incrementally as part of a wider renewals programme.								
6	**Develop short sections of new railways on congested corridors.** There are three sections of the network that are likely to require a four-tracking or new rail alignment solution to accommodate conflicting demands for capacity and deliver a 200 km/h railway. These are: **Belfast – Lisburn – Newry:** The existing railway between Newry and Belfast has significant constraints due to its alignment, level crossings, and limited space to add capacity between Lisburn and Belfast. A new railway could deliver significant journey time and capacity benefits for this corridor. **Dublin – Drogheda:** This railway is expected to become busier when the DART network is extended to Drogheda MacBride. While it is probably technically feasible to four track this railway, doing so would have a significant adverse impact on several Special Protection Areas and potentially the waterfronts of Malahide and Balbriggan. An alternative approach could be to build a new railway from Drogheda to Clongriffin following the M1 corridor. This railway would be shorter than a four-tracked solution, deliver faster journey times, require fewer significant crossings, require less land and property acquisition, generate less disruption to existing services during construction, and would have a lesser impact on the environment. **Portarlington/Kildare – Hazelhatch:** This railway is also expected to become busy as the commuter market to the southwest of Dublin grows. It should be feasible to four-track the corridor as far as Portarlington but doing so would have some impact on towns on the route and would involve building tracks through the Curragh. An alternative option could be to build a new alignment from Hazelhatch to Portarlington (with a spur to the Waterford line) that avoids the Curragh altogether. This route would be shorter and could deliver faster journeys.								
7	**Develop a cross-Dublin solution.** An east-west railway from Heuston to Spencer Dock could deliver transformational improvements in cross-Island connectivity if combined with improvements north of Connolly.								
SEA Comments: Potential for positive effects on population and human health, air quality and climate and material assets are predicted as a result of the intercity recommendations. This is due to the provision of a more efficient railway system and subsequently encouraging a modal shift from private car to public transport during the operational phase. However, there is a potential for negative effects on these environmental aspects during any construction works required to implement this strategy (i.e. as a result of air and noise emissions, potential land take etc). However, a positive rating was assigned as it is predicted that the predominant effect is positive during the operational phase. Negative impacts are likely on land and soils, water, archaeological, architectural and cultural heritage and landscape and visual due to construction works required to improve the intercity network. In relation to biodiversity, both positive and negative effects are predicted resulting in an uncertain rating where reinstatement or upgrade works are proposed. Positive impacts relate to the provision of a more efficient railway system and subsequently encouraging a modal shift from private car to public transport during the operational phase, reducing harmful air emissions which may be impact sensitive habitats/species. However, negative effects include disturbance to habitats/species during the construction phase and the potential for loss of habitats due to any required land-take. Refer to Section 9 Mitigation and Monitoring for details of relevant mitigation and monitoring measures.								
Regional and Rural									
8	**Provide more direct services between Ireland's West and South Coasts.** For example, between Galway, Limerick and Cork.								

No.	Recommendations	P&HH	Bio	L&S	Wat	AQ&C	AA&CH	L&V	MA
9	**Ensure regional and rural lines have at least one train per two hours.** Including hourly services between Galway, Limerick, Cork and Waterford.								
10	**Increase line speeds to at least 120km/h (75mph).** This would deliver significant benefits for communities across the Island.								
11	**Upgrade Limerick Junction and the Limerick Junction – Waterford line.** This will support freight services between the South Coast ports, Foynes, and the northwest. With a chord Limerick Junction, it will support direct Cork – Waterford services.								
12	**Reinstate the Western Rail Corridor railway between Claremorris and Athenry.** This will support freight and regional connectivity objectives in the West of Ireland.								
13	**Extend the railway into Tyrone, Derry~Londonderry, and Donegal.** Reinstating the railway between Portadown, Dungannon, Omagh, Strabane, Derry~ Londonderry, and Letterkenny would connect the railway to many communities and support direct services between Dublin, Belfast, Derry~Londonderry, and Letterkenny.								
14	**Reinstate the South Wexford Railway to boost connectivity in the southeast.**								
15	**Develop the railway to boost connectivity in the North Midlands.** Reinstating the railway between Portadown, Cavan, Mullingar, and Athlone would address several regional connectivity gaps. Building a new link between Maynooth and Adamstown and dualling the railway to Mullingar would also add capacity to support services to this region.								
16	**Integrate bus service and rail service timetables to connect communities where direct rail access proves to be unviable.** Bus services can help new railways boost public transport connectivity to places like Donegal, Enniskillen, Cookstown, and Downpatrick.								
SEA Comments: Positive effects on population and human health, biodiversity, air quality and climate and material assets are likely as a result of the intercity recommendations. This is due to the provision of a more efficient railway system (and public transport systems) and subsequently encouraging a modal shift from private car to public transport during the operational phase. However, there is a potential for negative effects on these environmental aspects during any construction/reinstatement works required to implement this strategy (i.e. as a result of air and noise emissions, potential land take etc). However, a positive rating was assigned as it is predicted that the predominant effect is positive during the operational phase. Negative impacts on land and soils, water, archaeology, architectural and cultural heritage and landscape and visual are likely where there is a requirement for any construction/reinstatement works. In relation to biodiversity, both positive and negative effects are predicted resulting in an uncertain rating where reinstatement works are proposed. Positive impacts relate to the provision of a more efficient railway system and subsequently encouraging a modal shift from private car to public transport during the operational phase, reducing harmful air emissions which may be impact sensitive habitats/species. However, negative effects include disturbance to habitats/species during the construction phase and the potential for loss of habitats due to any required land-take. Refer to Section 9 Mitigation and Monitoring for details of relevant mitigation and monitoring measures.									
Sustainable Cities									
17	**Connect Dublin, Belfast International, and Shannon Airport to the railway and improve existing rail-airport connections by:**								

No.	Recommendations	P&HH	Bio	L&S	Wat	AQ&C	AA&CH	L&V	MA
	Building a spur from Clongriffin to Dublin Airport. This intervention, which aims to complement the planned MetroLink project in Dublin, would enable intercity and other longer-distance services to directly access Ireland's busiest airport. With the proposed cross-Dublin tunnel, this intervention could connect places like Cork and Galway to Dublin Airport. Reinstating the railway between Lisburn and Antrim. This would enable Belfast International Airport to be connected to the railway network. Improving existing rail-airport connections at George Best Airport. Building a spur from Sixmilebridge or Cratloe to Shannon Airport. This intervention could include developing new stations between the airport and Limerick to be served by a new urban rail service centred on Limerick.								
18	**Extend double tracking in the Belfast area.** The section of railway between Antrim and Monkstown would need to be dualled to enable more frequent local services to the north and east of Belfast.								
19	**Segregate long-distance/fast services from stopping services.** This can be achieved by delivering a four-track railway on the approaches to Dublin Heuston and Connolly, and potentially by diverting Sligo and Longford trains away from the Maynooth – Connolly corridor using a new link between Adamstown and Maynooth.								
20	**Explore the case for developing new stations in the Belfast, Cork, Derry~Londonderry (including a spur for Limavady), and Limerick – Shannon city regions.**								
SEA Comments: Positive effects on population and human health, biodiversity, air quality and climate and material assets are predicted as a result of the sustainable cities recommendations. This will be due to the provision of a more efficient and more accessible railway system and subsequently encouraging a modal shift from private car to public transport during the operational phase. However, there is a potential for negative effects on these environmental aspects during any construction/reinstatement works required to implement the draft AISRR (i.e. as a result of air and noise emissions, potential land take etc). However, a positive rating was assigned as it is predicted that the predominant effect is positive during the operational phase. In relation to biodiversity, both positive and negative effects are predicted. Positive impacts relate to the provision of a more efficient railway system and subsequently encouraging a modal shift from private car to public transport during the operational phase, reducing harmful air emissions which may impact sensitive habitats/species. However, a predominant negative effect results from disturbance to habitats/species during the construction phase and the potential for loss of habitats due to any required land-take (in the absence of mitigation measures). Negative impacts on land and soils, water, archaeology, architectural and cultural heritage and landscape and visual are likely where there is a requirement for any construction/reinstatement works. Refer to Section 9 Mitigation and Monitoring for details of relevant mitigation and monitoring measures.								
Freight									
21	**Develop a sustainable solution for first-mile-last-mile rail access for Dublin Port.** Without this connection, there are limited options for growing rail freight.								
22	**Reduce Track Access Charges for freight services.** These charges are very high compared to other European railways and but could be reduced through support/government subsidy to stimulate demand for rail freight.								
23	**Strengthen rail connectivity to the Island's busiest ports, where links are feasible and improve access to ports that currently are underserved by rail freight**.								

No.	Recommendations	P&HH	Bio	L&S	Wat	AQ&C	AA&CH	L&V	MA
	These include: Foynes for Limerick, Waterford (Belview), Marino Point for Cork, and Rosslare Europort (in the longer term, when LoLo operations are feasible here, or, in the shorter-term following analysis of the feasibility of RoRo rail freight).								
24	**Develop a network of inland terminals close to major cities on the rail network, especially where there is good access to major roads/motorways, limited impact on communities and passenger traffic, and good access to industrial clusters.** Potential locations for new terminals include the Upper Bann area for Northern Ireland, Limerick Junction, a location north of Cork, Athenry for Galway, Sligo, and west of Dublin.								
SEA Comments: Positive effects on population and human health, air quality and climate and material assets are predicted as a result of the freight recommendations. These effects will result from the improvement of freight infrastructure, therefore resulting in positive impacts on businesses and the population generally. However, there is a potential for negative effects on these environmental aspects during any construction/reinstatement works required to implement this strategy (i.e. as a result of air and noise emissions, potential land take etc). However, a positive rating was assigned as it is predicted that the predominant effect is positive during the operational phase. In relation to biodiversity, both positive and negative effects are predicted where works are likely to be required. Positive impacts relate to the provision of a more efficient railway system and subsequently encouraging a modal shift from private care to public transport during the operational phase, reducing harmful air emissions which may impact sensitive habitats/species. However, a predominant negative effect results from disturbance to habitats/species during the construction phase and the potential for loss of habitats due to any required land-take (in the absence of mitigation measures) particularly in proximity to coastal areas. Negative impacts on land and soils, water, archaeology, architectural and cultural heritage and landscape and visual are likely where there is a requirement for any construction/reinstatement works. Refer to Section 9 Mitigation and Monitoring for details of relevant mitigation and monitoring measures.								
Customer Experience									
25	**Continue to invest in initiatives that deliver a seamless customer journey such as improving information provision and catering.**								
26	**Continue to benchmark and monitor service quality and deliver continuous improvement.** The Public Service Contracts provide a framework for holding operators to account for delivering high levels of service.								
27	**Ensure future rolling stock specifications are aligned to the infrastructure-led interventions outlined in this Review**. This includes increasing the size and/or speed of the rolling stock fleet to deliver higher frequency service patterns and new services.								
28	**Invest in improving integration within rail and between rail and other transport options - and put in place appropriate forums to co-ordinate work across institutions.**								
29	**Deliver 'clock-face' timetable calling patterns that integrate with other services**.								
30	**Develop cross-border structures to improve the effectiveness of cross-border infrastructure and rail service planning.**								
SEA Comments: Positive impacts on population and human health, biodiversity, air quality and climate, and material assets are predicted as a result of a number of the recommendations outlined above. This is due to the improvement of the customer experience for those using the rail network, thereby encouraging a modal shift to public transport. By ensuring the allocation of future rolling stock to aid in the decarbonisation of the railway network, positive impacts are predicted due to future improvements in air quality.									

8.4 Cumulative Effects

Cumulative effects are those that arise when the effects of the implementation of a plan or project to occur in combination with those of other plans or projects. Cumulative effects can be described as the addition of many small impacts to create one larger, more significant, impact.

To implement the recommendations of the draft AISRR, a range of projects/schemes would be required. Each of these should be subject to cumulative assessment at project level, as necessary, to determine whether the subject project is likely to give rise to cumulative effects with other proposed or existing projects. However, it is thought that the mitigation measures outlined in Section 9 of this report will assist in the reduction or avoidance of cumulative environmental effects.

The two types of potential cumulative effects that have been considered throughout this assessment are:

- Potential Intra-Plan cumulative effects, which arise from the interactions between different types of potential environmental effects resulting from a plan, programme, or policy where there are elevated levels of environmental sensitivities. Environmental sensitivities have been identified in **Section 5** of this Environmental Report to inform whether future development could potentially result in environmental conflicts and lead to a deterioration in environmental quality. The interrelationships between environmental components that help determine these potential effects are identified in Table 8.3 below.
- Potential Inter-Plan cumulative effects arise when the effects of the implementation of one plan occur in combination with those of other plans, programmes, developments, etc. Other policies, plans and programmes, as outlined in Section 3 and Appendix A have therefore been considered for their potential to give rise to potential cumulative effects with the draft AISRR.

Within the draft AISRR, a range of potential developments are proposed. Each of these should be subject to cumulative assessment at project level, as necessary, to determine whether the subject project is likely to give rise to cumulative effects with other proposed or existing projects. However, it is thought that the mitigation measures outlined in Section 9 of this report will assist in the reduction or avoidance of cumulative environmental effects.

8.4.1 Intra-Plan Cumulative Effects

The SEA Directive requires the Environmental Report to include information on the likely significant effects on the environment, including on issues such as biodiversity, fauna, flora, population, human health, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape, and the interrelationship between the above factors.

The presence of significant interactive effects between environmental factors is identified on Table 8.3 below.

Table 8.3: Intra-Plan Cumulative Effects

Environmental Aspect	P+HH	Bio	L&S	Wat	AQ&C	AA&CH	L&V	MA
P+HH	-	No	No	No	Yes	No	No	Yes
Bio	No	-	No	No	No	No	Yes	No
L&S	No	Yes	-	Yes	Yes	Yes	Yes	Yes
Wat	Yes	Yes	No	-	No	No	No	Yes
AQ&C	Yes	Yes	No	No	-	No	No	No
AA&CH	Yes	No	No	No	No	-	No	No
L&V	Yes	No	No	No	No	Yes	-	No
MA	Yes	Yes	Yes	Yes	Yes	Yes	No	-

8.4.2 Inter-Plan Cumulative Effects

Cumulative effects of the AISRR have been detailed Table 8.4 below with reference to the schematic included in Section 3 (Figure 3.1), that was recommended at SEA Scoping Stage by the EPA, inclusive to key plans and programmes and their interlinkage with the AISRR.

Table 8.4 Cumulative Impacts of the AISRR with key plans and programmes

Environmental Component	Potential Cumulative effects that could generally occur across environmental components
Population and Human Health	There is potential for cumulative positive effects on communities and/or individuals to occur as a result of increased access to better public transport, particularly in relation to improved rail services resulting from the implementation of the AISRR, in combination with the investment and policies emanating from a number of plans outlined in Table A1 of Appendix A. including the National Development Plan 2021-2030, the Regional and Spatial Economic Strategies and specific Transport Policies and Strategies. All such plans will be subject to SEA in line with the SEA Directive (2001/42/EC), and AA as necessary in line with Article 6 of the Council Directive 92/43/EEC. There is potential for cumulative negative effects on communities and/or individuals to occur as a result of any construction/reinstatement/upgrade works (which could potentially result in air, noise and water emissions and visual disturbance) associated with the implementation of the AISRR, particularly in combination with any transport policies and strategies which will involve physical works (i.e. Greater Dublin Area Transport Strategy 2022-2042, Belfast Metropolitan Plan 2015 and Sub-Regional Transport Plan 2015). However, all such plans will be subject to SEA in line with the SEA Directive (2001/42/EC), AA as necessary in line with Article 6 of the Council Directive 92/43/EEC. It is anticipated that any negative impacts to population and human health resulting from development plans will be minimised insofar as possible, through the relevant mitigation and monitoring outlined in SEA and AA processes. Thus, there is no potential for likely significant cumulative effects to occur on population and human health as a result of the implementation of plans and the AISRR.
Biodiversity	There is potential for cumulative negative effects on biodiversity to occur as a result of increased development, associated construction works and potential land-use change emanating from the implementation of the AISRR in combination with the increased development, land-use change and associated development emanating in line with the various transport and policy strategies outlined in Table A1 of Appendix A and any other plans which may affect areas in close proximity to developments arising from the implementation of the AISRR. However, all such plans will be subject to SEA in line with the SEA Directive (2001/42/EC), and AA as necessary in line with Article 6 of the Council Directive 92/43/EEC. It is anticipated that any negative impacts to biodiversity resulting from development plans will be minimised insofar as possible, through the relevant mitigation and monitoring outlined in SEA and AA processes. Thus, there is no potential for likely significant cumulative effects to occur on biodiversity as a result of the implementation of development plans and the AISRR. There is also potential for cumulative, positive impacts on biodiversity as a result of the implementation of the AISRR (i.e. the decarbonisation of the railway network, developments to encourage a modal shift from private transport to public transport) which will ultimately result in an improvement in air quality, thus having a positive effect on sensitive habitats and species. The implementation of various transport policies and strategies (i.e. Better Connecting Dublin & Belfast Enterprise 2018) and Climate and Sustainability Strategies and Plans (i.e. Decarbonising Transport – A Better, Greener Britain) will also result in a reduction of GHG emissions and encourage a modal shift to public transport and a more sustainable future, resulting in a positive in-combination effect. These Plans are subject to SEA in line with the SEA Directive (2001/42/EC) and AA as necessary in line with Article 6 of the Council Directive 92/43/EEC. Overall, it is not anticipated that negative cumulative effects are likely to occur as a result of the aforementioned Plans and or Strategies in combination with the AISRR, where all relevant mitigation and monitoring are undertaken.
Land and Soils	There is potential for cumulative negative effects to occur on land and soil, as a result of new development, such as new railway lines and upgrades to existing infrastructure, emanating from the AISRR, in combination with new development and or land use changes in line the various strategic national and regional plans and transport policies and strategies, all of which reference improvements in the transport sector. However, all such plans will be subject to SEA in line with the SEA Directive (2001/42/EC), AA as necessary in line with Article 6 of the Council Directive 92/43/EEC, and relevant mitigation and monitoring. Thus, it is anticipated that any cumulative negative impacts on land and soils will be minimised insofar as possible through SEA and AA mitigation measures.
Water Resources	There is potential for cumulative negative effects to occur on water quality as a result of construction works associated with new developments, reinstatement and upgrade works associated with the implementation of the AISRR, particularly in combination with any plans which also reference transport infrastructure

Environmental Component	Potential Cumulative effects that could generally occur across environmental components
	works (i.e. Greater Dublin Area Transport Strategy 2022-2042, Belfast Metropolitan Plan 2015 and Sub-Regional Transport Plan 2015). However, all such plans will be subject to SEA in line with the SEA Directive (2001/42/EC), and AA as necessary in line with Article 6 of the Council Directive 92/43/EEC. It is anticipated that any negative impacts to water quality resulting from the aforementioned plans will be minimised insofar as possible, through the relevant mitigation and monitoring outlined in SEA and AA processes. Thus, there is no potential for likely significant cumulative effects to occur on water quality as a result of the implementation of plans and the AISRR.
Air and Climate	There is potential for cumulative positive effects to occur on air quality and climate as a result of the implementation of the AISRR in combination with the implementation of various transport policies and strategies (i.e. Better Connecting Dublin & Belfast Enterprise 2018) and Climate and Sustainability Strategies and Plans (i.e. Decarbonising Transport – A Better, Greener Britain) as all plans will aim to reduce GHG emissions and encourage a modal shift to public transport and a more sustainable future, resulting in a positive in-combination effect on air quality and climate. There is a potential for cumulative negative effects to occur on air quality and climate at a result of the implementation of these plans due to any construction works required to deliver these plans (i.e. through air emissions associated with excavation works). However, all such plans will be subject to SEA in line with the SEA Directive (2001/42/EC), AA as necessary in line with Article 6 of the Council Directive 92/43/EEC, and relevant mitigation and monitoring. Thus, it is anticipated that any negative impacts on air quality and climate will be minimised insofar as possible through the relevant mitigation and monitoring outlined within the SEA and AA of these Plans.
Archaeological, Architectural and Cultural Heritage	There is potential for cumulative negative impacts to occur on archaeology, architectural and cultural heritage due to potential intrusive works associated with any new developments, reinstatement and upgrade works as a result of the implementation of the AISRR, in combination with any plans which also reference transport infrastructure works (such as Greater Dublin Area Transport Strategy 2022-2042, Belfast Metropolitan Plan 2015 and Sub-Regional Transport Plan 2015). However, all such plans will be subject to SEA in line with the SEA Directive (2001/42/EC), AA as necessary in line with Article 6 of the Council Directive 92/43/EEC, and relevant mitigation and monitoring. Thus, it is anticipated that any negative impacts to archaeology, architectural and cultural heritage will be minimised insofar as possible through the relevant mitigation and monitoring outlined within the SEA and AA of these Plans.
Landscape and Visual	There is potential for cumulative negative impacts to occur on landscape and visual due to visual disturbance associated with any construction works associated with new developments, reinstatement and upgrade works as a result of the implementation of the AISRR. In addition, the presence of new infrastructure required for the operation of developments associated with the implementation of the AISRR (i.e. such as potential new railway corridors and inland terminals) could also result in negative effects on landscape and visual. These effects could result in negative in-combination effects with any plans which also require the development of new infrastructure (such as Greater Dublin Area Transport Strategy 2022-2042, Belfast Metropolitan Plan 2015 and Sub-Regional Transport Plan 2015). However, all such plans will be subject to SEA in line with the SEA Directive (2001/42/EC), AA as necessary in line with Article 6 of the Council Directive 92/43/EEC, and relevant mitigation and monitoring. Thus, it is anticipated that any negative impacts to landscape and visual will be minimised insofar as possible through the relevant mitigation and monitoring outlined within the SEA and AA of these Plans.
Material Assets	There is potential for cumulative positive effects on material assets (i.e. transport infrastructure) to occur as a result of increased access to better public transport, particularly in relation to improved rail services resulting from the implementation of the AISRR, in combination with the implementation of a number of plans outlined in Section 3 and Appendix A including the National Development Plan 2021-2030, the Regional and Spatial Economic Strategies and specific Transport Policies and Strategies which all include aims and objectives to improve the provision of public transport across the Island of Ireland. All such plans will be subject to SEA in line with the SEA Directive (2001/42/EC), and AA as necessary in line with Article 6 of the Council Directive 92/43/EEC. There is potential for cumulative negative effects on material assets to occur as a result of any construction/reinstatement/upgrade works associated with the implementation of the AISRR, particularly in combination with any transport policies and strategies which will involve physical works (i.e. Greater Dublin Area Transport Strategy 2022-2042, Belfast Metropolitan Plan 2015 and Sub-Regional Transport Plan 2015) as there is a potential for disturbance to utilities and services, generation of waste material, possible changes in land-use and temporary disruption to existing services during construction works and also possible changes to land-use during the operational phase of any new developments. However, all such plans will be subject to SEA in line with the SEA Directive (2001/42/EC), and AA as necessary in line with Article 6 of the Council Directive 92/43/EEC. It is anticipated that any negative impacts to population and human health resulting from development plans will be minimised insofar as possible, through the relevant mitigation and monitoring outlined

Environmental Component	Potential Cumulative effects that could generally occur across environmental components
	in SEA and AA processes. Thus, there is no potential for likely significant cumulative effects to occur on material assets as a result of the implementation of plans and the AISRR.

9. Mitigation Measures and Monitoring

9.1 Mitigation

Mitigation measures are measures envisaged and designed to prevent, reduce and as fully as possible offset any significant adverse impacts on the environment during both the construction and operational phases of the implementation of the AISRR. All mitigation measures have been developed and agreed with the DoT and the DfI as part of the SEA iterative process. The primary mitigation measure is the development of the draft AISRR which ensures the sustainable and appropriate development without compromising the integrity of the natural and built environment. It is recommended that all environmental requirements and guidelines outlined in this Environmental Report are adhered to. In addition, future legislation, policies, environmental requirements and guidelines should also be fully integrated into the AISRR and Environmental Report.

In general terms, all proposals for development will be required to have due regard to environmental considerations outlined in this Environmental Report and associated Appropriate Assessment. In addition, many impacts will be more adequately identified and mitigated at project and EIA/AA level. Any new projects or plans arising from the implementation of the draft AISRR shall be subject to appropriate feasibility, options and environmental assessments, where required.

The majority of Recommendations are predicted have a positive environmental impact particularly on Population, Human Health, Air, Climate and Material Assets. However, a number of objectives are proposed that may have a negative environmental impact, particularly those relating to new development where biodiversity, land and soils, water and landscape and visual impacts may arise.

The relevant mitigation measures outlined in Table 9.1 below should be adhered to in full during the implementation of the draft AISRR.

The mitigation measures outlined in this section will be appended to the final AISRR.

Table 9.1: Mitigation Measures

Environmental Aspect	Mitigation Measure	Relevant to Which Recommendation
Population and Human Health	Any developments resulting from the implementation of the AISRR which would be likely to have a significant negative effect on amenities in the plan area through air emissions, noise emissions, odours, water emissions or visual disturbance should be mitigated in order to eliminate significant negative impacts or reduce them to relevant limit levels.	1,4,5,6,7,11,12,13,14,15,17,18,19,20,21,23 and 24
Biodiversity	**Protection of Biodiversity including Natura 2000 Network** Protect designated sites including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), Natural Heritage Areas, proposed Natural Heritage Areas, UNESCO World Heritage and UNESCO biosphere sites, Ramsar Sites, Salmonid Waters, Shellfish Waters, Freshwater Pearl Mussel catchments, Flora Protection Orders and Species, Wildlife sites (including Nature Reserves); the Water Framework Directive Register of Protected Areas; Wildfowl Sanctuaries and Tree Preservation Orders. Any developments arising from the implementation of the AISRR shall comply with relevant EU Environmental Directives and applicable National Legislation, Policies, Plans and Guidelines, including the following: EU Directives, including the Habitats Directive (92/43/EEC, as amended), the Birds Directive (2009/147/EC), the Environmental Liability Directive (2004/35/EC), the Environmental Impact Assessment Directive (2011/92/EU, as amended by 2014/52/EC), the Water Framework Directive (2000/60/EC) and the Strategic Environmental Assessment Directive (2001/42/EC); National legislation, including the Wildlife Acts 1976 and 2010 (as amended), the Planning and Development Act 2000 (as amended) and associated regulations, Environmental Impact Assessment Regulations, the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), the Flora Protection Order 2015, the Wildlife (NI) Order 1985 (as amended), the Wildlife and Natural Environment Act (NI) 2011, The Conservation (Natural Habitats, etc) Regulations (Northern Ireland) 2017 and the Strategic Planning Policy Statement (SPPS) for Northern Ireland; National policy guidelines; Catchment and water resource management plans; and Biodiversity plans and guidelines including National Biodiversity Action Plan 2017-2021 and Ireland's 4th National Biodiversity Action Plan (Ireland), All-Island Pollinator Plan; Biodiversity Strategy for Northern Ireland to 2020 (Northern Ireland), Draft Environment Strategy (NI), the Draft NI Peatland policy, the Draft Green Growth Strategy (Northern Ireland) and Northern Ireland Energy Strategy 2050; (and any updated/superseding documents).	1,4,5,6,7,8,11,12,13,14,15,17,18,19,20,21,23 and 24
	Biodiversity and Ecological Networks Any developments arising from the implementation of the AISRR should aim to protect, restore and enhance biodiversity and ecological connectivity, including woodlands, trees, hedgerows, semi-natural grasslands, rivers, streams, natural springs, wetlands, geological and geo-morphological systems, other landscape features, natural lighting conditions, and associated wildlife where these form part of the ecological network and/or may be considered as ecological corridors or stepping-stones in the context of Article 10 of the Habitats Directive. The design of any developments arising from the implementation of the AISRR should aim to achieve no net biodiversity loss where practicable.	

Environmental Aspect	Mitigation Measure	Relevant to Which Recommendation
	The design of any developments arising from the implementation of the AISRR should aim to incorporate Biodiversity Net Gain where practicable.	
	Invasive Species Appropriate invasive species surveys shall be carried out in advance of any construction/reinstatement works. Invasive Species Management Plans shall be prepared and implemented where required, following the assessment of invasive species surveys.	
	Direct Land Take The design of any developments arising from the implementation of the AISRR will ensure that measures are explored to avoid unnecessary land-take, in line with the ecological mitigation hierarchy which prioritises avoidance, and seeks to reduce, mitigate and then compensate and offset for adverse effects on biodiversity, in that order of preference. If land-take cannot be avoided, an assessment of the type (and use) of habitat present is required to determine suitable mitigation and/or compensation measures.	
	Hydrological Change Where proposed work has the potential to result in hydrological change, and there is a European Site within the zone of influence, then design level modelling will be undertaken to determine any potential hydrological change as a result of any proposed construction works which may impact on the hydrology of sites within the zone of influence of the implementation of the AISRR, including European Sites designated for their international nature conservation importance. This will also help to inform the overall design of any infrastructure requirements.	
	Water Pollution Where proposed work has the potential to result in water pollution, and there is hydrological connectivity to a European Site, Surface Water Management Plans (SWMPs) will be prepared for planning submission of development proposals and implemented during construction where impacts on sensitive waterbodies are likely to arise. SWMPs will include appropriate measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds set up early in construction to capture runoff and prevent ingress of sediments and contaminants into existing drainage infrastructure where necessary. Integrated and innovative solutions require a partnering approach best managed through a SWMP. Where implementation of the Recommendations presents a challenge to existing drainage systems, and/or the operation of a local drainage system is known to be complicated by interactions between river, groundwater and sewer systems or river and canal systems, submission of a Water Protection Plan and detailed site drainage plans will be required with planning applications associated with developments arising from the implementation of the AISRR, if a European Site falls within the zone of influence..	
	Air Quality Where there is potential for implementation of the AISRR to result in significant increases in air pollution, and a European Site falls within the zone of influence of such implementation, then air quality modelling should be undertaken to determine potential air quality impacts of the implementation of the AISRR on sites, including European Sites within the zone of influence.	

Environmental Aspect	Mitigation Measure	Relevant to Which Recommendation
	Where increased air pollution may result in adverse effects on habitats, potential solutions to mitigate air pollution and resulting dust and nitrogen deposition may include: tree planting to reduce deposition of pollutants on a site (this is site and habitat dependent); preparation and implementation of dust management plans, screening and the provision of compensatory habitat (where practicable).	
	Noise, vibration and visual disturbance Development proposals arising as a result of implementation of the AISRR will have regard to the requirements of the Noise Directive 2002/49/EC and associated Environmental Noise Regulations 2006 ES 45 and European Communities (Environmental Noise) Regulations 2018 S.I. No. 549/2018 (Ireland) (and any updated/superseding documents). Development proposals will provide evidence that the design does not result in increased noise, vibration or visual disturbance to important ecological receptors within the zone of influence, in particular those that are QI/SCIs of European Sites, to the degree that the noise/vibration/visual disturbance affects the integrity of the ecological receptor. In constructing development proposals arising as a result of the AISRR regard shall also be given to BS 5228 Part 1 (2014) and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001 '*Code of Practice for Noise and Vibration Control on Construction and Open Sites*' (and any updated/superseding documents).	
	Lighting Proposals arising from the implementation of the AISRR will demonstrate that the design of lighting minimises the incidence of light spillage or pollution into the surrounding environment and that there is no unacceptable adverse effect on the integrity of European Sites (i.e. no unacceptable adverse effect on QIs/SCIs of European Sites). It should be demonstrated that the design and implementation of a hierarchy of light intensity zones has been factored into designs to ensure that environmental impact is minimised as far as possible particularly in areas proximate to ecological corridors and European Sites. It is encouraged that that any developments arising from the implementation of the AISRR maintain dark skies in rural areas and limit light pollution in urban and rural areas.	
	Additional Recreational Pressure Improving the transport network across the Island of Ireland increases accessibility to protected areas, which places pressure on habitats and species within the protected areas, and can have adverse effects on the integrity of such sites. Mitigation requirements would be dependent on the level of potential recreational pressure and the actual site in question, but mitigation needs to ensure that there are no adverse effects on the integrity of European Sites resulting from implementation of the AISRR Recommendations. Examples of alleviation include guided paths to less sensitive areas of Protected Sites, or reduced access at certain times of year when important features of a site are at their most sensitive e.g. breeding bird season.	
Land and Soils	**Land Take** Development proposals arising from the implementation of the AISRR should be cognisant of the target of the National Planning Framework's (2018) SEA to "*Maintain built surface cover nationally to below the EU average of 4%*".	1,4,5,6,7,10,11,12,13,14,15,17,18,19,21,23 and 24

Environmental Aspect	Mitigation Measure	Relevant to Which Recommendation
	Geological Heritage Sites and Areas of Special Scientific Interest Development proposals arising from the implementation of the AISRR should contribute towards the appropriate protection and maintenance of the character, integrity and conservation value of features or areas of geological interest. GSI datasets should be taken into account as appropriate during the design or development of projects and plans arising from the implementation of the AISRR, including those relating to geoheritage, groundwater, geohazards, natural resources and coastal vulnerability.	
	Contamination Ensure that adequate soil protection measures are undertaken where appropriate on any developments arising from the implementation of the AISRR. Adequate and appropriate investigations shall be carried out into the nature and extent of any soil and groundwater contamination and the risks associated with site development work, particularly where brownfield development is proposed.	
Water	**Flood Risk Management Guidelines** Any developments resulting from the implementation of the AISRR shall be subject to plan/project level flood risk assessments.	1,4,5,6,7,10,11,12,13,14,15,17,18,19,21,23 and 24
	Legislation Where appropriate, any developments arising from the implementation of the AISRR should contribute towards the protection of existing and potential water resources, and their use by humans and biodiversity. This should be carried out in accordance with the requirements and guidance in the EU Water Framework Directive 2000 (2000/60/EU), the European Union (Water Policy) Regulations 2003 (as amended), the European Communities Environmental Objectives (Surface Water) Regulations 2009 (SI No. 272 of 2009), the Groundwater Directive 2006/118/EC and the European Communities Environmental Objectives (groundwater) Regulations, 2010 (S.I. No. 9 of 2010) and other relevant EU Directives, including associated national legislation and policy guidance (including any superseding versions of same).	
	Sustainable Drainage Systems (SuDS) Any new developments associated with the implementation of the AISRR should implement SuDS where possible.	
Air and Climate	**Air** Any developments arising from the implementation of the AISRR should comply with air quality legislation and contribute to achieving greenhouse gas emission targets. Management plans shall be formulated based on the following best practice guidance from Ireland, the UK (IAQM (2014), The Scottish Office (1996), UK Office of Deputy Prime Minster (2002) and BRE (2003) (and any updated/superseding documents). Dust management plans shall be prepared and implemented for any major construction/reinstatement/upgrade works associated with the implementation of the AISRR.	1,4,5,6,7,11,12,13,14,15,17,18,19,20,21,23 and 24

Environmental Aspect	Mitigation Measure	Relevant to Which Recommendation
	Climateadaptation and resilience Improve resilience and adaptation to climate change by taking into account issues including the following in the location and design of any developments/plans arising from the implementation of the AISRR; • Flood risk; • Susceptibility to major accidents/disasters; • Extreme temperature and associated implications including those relating to the operation of transport and ancillary infrastructure and services.	
Archaeological, architectural and cultural heritage	**Archaeological Heritage** Where practicable, developments arising from the implementation of the AISRR should protect archaeological heritage by implementing the relevant provisions of the Planning and Development Act 2000 (as amended), the National Monuments Act, 1930 (as amended) (Ireland), The Northern Irish Historic Monuments, Archaeological Objects Order 1995 (Northern Ireland) and the Planning Act (NI) 2011, The Valetta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas and the Convention for the Protection of the Architectural Heritage of Europe (hereafter referred to as the Granada Convention) (Council of Europe 1985). Any changes to archaeological heritage resulting from any new developments, reinstatement works or alterations to existing infrastructure arising from the implementation of the AISRR, shall be in accordance with the relevant legislation. Consultation with the National Monuments Service of the Department of Housing, Local Government and Heritage (Ireland) and the Historic Environment Division of the Department of Communities (Northern Ireland) should be carried out for any plans/projects resulting from the implementation of the AISRR where impacts on protected sites are likely to arise. Any developments associated with the implementation of the AISRR should contribute, where relevant, towards the protection and preservation of underwater archaeological sites in riverine, intertidal and sub-tidal locations.	1,4,5,6,7,10,11,12,13,14,15,17,18,19,21,23 and 24
	Architectural Heritage Where possible developments arising from the implementation of the AISRR should contribute towards the protection of architectural heritage by adhering to the relevant legislative provisions of the Planning and Development Act 2000 (as amended) in relation to architectural heritage and the policy guidance contained in the Architectural Heritage Protection Guidelines 2011 (Ireland) and The Northern Irish Historic Monuments and Archaeological Objects Order 1995 (Northern Ireland) (and any updated/superseding documents). Any changes to architectural heritage or it's curtilage, resulting from any new developments, reinstatement works or alterations to existing infrastructure resulting from the implementation of the AISRR, shall be in compliance with relevant legislation. Any plans/projects arising from the implementation of the AISRR will have regard to the Historic Environment Division's Record of assets which have protections under the regional and local planning policies in Northern Ireland, including Historic (and Listed Buildings), designated Areas of Significant Archaeological Interest (ASAI), Historic Parks, Gardens and Demesnes, Defence and Industrial Heritage and shipwrecks and maritime heritage where relevant.	

Environmental Aspect	Mitigation Measure	Relevant to Which Recommendation
	In addition, any plans/projects arising from the implementation of the AISRR will have regard to aspects of heritage not fully covered by those held on formal records - e.g. the wealth of vernacular heritage, particularly across the rural landscape, historic routeways, boundaries, and townland and parish boundaries.	
Landscape and Visual	Developments and plans arising from the implementation of the AISRR should contribute, where possible, towards the protection of county and local level landscape designations from incompatible developments. Any developments which may arise from the implementation of the AISRR that have the potential to result in negative effects on these designations shall be accompanied by an assessment of the potential landscape and visual impacts of any such development. This will demonstrate that potential landscape effects have been anticipated and avoided to a level consistent with the sensitivity of the landscape and the nature of the designation. Protect amenity value and minimise negative effects on amenity value resulting from any new developments, reinstatement works or alterations to existing infrastructure arising from the implementation of the AISRR. Any developments arising from the implementation of the AISRR should protect the landscape character and visual potential of the coast and conserve the character and quality of seascapes. Cognisance shall be given to the information and recommendations contained in the Landscape Strategy for Ireland 2015-2025, the Northern Ireland Regional Landscape Character assessment and the Shared Horizons Statement of Policy on Protected Landscapes in Northern Ireland during the development of any projects and plans arising from the implementation of the AISRR. Any future plans/programmes arising from the implementation of the AISRR will have regard to existing and new landscape guidance documents.	1,4,5,6,7,10,11,12,13,14,15,17,18,19,21,23 and 24
Material Assets	**Resources and Waste** All waste arising during any construction or reinstatement works arising from the implementation of the AISRR shall be managed and disposed of in accordance with relevant legislation. Waste management plans shall be implemented to minimise waste and ensure correct handling and disposal of construction wastes streams. Where possible ensure that the principles of reduce, reuse and recycle are implemented on any developments arising from the implementation of the AISRR. **Land-Use and Infrastructure** Any developments arising from the implementation of the AISRR should protect public assets and infrastructure including public open spaces, parks and recreational areas, public buildings and services and utility infrastructure (electricity, gas, telecommunications, water supply, wastewater infrastructure etc).	1,4,5,6,7,11,12,13,14,15,17,18,19,20,21,23 and 24
All	**Preparation of a Construction Environmental Management Plan** Construction Environmental Management Plans (CEMP) shall be prepared for any major construction/reinstatement works associated with the implementation of the AISRR. The CEMP shall include, but not limited to, the following information: Description of the project; Description of the construction works required (including duration and phasing, location, sensitive receptors etc); Details of any environmental assessments carried out to inform the CEMP; Roles and responsibilities (including training and competencies);	1,4,5,6,7,11,12,13,14,15,17,18,19,20,21,23 and 24

Environmental Aspect	Mitigation Measure	Relevant to Which Recommendation
	Details on environmental management, including details of any environmental management systems, identification of the relevant regulations and requirements, environmental awareness and commitments; Identification of potential negative environmental effects and mitigation measures to reduce or avoid said impacts (including mitigation measures relating to population and human health, biodiversity, land and soils, water, air and climate, archaeological, architectural and cultural heritage, landscape and visual, material assets (including infrastructure, waste and resources). Procedures for audits, monitoring and inspections.	
All	Operational Phase Maintenance Plans should be developed where relevant for any major developments arising from the implementation of the AISRR.	1,4,5,6,7,11,12,13,14,15,17,18,19,20,21,23 and 24
All	Any new railway lines shall be subject to feasibility, constraints and route options selections assessments.	4,5,6,7,13,15,17,18,19,20,21,23 and 24
All	Any developments arising from the implementation of the AISRR shall be subject to the relevant environmental assessments, as required (i.e. Environmental Impact Assessment, Environmental Impact Assessment Screening, Appropriate Assessment, Habitats Regulations Assessment).	All

9.2 Monitoring

Article 10 of the SEA Directive requires that monitoring should be carried out in order to identify at an early stage any unforeseen adverse impacts associated with the implementation of the plan or programme.

A monitoring programme is developed based on the indicators selected to track progress towards achieving strategic environmental objectives and reaching targets, enabling positive and negative impacts on the environment to be measured. As previously described, the environmental indicators have been developed to show changes that would be attributable to implementation of the draft AISRR.

As outlined in the EPA guidance document '*Guidance on SEA Statements and Monitoring'* (EPA, 2020), SEA monitoring should reflect the nature and level of detail of the plan/programme (EPA, 2020). Many national-level plans/programmes lack geographic specificity, contain only high-level strategic objectives and do not lend themselves to cause–effect models in terms of direct measuring of environmental effects. As such, SEA monitoring for these plans should focus on national indicators to examine environmental trends.

Refer to Table 9.2 for the proposed monitoring measures. The monitoring measures included are based on national indicators and informed by the content of the draft AISRR.

The SEA carried out has ensured that any potential significant environmental impacts have been identified and given due consideration.

The monitoring measures outlined in this section will be appended to the final AISRR.

Table 9.2: Proposed monitoring measures for the AISRR

Environmental Component	Indicators	Monitoring Sources	Frequency/Responsibility
Population and Human Health	Improved accessibility/proximity to rail transport Mode share of rail transport (passenger and freight) Improvement in air quality due to modal shift Reduction in GHG emissions from rail transport and due to modal shift Status and quality of waterbodies near railway infrastructure	CSO Census Reports (Ireland) and Northern Ireland Statistics and Research Agency Census Reports (Northern Ireland) Environmental Protection Agency's annual air quality reports (Ireland) and the Department of Agriculture, Environment and Rural Affairs (DAERA) data on air quality (Northern Ireland). Irish Water and Northern Ireland Water's water quality reports. Monitoring of the effects of projects developments required under separate processes (EIA, AA)	Central Statistics Office (every 6 years) and Northern Ireland Statistics and Research Agency (every 10 years) EPA (annual air quality reports) and DAERA (annual air quality reports) EPA (continuously) and DAERA (continuously) In accordance with the monitoring provisions of EIA/ AA In accordance with the monitoring provisions of the lower-level plans.
Biodiversity	Conservation status/habitat quality for all sites and species located near railway infrastructure Conservation status/habitat quality for all sites and species positively impacted by an improvement in air quality due to modal shift and/or decarbonisation of rail. Level of biodiversity gain achieved as a result of the implementation of the draft AISRR. Level of biodiversity lost as a result of the implementation of the draft AISRR.	The Status of EU Protected Habitats and Species in Ireland Article 17 Report (Department of Housing, Local Government and Heritage) Department of Housing, Local Government and Heritage report of the implementation of the measures contained in the Habitats Directive - as required by Article 17 of the Directive. Monitoring of the effects of railway related project development required under separate processes (EIA, AA). Monitoring of the results of any ecological surveys carried out for any developments arising from the implementation of the AISRR. Updates to National Red List Check List (Ireland) Targeted Local Catchment Assessments Monitoring related to relevant Local Area Plans and County/City Development Plans. Corine and Táilte mapping. EPA State of the Environment Report 2020. Ireland's National Water Framework Directive Monitoring Programme, 2019-2021. EPA Water Quality of Ireland Report.	DHLGH (every 6 years) In accordance with the monitoring provisions of EIA/ AA. NPWS (varies) LAWPRO Catchment Scientists (varies) In accordance with the monitoring provisions of the lower-level plans. EEA and EPA (continuously) EPA (every 4 years) EPA and DAERA (continuously) EPA (yearly) IFI (varies) Birdwatch Ireland (every 6 years)

Environmental Component	Indicators	Monitoring Sources	Frequency/Responsibility
		Inland Fisheries Ireland – Protected Freshwater Species – Atlantic Salmon etc – trends in protected freshwater species, population, distribution, health etc. Birds of Conservation Concern Ireland – Monitoring by Birdwatch Ireland on status, distribution, population etc.	
Land and Soils	Incidences of soil contamination near railway infrastructure Rates of re-use/recycling of construction waste related to implementation of AISRR Rates of brownfield site and contaminated land re-use and development near railway infrastructure Rates of greenfield development near railway infrastructure	Monitoring of the effects of project developments required under separate processes (EIA, AA) EPA State of the Environment Report 2020 CSO Census Reports (Ireland) and Northern Ireland Statistics and Research Agency Census Reports (Northern Ireland) Monitoring for Geological Survey Irelands (GSI) (Ireland) and Geological Survey of Northern Ireland Database. Corine and Táilte mapping.	In accordance with the monitoring of provisions of EIA/AA EPA (every 4 years) Central Statistics Office (every 6 years) and Northern Ireland Statistics and Research Agency (every 10 years) GSI and GSNI (varies) EEA and EPA (continuously)
Water	Status and quality of waterbodies near railway infrastructure. Number of significant pollution events recorded as a result of the implementation of the draft AISRR.	Ireland's National Water Framework Directive Monitoring Programme, 2019-2021. River Basin Management Plan for Ireland 2018 -2021 (2022 – 2027). Draft 3rd cycle River Basin Management Plan (RBMP) 2021-2027 for Northern Ireland Irish Water and Northern Ireland Water's water quality reports. The Status of EU Protected Habitats and Species in Ireland Report (Department of Housing, Local Government and Heritage) EPA State of the Environment Report 2020. Ireland's National Water Framework Directive Monitoring Programme Monitoring in the Review of Flood Risk Management Plans 2021. Monitoring for the EPA Catchments Unit and Local Authority Waters Programme.	EPA, continuously. EPA (continuously) and DAERA (continuously) DHLGH (every 6 years) EPA (every 4 years) EPA (continuous) OPW (every 3 years) EPA Catchment Unit, DHLGH and relevant local authorities (varies)
Air Quality and Climate	General air quality results in Ireland and Northern Ireland. The level of GHG emission from rail transport changes over the plan period.	Environmental Protection Agency's annual air quality reports (Ireland) and the Department of Agriculture, Environment and Rural Affairs data on air quality (Northern Ireland).	EPA (annual air quality reports) and DAERA (annual air quality reports) EPA (continuous) EPA (every 4 years)

Environmental Component	Indicators	Monitoring Sources	Frequency/Responsibility
	Mode share of rail transport (passenger and freight) Nitrogen deposition	Air Quality Monitoring Stations around Ireland. EPA State of the Environment Report 2020. EPA Greenhouse Gas Emissions Report. EPA Climate Change Projections. Climate Change Committee in Northern Ireland reports Monitoring of the effects of project development required under separate processes (EIA, AA) Monitoring related to relevant Local Area Plans and County/City Development Plans or RSES	EPA (annually) EPA (varies) Climate Change Committee Northern Ireland (continually) In accordance with the monitoring provisions of EIA/ AA Various regional, county and local area development plans (varies)
Archaeological, Architectural and Cultural Heritage	No deterioration of features of archaeological/ architectural/ cultural significance as a result of the implementation of the draft AISRR.	Registers of nationally protected sites and structures. Monitoring related to relevant regional, Local Area Plans and County/City Development Plans. Monitoring of the effects of rail projects and or development required under separate processes (EIA, SEA AA)	NPWS (National Parks and Wildlife Services), NMS (National Monuments Service), UNESCO and Department for Communities Historic Environment Division (continually). Various regional, county and local area development plans (varies) In accordance with the monitoring provisions of EIA/AA
Landscape and Visual	No deterioration of landscape or areas with scenic value e.g. Areas of High Amenity, Areas of Outstanding Natural Beauty and Protected Views as a result of the implementation of the draft AISRR	Monitoring related to relevant Local Area Plans and County/City Development Plans or RSES's e.g., Landscape Character Assessments National Landscape Strategy for Ireland 2015-2025 Landscape Character Assessments of Northern Ireland Corine and Táilte mapping. Monitoring of the effects of project development required under separate processes (EIA, AA)	Various regional, county and local area development plans (varies) Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media (every 10 years) Northern Ireland Environment Agency (varies) EEA and EPA (continuously) In accordance with the monitoring provisions of EIA/AA
Material Assets	Statistics relating to rail usage (including number of passengers and journey times). Economic growth statistics – particularly those relating to transport (rail). Mode share of rail transport (passenger and freight)	CSO Census Reports (Ireland) and Northern Ireland Statistics and Research Agency Census Reports (Northern Ireland) Monitoring related to relevant regional, Local Area Plans and County/City Development Plans. Monitoring of the effects of project development required under separate processes (EIA, AA)	Central Statistics Office (every 6 years) and Northern Ireland Statistics and Research Agency (every 10 years) Various regional, county and local area development plans (varies) In accordance with the monitoring provisions of EIA/AA

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Appendix A

Interaction with Relevant Plans, Policies and Programmes

Plan, Programme or Policy	Plan, Programme or Policy Objectives	Relevance of Plan, Programme or Policy to the Draft AISRR
Strategic National Plans		
New Decade, New Approach (Governments of the United Kingdom and Ireland) 2020	A deal to restore devolved government in Northern Ireland, with a focus on better public services, a stronger economy and a fairer society. It includes a commitment to investigate the feasibility of a high-speed rail connection between Belfast, Dublin and Cork, creating a spine of connectivity on the Island.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Draft Programme for Government Outcomes Framework (Northern Ireland Executive) 2021	The draft Framework contains nine strategic Outcomes which, taken together, will set a clear direction of travel for the NI Executive and provide a vision for the future of all citizens. Agreement of the draft Framework was delayed due to the COVID-19 pandemic and will be revised and updated by any incoming Executive when seeking to agree its agenda for Government.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
National Planning Framework (Project Ireland 2040) – (Government of Ireland) 2019	A planning framework to guide growth, development and investment over the period to 2040. Vision: A shared set of goals for every community across the country, expressed as the National Strategic Outcomes.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
National Development Plan 2021- 2030 (Project Ireland 2040) (Department of Public Expenditure and Reform) 2021	The Irish Government's over-arching investment strategy and budget for the period 2021-2030, balancing the demand for public investment across all sectors and regions of Ireland, with a major focus on improving infrastructure projects.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Regional and City Planning		
Control of Development in Airport Public Safety Zones (Department for Infrastructure) 2007	This document sets out the DfI's policy for controlling development within Public Safety Zones for the relevant runways at George Best Belfast City Airport and Belfast International Airport. Future development plans must take account of and be consistent with this document.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Regional Strategic Framework for the Central Border Region 2013-2027 (Irish Central Border Area Network) 2013	A Framework for the development of the Central Border Region, produced by both NI and the IE by 10 local authorities from both sides of the border, who worked through their partnership organisation and Cross-Border Group, the Irish Central Border Area Network Ltd. (ICBAN). The framework covers the period from 2013 to 2027, setting out the opportunities and priorities for the region. Vision: '*A sustainable region that delivers the best quality of life for its people and makes a distinctive contribution to economic and social renewal and growth on the Island.'*	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Regional Development Strategy 2035 (RDS) (Department for Regional Development) 2012	An overarching strategic planning framework to facilitate and guide the public and private sectors, providing a spatial perspective to complement the strategies of other Departments' strategies for Northern Ireland to 2035.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.

Plan, Programme or Policy	Plan, Programme or Policy Objectives	Relevance of Plan, Programme or Policy to the Draft AISRR
	Vision: '*An outward-looking, dynamic and liveable Region with a strong sense of its place in the wider world; a Region of opportunity where people enjoy living and working in a healthy environment which enhances the quality of their lives and where diversity is a source of strength rather than division*'.	
Strategic Planning Policy Statement (SPPS) (Department for Infrastructure) 2015	The Strategic Planning Policy Statement (SPPS) consolidates some twenty separate policy publications into one document and sets out the DfI's policy on important planning matters that should be addressed across Northern Ireland. It also provides the core planning principles to underpin delivery of the two-tier planning system with the aim of furthering sustainable development. It sets the strategic direction for councils to bring forward detailed operational policies within their new Local Development Plans.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Eastern and Midland Regional Spatial and Economic Strategy 2019-2031 (Eastern and Midland Regional Assembly) 2019	A strategic plan and investment framework to shape the future development of the Region to 2031 and beyond. Vision: '*To create a sustainable and competitive Region that supports the health and wellbeing of our people and places, from urban to rural, with access to quality housing, travel and employment opportunities for all*'.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Northern and Western Regional Spatial and Economic Strategy 2020-2032 - Northern and Western Regional Assembly 2020	A Strategy to support the implementation of Project Ireland 2040, including the economic and climate policies of the Government, by providing a long-term strategic planning and economic framework for the region. Vision: '*To play a leading role in the transformation of this region into a vibrant, connected, natural, inclusive and smart place to work and live.*'	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Southern Regional Spatial and Economic Strategy (Southern Regional Assembly) 2020	A long-term, strategic development framework for the future physical, economic and social development of the region. Vision: *Nurture all our places to realise their full potential;* *Protect and enhance our environment;* *Successfully combat climate change;* *Achieve economic prosperity & improved quality of life for all;* *Accommodate expanded growth & development in suitable locations; and* *Make the Southern Region one of Europe's most creative, innovative, greenest, and liveable regions.*	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Rural Development Policy (Department of Rural and Community Development) 2021	A policy framework for the development of rural Ireland over the next five years Vision: *'A thriving rural Ireland which is integral to our national economic, social, cultural, and environmental wellbeing and development. An Ireland which is built on the interdependence of urban and rural areas. An Ireland which recognises the centrality of people, the importance of vibrant and lived-in*	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.

Plan, Programme or Policy	Plan, Programme or Policy Objectives	Relevance of Plan, Programme or Policy to the Draft AISRR
	rural places, and the potential to create quality jobs and sustain our shared environment.'	
Realising our Rural Potential – Action Plan for Rural - Development (Department of Rural and Community Development) 2017	An action plan to ensure that people who live in rural areas have increased opportunities for employment locally, and access to public services and social networks that support a high quality of life.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Development in the Countryside Call for Evidence (CfE); CfE Emerging Issues; and Consultant's Report (Department for Infrastructure) 2021	Following the publication of the Strategic Planning Policy Statement *(*SPPS), the DfI issued a 'Call for Evidence' and also procured independent consultants to undertake research and provide an updated evidential context for regional planning policy on development in the countryside. This preparatory work and research helped inform Minister's decision that the current policy approach, provided for by the SPPS, remains appropriate, robust, and fit-for-purpose for the two-tier planning system.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Transport Policies and Strategies		
Regional Transportation Strategy (RTS) 2002-2012 – (Department for Regional Development) 2002	The RTS supports the RDS 2035 and makes a significant contribution towards achieving the longer-term transportation vision contained within the RDS 2035.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Trans European Transport Network (TEN-T) Policy – (European Parliament) 2013	A policy to address the implementation and development of a Europe-wide network of railway lines, roads, inland waterways, maritime shipping routes, ports, airports and railroad terminals. Aim: '*To close gaps, remove bottlenecks and technical barriers, as well as to strengthen social, economic and territorial cohesion in the EU.'*	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Sustainable and Smart Mobility Strategy (European Commission's Directorate-General for Mobility and Transport 2021)	A strategy setting out a roadmap for a sustainable and smart transport future. It includes 10 focus areas and an action plan, aiming for a 90% reduction in the transport sector's emissions by 2050.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Planning for the Future of Transport - Time for Change – (Department for Infrastructure) 2021	An outline of how the Department's priorities for the future of transport can be supported by the improved planning, management and development of the transport networks over the next 10 to 15 years.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Regional Strategic Transport Network Transport Plan – (Department for Regional Development) 2015	The plan considers the Regional Strategy Transport Network (the trunk road network including the key transport corridors and link corridors), the buses that run on it and the complete rail network.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.

Plan, Programme or Policy	Plan, Programme or Policy Objectives	Relevance of Plan, Programme or Policy to the Draft AISRR
Ensuring a sustainable transport future: A new approach to regional transportation (Department for Regional Development) 2011	An approach for planning Northern Ireland's regional transportation, including the aims of supporting economic growth, enhancing quality of life, and reducing the environmental impact of transport; supported by 12 strategic objectives. This document compliments the RDS 2035 and aims to achieve its vision for transportation. Vision: '*To have a modern, sustainable, safe transportation system which benefits society, the economy and the environment and which actively contributes to social inclusion and everyone ' s quality of life. '*	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Rail Investment Prioritisation Strategy – (Department for Regional Development) 2014	A vision and strategic direction for future railways investment in Northern Ireland over the next 20 years and beyond.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Draft Transport Studies (Department for Infrastructure) 2019/2020	An objective and evidence-based assessment of current and future transport issues in the context of Council growth ambitions and future indicative transport measures. These studies include the Belfast Metropolitan Area Plan - Transport Study, the North West Transport Plan - Transport Study and the Sub-Regional Transport Plan – Transport Study.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Draft Connecting Ireland (National Transport Authority) 2021	A public transport plan to improve mobility in Ireland's rural areas, by providing better connections between villages and towns, and by linking these areas with an enhanced regional network connecting cities and regional centres. The draft plan will be updated with feedback from the public consultation that occurred in late 2021.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Iarnród Éireann Strategy 2021-2027 (Iarnród Éireann) 2021	A strategy to enhance Ireland's rail system, creating a modern, fit-for-purpose and sustainable transport asset that will deliver for customers and support Ireland's growing population and economy for decades to come. Vision: '*To transform our railway towards building a sustainably connected Ireland. '*	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Rail Freight 2040 Strategy (Iarnród Éireann) 2021	A strategy setting out Iarnród Éireann's commitment to the improvement of rail freight services and the aim to increase the role of rail to support the logistics and supply chain industries. Vision: *'By 2040 Ireland will have a thriving rail logistics system which supports supply chains, the economy, society and the environment. '*	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Better Connecting Dublin & Belfast Enterprise – Strategic Development Plan – (Translink, Iarnród Éireann) 2018	A proposal to improve the Dublin-Belfast train services through increased frequencies, infrastructure enhancements to improve journey times and connections, and electrification.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
National Investment Framework for Transport in	The DoT prepared the National Investment Framework for Transport in Ireland (NIFTI)	Any development resulting from the Draft AISRR will comply with all relevant

Plan, Programme or Policy	Plan, Programme or Policy Objectives	Relevance of Plan, Programme or Policy to the Draft AISRR
Ireland (Department of Transport) 2021	as a high-level strategic framework to support the consideration and prioritisation of future investment in land transport. It represents the Department's contribution to Project Ireland 2040, Government's long-term, overarching strategy to make Ireland a better country for all and to build a more sustainable future. NIFTI has been developed to ensure sectoral investment is aligned with the National Planning Framework (NPF) and supports the delivery of the ten National Strategic Outcomes (NSOs). NIFTI establishes a common lens through which to consider potential investment. In doing so, NIFTI sits alongside other Government priorities and policy objectives, such as the Programme for Government and Climate Action Plan.	environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Sustainable Mobility Policy (Department of Transport) 2022	The Sustainable Mobility Policy (SMP) was published in April 2022 and includes 91 actions that support behavioural change through a wide range of interventions. These interventions include, among other things, public transport infrastructure and services, active travel promotion and supports, road safety initiatives, legislative measures, research, and public engagement.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Department for Infrastructure Strategic Framework (Department for Infrastructure) 2023	The DfI's Strategic Framework document outlines the main aspects of the Department's work and the challenges it faces in delivering its essential public services in NI. By focusing on water, transport and planning the Department are clear on what they need to do, why they need to do it and how they will prioritise the use of public money.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Greater Dublin Area Transport Strategy 2022-2042 (National Transport Authority) 2022	The Greater Dublin Area (GDA) Transport Strategy provides framework for further investment in services and infrastructure. A substantial increase in the numbers of people using sustainable and active travel is among the primary objectives of this strategy.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
City and Council transport strategies and plan (IE) (National Transport Authority)	Transport strategies and plans for the cities and local authority areas across the Island. These include the Metropolitan Area Transport Strategies for Cork, Dublin, Galway, Limerick and Waterford.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Local Transport Plans (NI) – (Department for Infrastructure)	A suite of Transport Plans covering all of Northern Ireland including the Belfast Metropolitan Transport Plan 2015 and the Sub-Regional Transport Plan 2015 (which addresses the transport strategy for Derry/Londonderry).	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Investment Plans		
Better Business Cases NI (Department of Finance) 2020	A framework for appraising, developing and planning projects and programmes using the Five Case Model to deliver the best social value-for-money for public expenditure in Northern Ireland.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the

Plan, Programme or Policy	Plan, Programme or Policy Objectives	Relevance of Plan, Programme or Policy to the Draft AISRR
		regulatory framework for environmental protection and management.
Investment Strategy for Northern Ireland 2050 (draft) – (NI Executive) 2022	Currently under consultation, the strategy sets a framework for planning and prioritising future infrastructure investments. Vision: '*We have the infrastructure that enables everyone to lead a healthy, productive and fulfilling life; that supports sustainable economic development and protects our environment.* '	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Infrastructure and Projects Directorate Business Plan 2021/2022 (Translink) 2021	A plan setting out the budgeting, planning and resource needs of Translink's Infrastructure and Projects Directorate, including details of investment programmes and the business strategies and objectives.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Public Spending Code (Department of Public Expenditure and Reform) 2019	The rules and procedures that ensure that all Irish public bodies treat public funds with care; ensuring the best possible value-for-money when public money is being spent or invested.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
National Investment Framework for Transport Investment (Department of Transport) 2021	A framework for considering future transport investment, aligned with key Government policy priorities and commitments, such as the Climate Action Plan and the National Development Plan. Purpose: '*To guide the development of the transport network in the decades ahead to enable the National Planning Framework, and to promote positive social, environmental and economic outcomes throughout the country.* '	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Climate and Sustainability Strategies and Plans		
Decarbonising Transport – A Better, Greener Britain (Department for Transport (UK)) 2021	A plan on how emission reductions to net zero will be delivered by 2050 and the associated benefits that will be realised across the UK.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
European Green Deal (European Commission) 2020	A strategy to oversee Europe's transformation to a climate-neutral, fair and prosperous society, with a modern, resource-efficient and competitive economy. The strategy will be supported by climate, energy and transport-related legislation under the 'Fit for 55 Package' to meet the 2030 and 2050 ambitions. Target: '*Net-zero greenhouse gas emissions at EU level by 2050, and an emissions reduction target of at least 55% for 2030 to limit warming to 1.5 degrees Celsius and align with the goal of the Paris Agreement.* '	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
The Paris Agreement (United Nations Climate Change Conference) 2015	A legally binding international treaty on climate change. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the

Plan, Programme or Policy	Plan, Programme or Policy Objectives	Relevance of Plan, Programme or Policy to the Draft AISRR
		regulatory framework for environmental protection and management.
UN Sustainable Development Goals (United Nations) 2015	17 interlinked global goals designed to be a "blueprint to achieve a better and more sustainable future for all", with the aim to end poverty and other deprivations alongside strategies that improve health and education, reduce inequality, and facilitate economic growth – while also tackling climate change and working to preserve oceans and forests.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.
Climate Action Plan 2023 (Department of the Environment, Climate and Communications) 2023	The Climate Action Plan 2023 (CAP 2023) is the second annual update to the Ireland's Climate Action Plan 2019. This plan is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings. The CAP 2023 implements the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government. The CAP 2023 also sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development. In relation to the transport sector, the CAP details a 50% reduction in emissions by transforming how we travel. It aims to drive policies to reduce transport emissions by improving town, city and rural planning, and by adopting the Avoid-Shift-Improve approach: reducing or avoiding the need for travel, shifting to public transport, walking and cycling and improving the energy efficiency of vehicles.	Any development resulting from the Draft AISRR will comply with all relevant environmental legislation and will align with, and cumulatively contribute towards the achievement of the objectives of the regulatory framework for environmental protection and management.

Appendix B

Figures

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Department for Infrastructure an Roinn Bonneagair

Issue	Date	By	Chkd	Appd
P01	21/07/2023	SW	SC	SW

Project Title
All-Island Strategic Rail Review

Scale
1:1750000

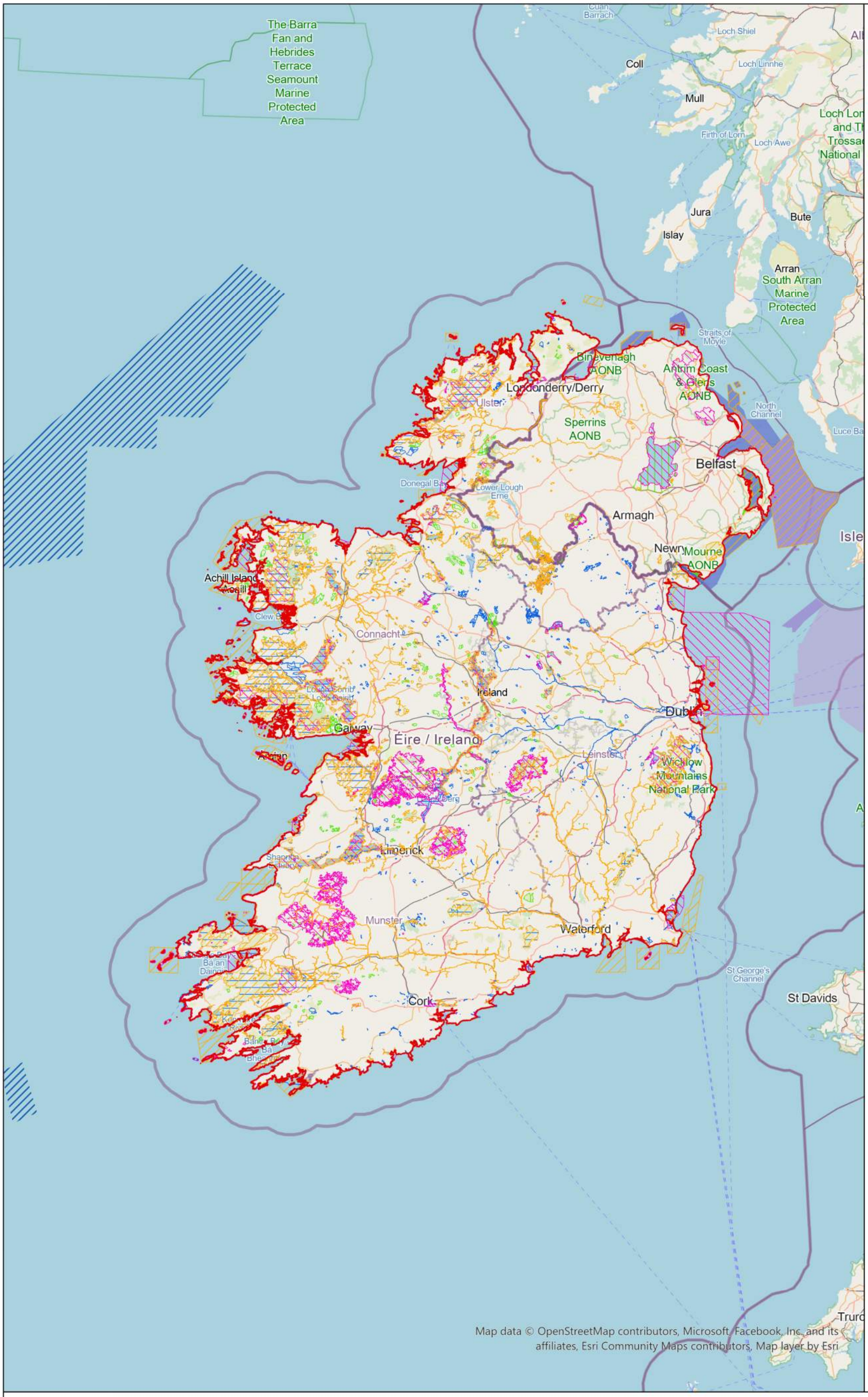
Date
July 2023

Drawing Title
Study Area / Programme Boundary

Drawing Status

Figure No.
Fig B1

Project Number
295182-00



Legend

- Land Mass
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Ramsar NI
- Natural Heritage Area (NHA) ROI
- Offshore Marine Protected Areas NI
- Marine Protected Areas NI
- Offshore Special Area of Conservation
- Proposed National Heritage Areas (pNHA) ROI

Source: National Parks and Wildlife Service & Northern Ireland Environment Agency

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Department for Infrastructure An Roinn Bonneagair

Issue	Date	By	Chkd	Appd
P01	21/07/2023	SW	SC	SW

Project Title
All-Island Strategic Rail Review

Scale
1:2200000

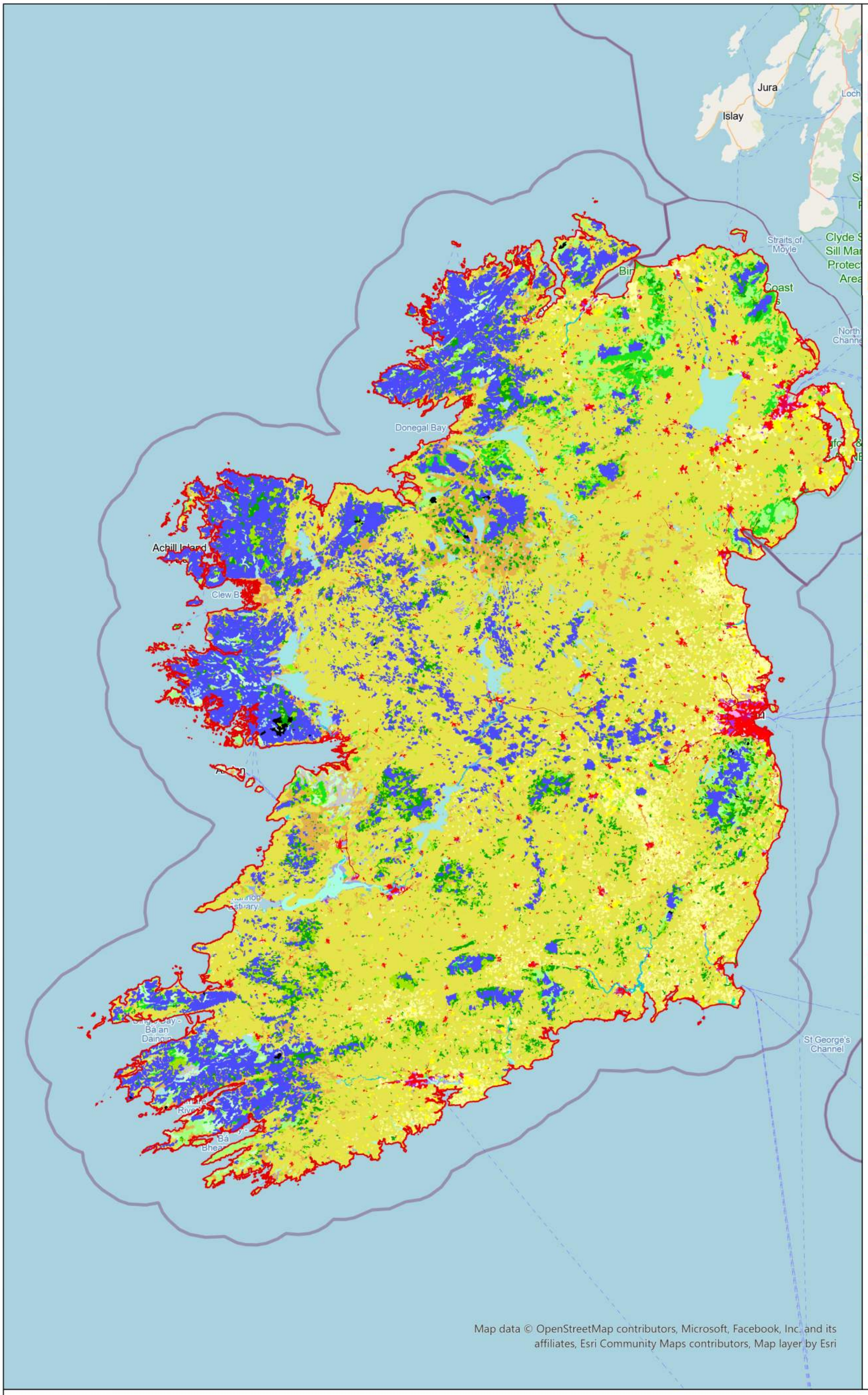
Date
July 2023

Drawing Title
Designated Sites

Drawing Status

Figure No.
Fig B2

Project Number
295182-00



Legend

- Land Mass

Corine Landcover Type

- 111 Continuous urban fabric
- 112 Discontinuous urban fabric
- 121 Industrial or commercial units
- 122 Road and rail networks
- 123 Sea ports
- 124 Airports
- 131 Mineral extraction sites
- 132 Dump
- 133 Construction sites
- 141 Green urban sites
- 142 Sport and leisure facilities
- 211 Non-irrigated land
- 231 Pastures
- 242 Complex cultivation patterns
- 243 Land principally occupied by agriculture with areas of natural vegetation
- 311 Broad-leaved forest
- 312 Coniferous forest
- 313 Mixed forest
- 321 Natural grassland
- 322 Moors and heaths
- 324 Transitional woodland scrub
- 331 Beaches dunes sand
- 332 Bare rocks
- 333 Sparsely vegetated areas
- 334 Burnt areas
- 411 Inland marshes
- 412 Peat bogs
- 421 Salt Marshes
- 423 Intertidal flats
- 511 Stream courses
- 512 Water bodies
- 521 Coastal lagoons
- 522 Estuaries

Source: Environmental Protection Agency

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

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Issue	Date	By	Chkd	Appd
P01	21/07/2023	SW	SC	SW

Project Title
All-Island Strategic Rail Review

Scale
1:1750000

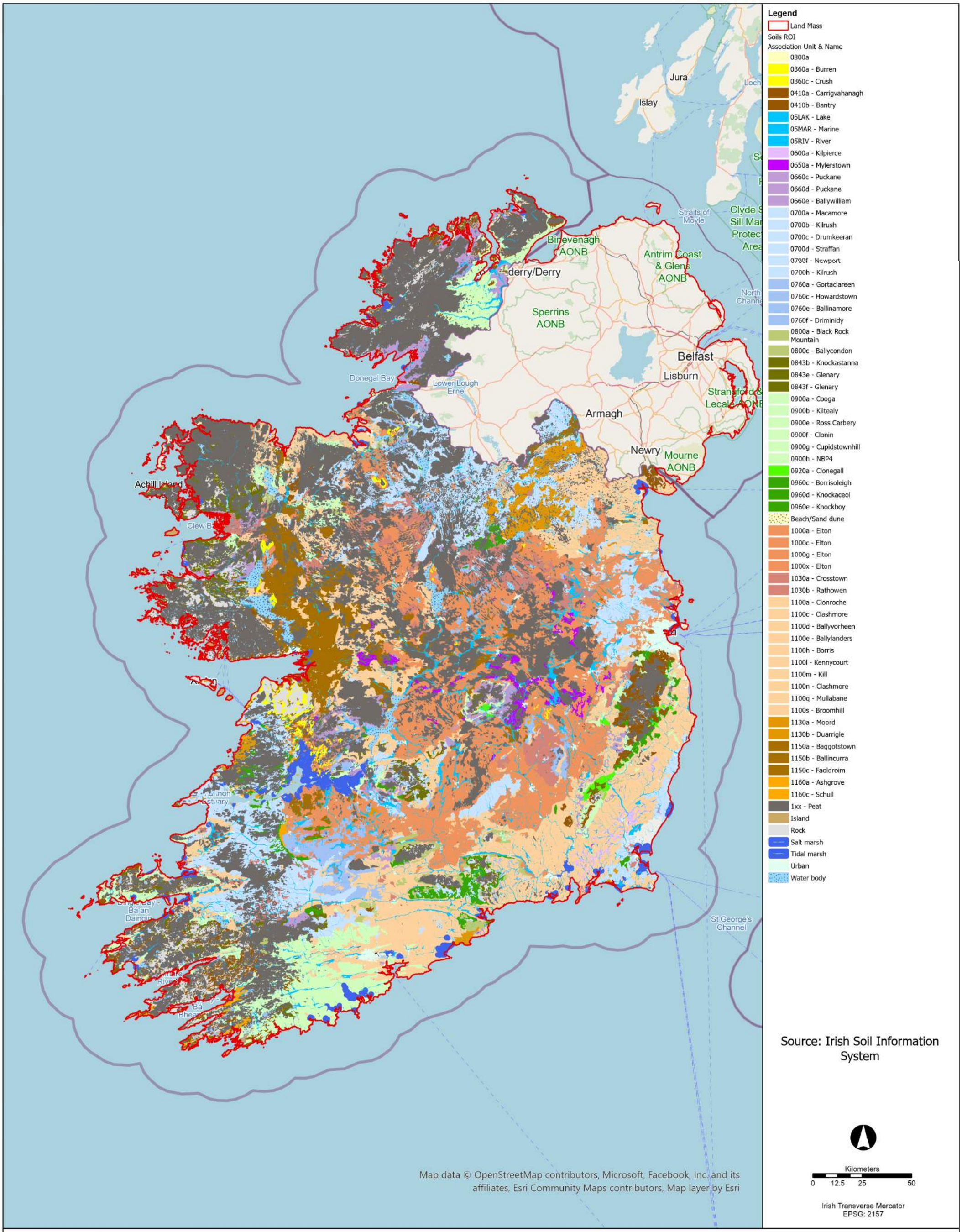
Date
July 2023

Drawing Title
Land Use

Drawing Status

Figure No.
Fig B3

Project Number
295182-00



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Issue	Date	By	Chkd	Appd
P01	21/07/2023	SW	SC	SW

Project Title
All-Island Strategic Rail Review

Scale
1:1750000

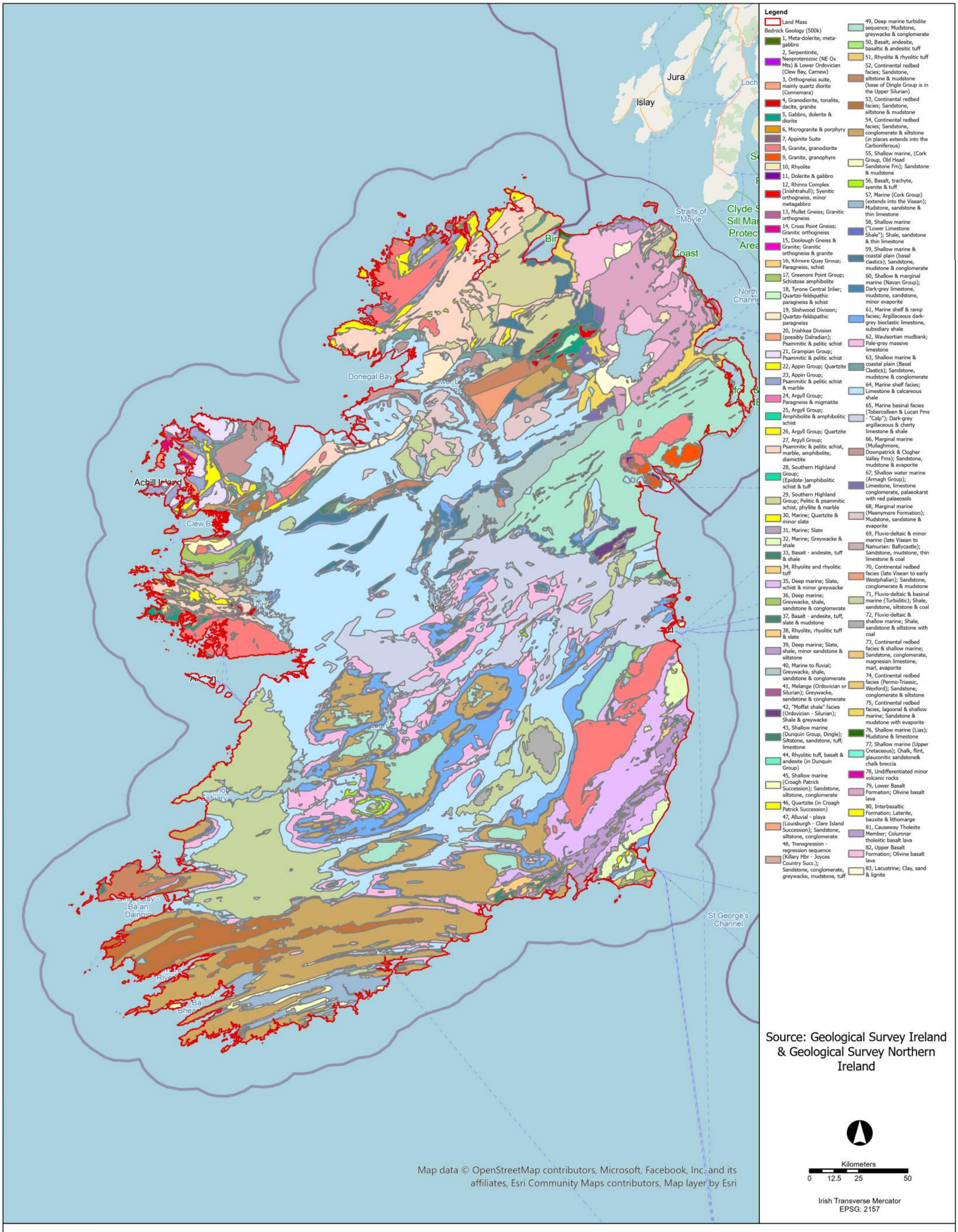
Date
July 2023

Drawing Title
Soils

Drawing Status

Figure No.
Fig B4

Project Number
295182-00



Legend

Land Mass

Bedrock Geology (500k)

1, Meta-dolerite, meta-gabbro
2, Serpentinite, Neoproterozoic (NE Ox Mts) & Lower Ordovician (Clew Bay, Carnew)
3, Orthogneiss suite, mainly quartz diorite (Connemara)
4, Granodiorite, tonalite, dacite, granite
5, Gabbro, dolerite & diorite
6, Microgranite & porphyry
7, Appinite Suite
8, Granite, granodiorite
9, Granite, granophyre
10, Rhyolite
11, Dolerite & gabbro
12, Rhinns Complex (Inishtrahull); Syenitic orthogneiss, minor metagabbro
13, Mullet Gneiss; Granitic orthogneiss
14, Cross Point Gneiss; Granitic orthogneiss
15, Doolough Gneiss & Granite; Granitic orthogneiss & granite
16, Kilmore Quay Group; Paragneiss, schist
17, Greenore Point Group; Schistose amphibolite
18, Tyrone Central Inlier; Quartzo-feldspathic paragneiss & schist
19, Slishwood Division; Quartzo-feldspathic paragneiss
20, Inishkea Division (possibly Dalradian); Psammitic & pelitic schist
21, Grampian Group; Psammitic & pelitic schist
22, Appin Group; Quartzite
23, Appin Group; Psammitic & pelitic schist & marble
24, Argyll Group; Paragneiss & migmatite
25, Argyll Group; Amphibolite & amphibolitic schist
26, Argyll Group; Quartzite
27, Argyll Group; Psammitic & pelitic schist, marble, amphibolite, diamictite
28, Southern Highland Group; (Epidote-)amphibolitic schist & tuff
29, Southern Highland Group; Pelitic & psammitic schist, phyllite & marble
30, Marine; Quartzite & minor slate
31, Marine; Slate
32, Marine; Greywacke & shale
33, Basalt - andesite, tuff & shale
34, Rhyolite and rhyolitic tuff
35, Deep marine; Slate, schist & minor greywacke
36, Deep marine; Greywacke, shale, sandstone & conglomerate
37, Basalt - andesite, tuff, slate & mudstone
38, Rhyolite, rhyolitic tuff & slate
39, Deep marine; Slate, shale, minor sandstone & siltstone
40, Marine to fluvial; Greywacke, shale, sandstone & conglomerate
41, Melange (Ordovician or Silurian); Greywacke, sandstone & conglomerate
42, "Moffat shale" facies (Ordovician - Silurian); Shale & greywacke
43, Shallow marine (Dunquin Group, Dingle); Siltstone, sandstone, tuff, limestone
44, Rhyolitic tuff, basalt & andesite (in Dunquin Group)
45, Shallow marine (Croagh Patrick Succession); Sandstone, siltstone, conglomerate
46, Quartzite (in Croagh Patrick Succession)
47, Alluvial - playa (Louisburgh - Clare Island Succession); Sandstone, siltstone, conglomerate
48, Transgression - regression sequence (Killary Hbr - Joyces Country Succ.); Sandstone, conglomerate, greywacke, mudstone, tuff
49, Deep marine turbidite sequence; Mudstone, greywacke & conglomerate
50, Basalt, andesite, basaltic & andesitic tuff
51, Rhyolite & rhyolitic tuff
52, Continental redbed facies; Sandstone, siltstone & mudstone (base of Dingle Group is in the Upper Silurian)
53, Continental redbed facies; Sandstone, siltstone & mudstone
54, Continental redbed facies; Sandstone, conglomerate & siltstone (in places extends into the Carboniferous)
55, Shallow marine, (Cork Group, Old Head Sandstone Fm); Sandstone & mudstone
56, Basalt, trachyte, syenite & tuff
57, Marine (Cork Group) (extends into the Visean); Mudstone, sandstone & thin limestone
58, Shallow marine ("Lower Limestone Shale"); Shale, sandstone & thin limestone
59, Shallow marine & coastal plain (basal clastics); Sandstone, mudstone & conglomerate
60, Shallow & marginal marine (Navan Group); Dark-grey limestone, mudstone, sandstone, minor evaporite
61, Marine shelf & ramp facies; Argillaceous dark-grey bioclastic limestone, subsidiary shale
62, Waulsortian mudbank; Pale-grey massive limestone
63, Shallow marine & coastal plain (Basal Clastics); Sandstone, mudstone & conglomerate
64, Marine shelf facies; Limestone & calcareous shale
65, Marine basinal facies (Tobercolleen & Lucan Fms - "Calp"); Dark-grey argillaceous & cherty limestone & shale
66, Marginal marine (Mullaghmore, Downpatrick & Clogher Valley Fms); Sandstone, mudstone & evaporite
67, Shallow water marine (Armagh Group); Limestone, limestone conglomerate, palaeokarst with red palaeosols
68, Marginal marine (Meenymore Formation); Mudstone, sandstone & evaporite
69, Fluvio-deltaic & minor marine (late Visean to Namurian: Ballycastle); Sandstone, mudstone, thin limestone & coal
70, Continental redbed facies (late Visean to early Westphalian); Sandstone, conglomerate & mudstone
71, Fluvio-deltaic & basinal marine (Turbiditic); Shale, sandstone, siltstone & coal
72, Fluvio-deltaic & shallow marine; Shale, sandstone & siltstone with coal
73, Continental redbed facies & shallow marine; Sandstone, conglomerate, magnesian limestone, marl, evaporite
74, Continental redbed facies (Permo-Triassic, Wexford); Sandstone, conglomerate & siltstone
75, Continental redbed facies, lagoonal & shallow marine; Sandstone & mudstone with evaporite
76, Shallow marine (Lias); Mudstone & limestone
77, Shallow marine (Upper Cretaceous); Chalk, flint, glauconitic sandstone& chalk breccia
78, Undifferentiated minor volcanic rocks
79, Lower Basalt Formation; Olivine basalt lava
80, Interbasaltic Formation; Laterite, bauxite & lithomarge
81, Causeway Tholeiite Member; Columnar tholeiitic basalt lava
82, Upper Basalt Formation; Olivine basalt lava
83, Lacustrine; Clay, sand & lignite

Source: Geological Survey Ireland & Geological Survey Northern Ireland

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

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Project Title
All-Island Strategic Rail Review

Scale
1:1750000

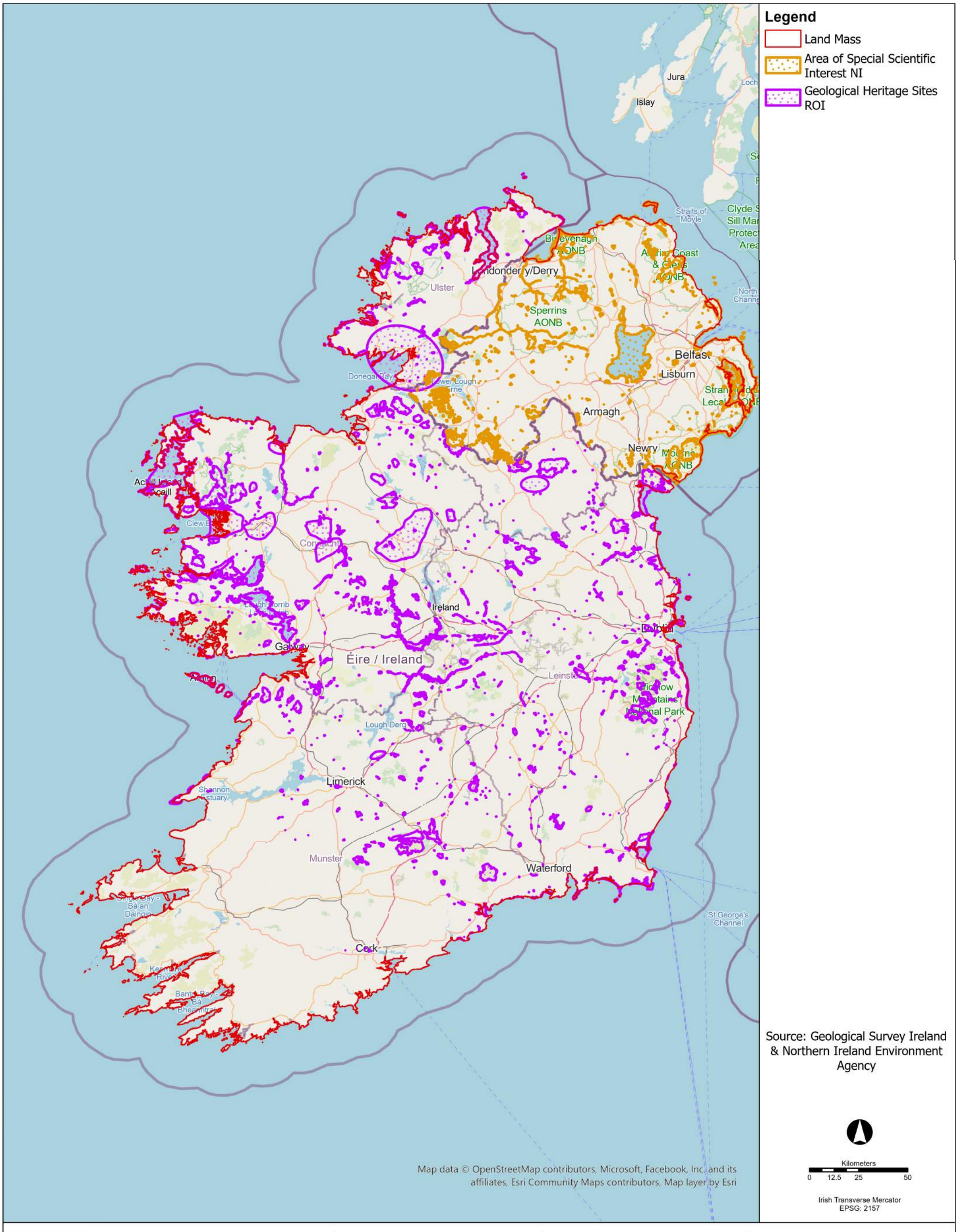
Date
July 2023

Drawing Title
Bedrock Geology

Drawing Status

Figure No.
Fig B5

Project Number
295182-00



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Date
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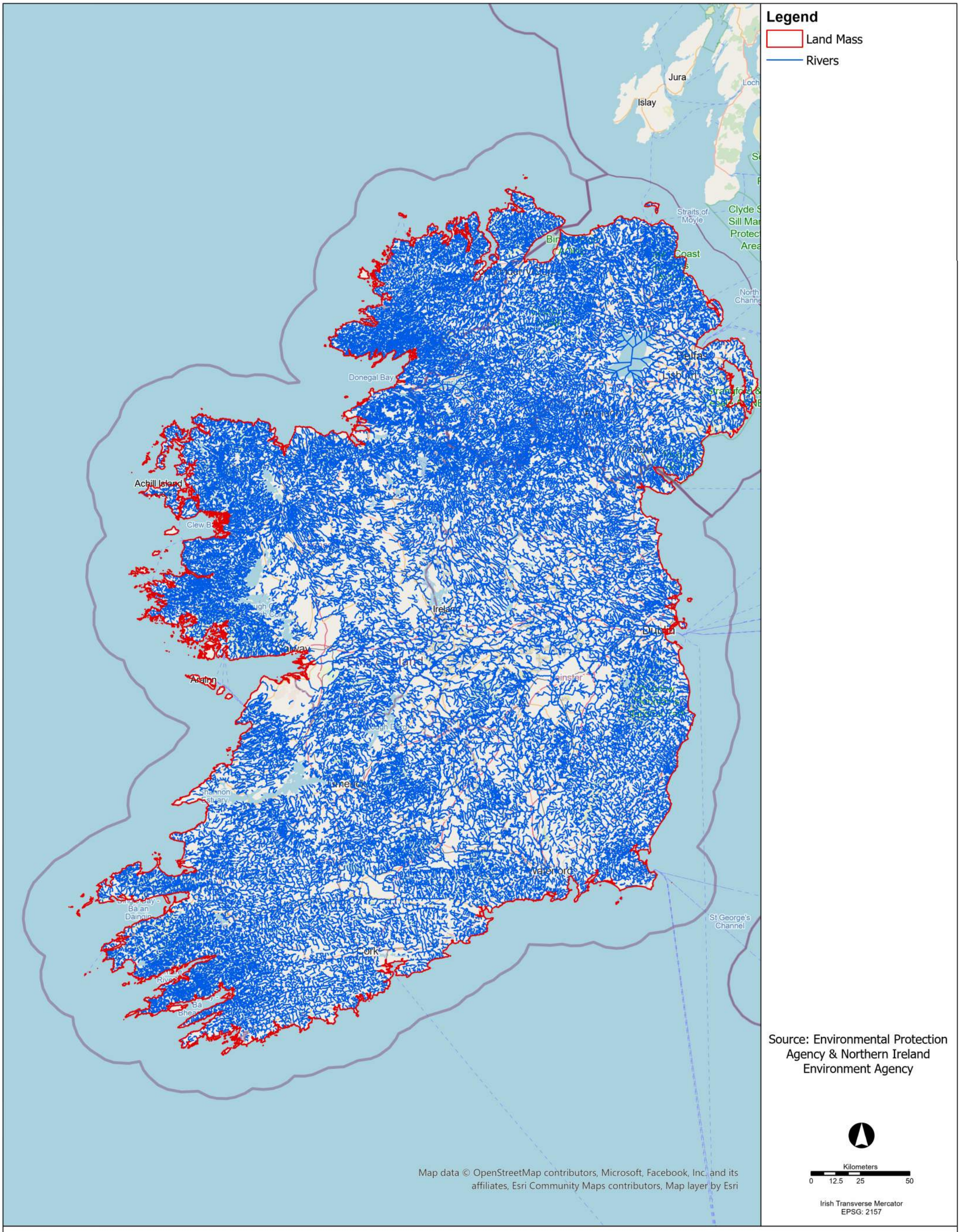
Drawing Title
Geological Heritage Sites and Areas of Special Scientific Interest

Drawing Status

Figure No.
Fig B6

Project Number
295182-00



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Drawing Title
River Network

Drawing Status

Figure No.
Fig B7

Project Number
295182-00

Legend

- Land Mass
- Lakes

Source: Environmental Protection Agency & Northern Ireland Environment Agency

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

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Date
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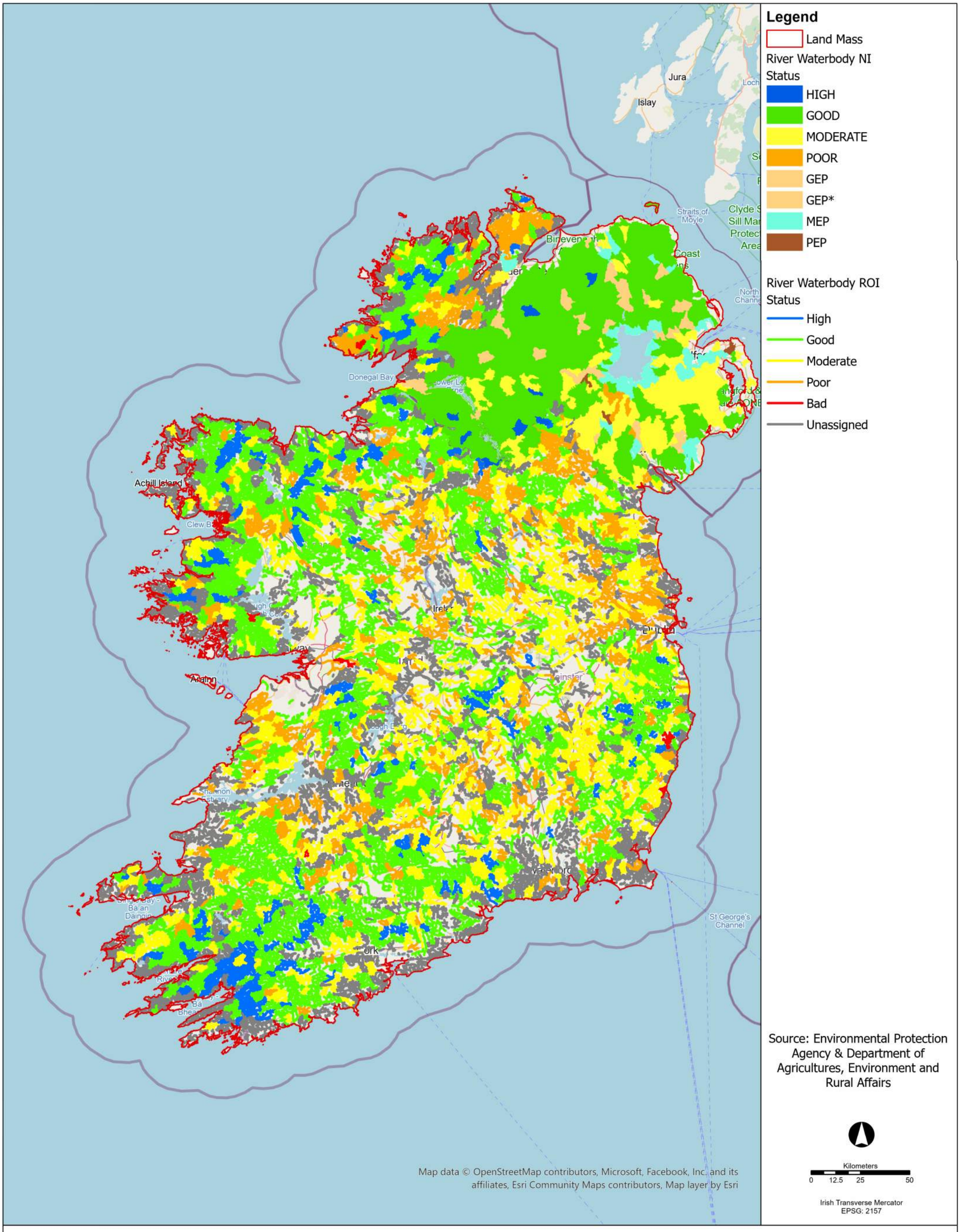
Drawing Title
Lake Network

Drawing Status

Figure No.
Fig B8

Project Number
295182-00



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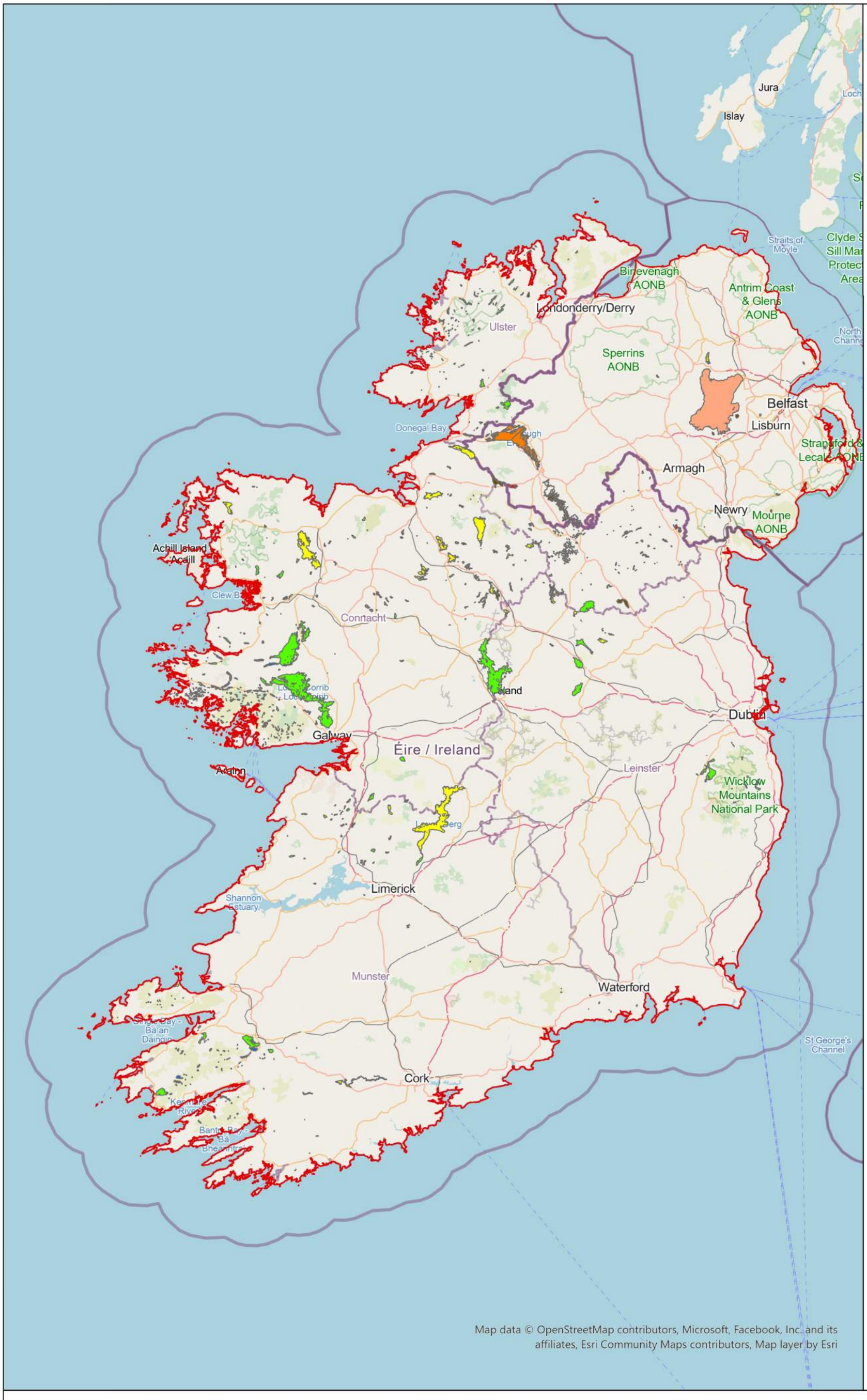
Drawing Title
River Quality Status

Drawing Status

Figure No.
Fig B9

Project Number
295182-00



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Drawing Title
Lake Quality Status

Drawing Status

Figure No.
Fig B10

Project Number
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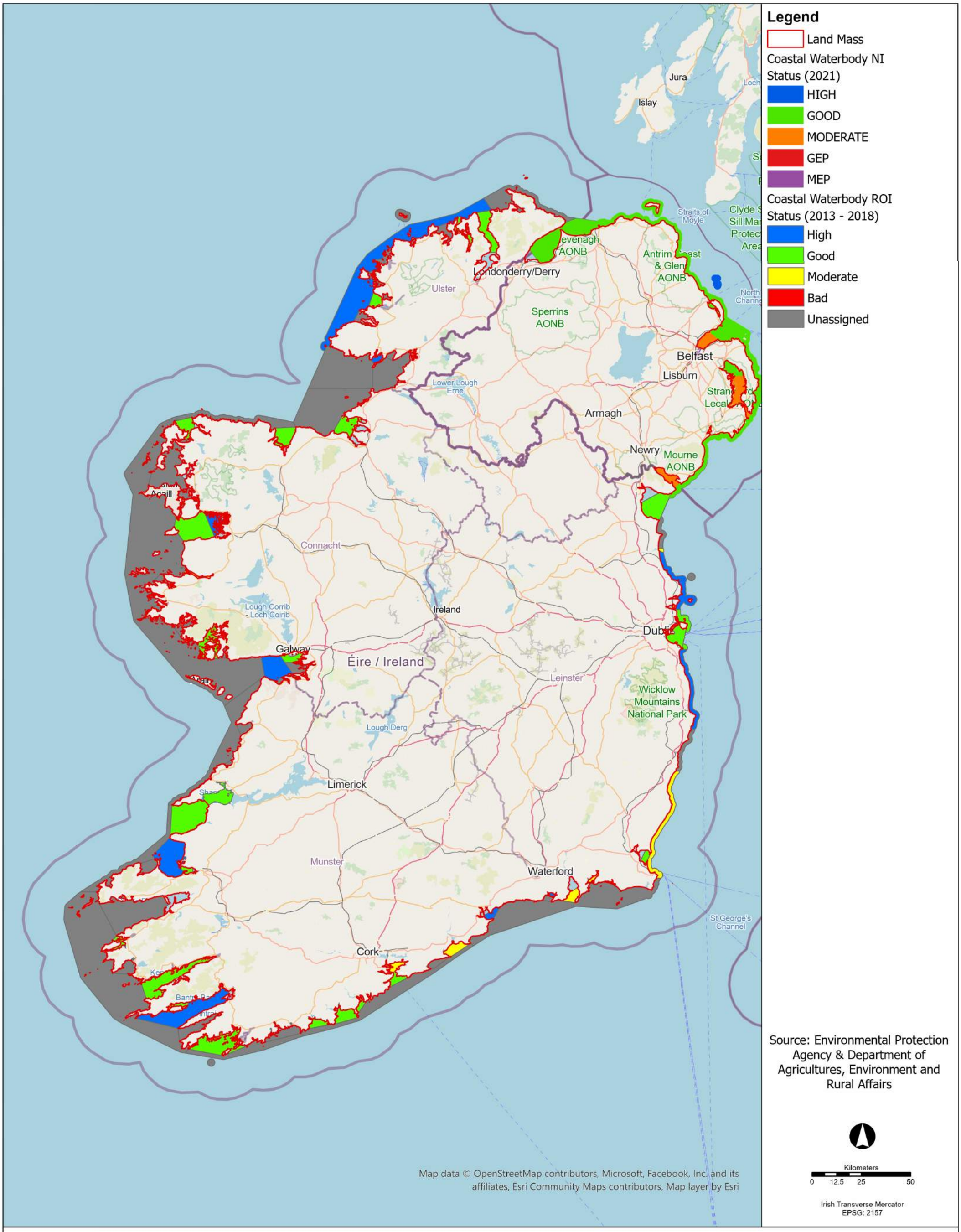
Drawing Title
Transitional Quality Status

Drawing Status

Figure No.
Fig B11

Project Number
295182-00



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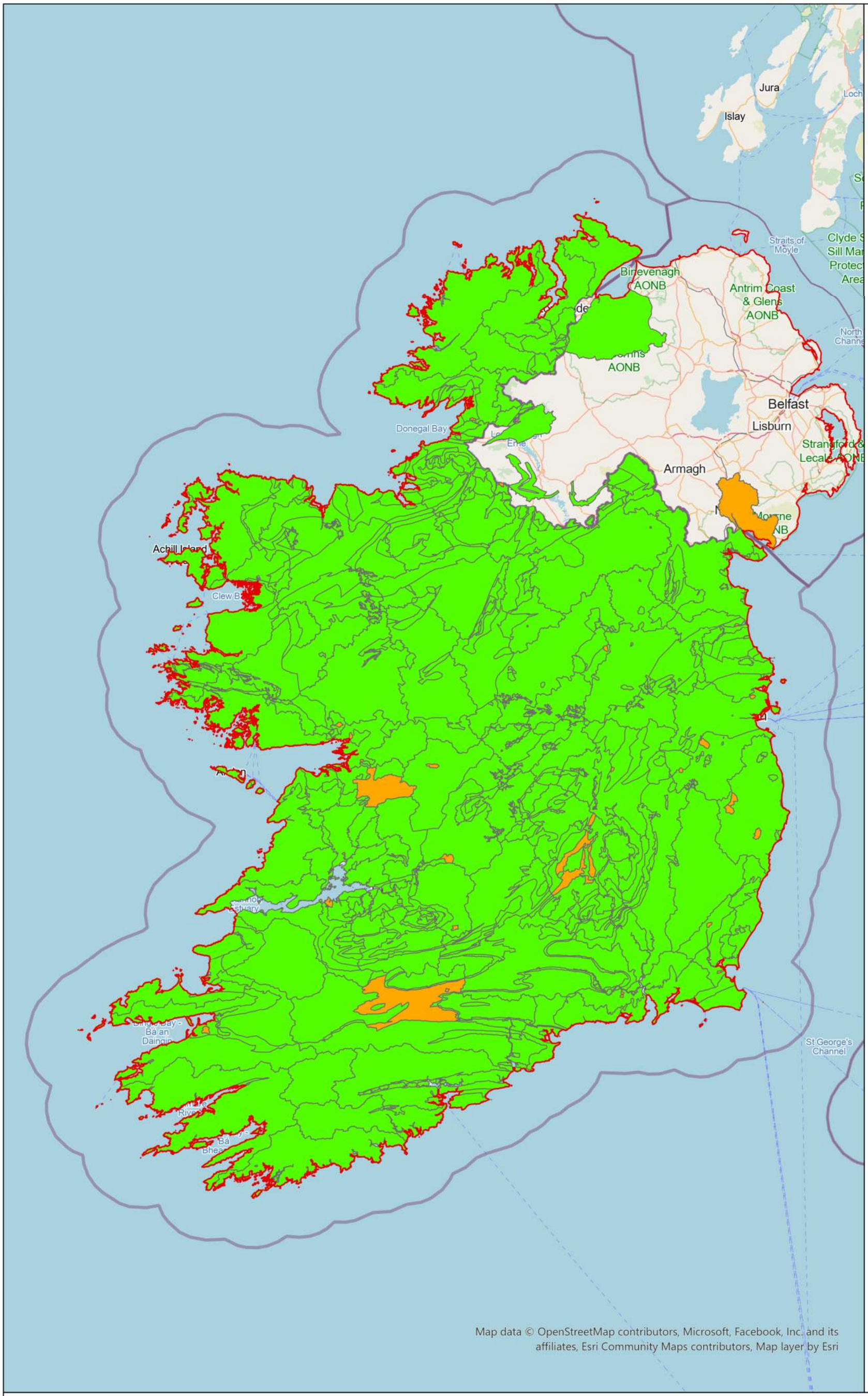
Drawing Title
Coastal Waterbody Status

Drawing Status

Figure No.
Fig B12

Project Number
295182-00



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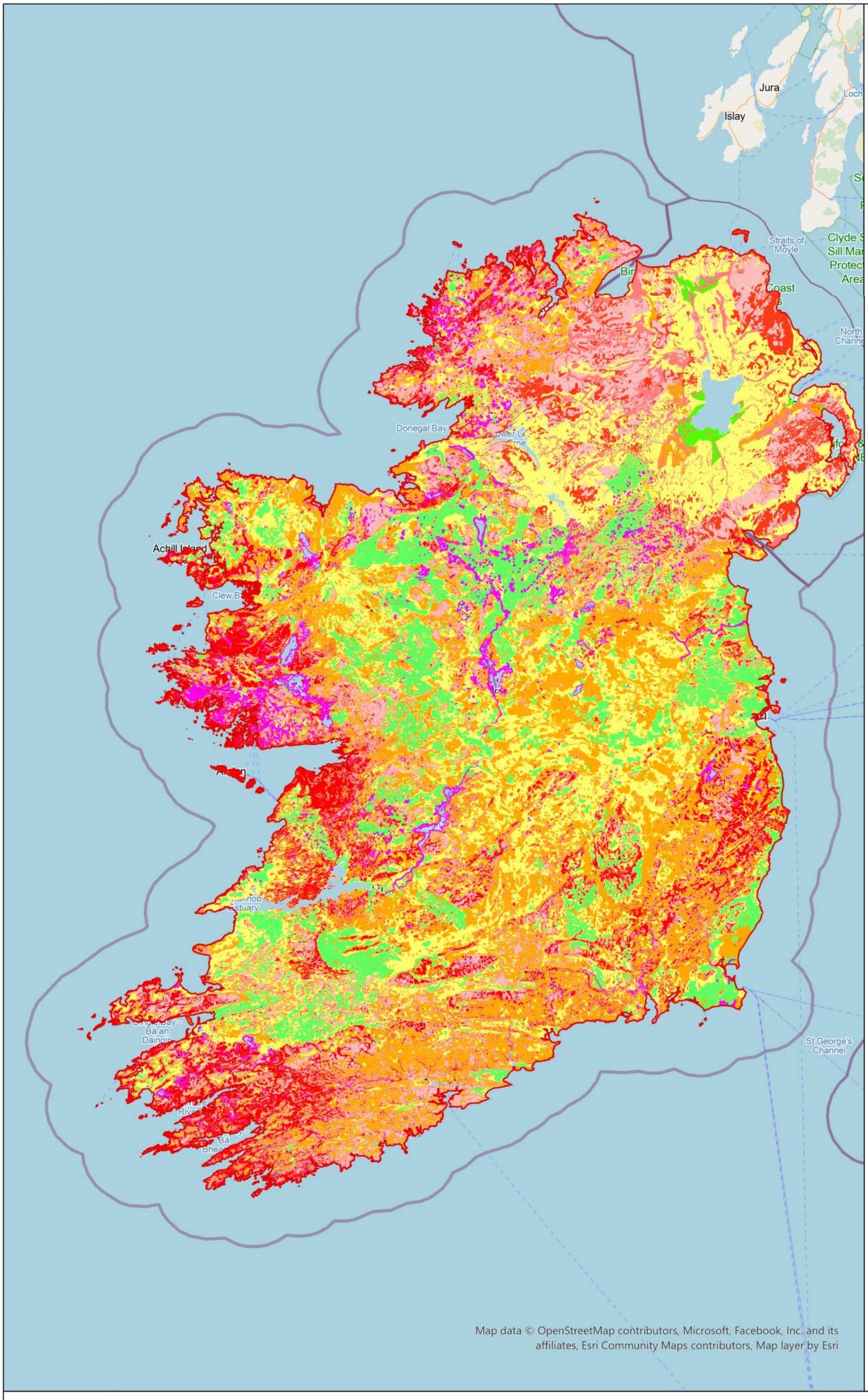
Drawing Title
Groundwater Body Quality

Drawing Status

Figure No.
Fig B13

Project Number
295182-00



Legend

- Land Mass

Groundwater Vulnerability

- Rock at or near Surface or Karst
- Extreme
- High
- Moderate
- Low
- Water

Source: Geological Survey Ireland & Geological Survey Northern Ireland

Kilometers
0 12.5 25 50

Irish Transverse Mercator
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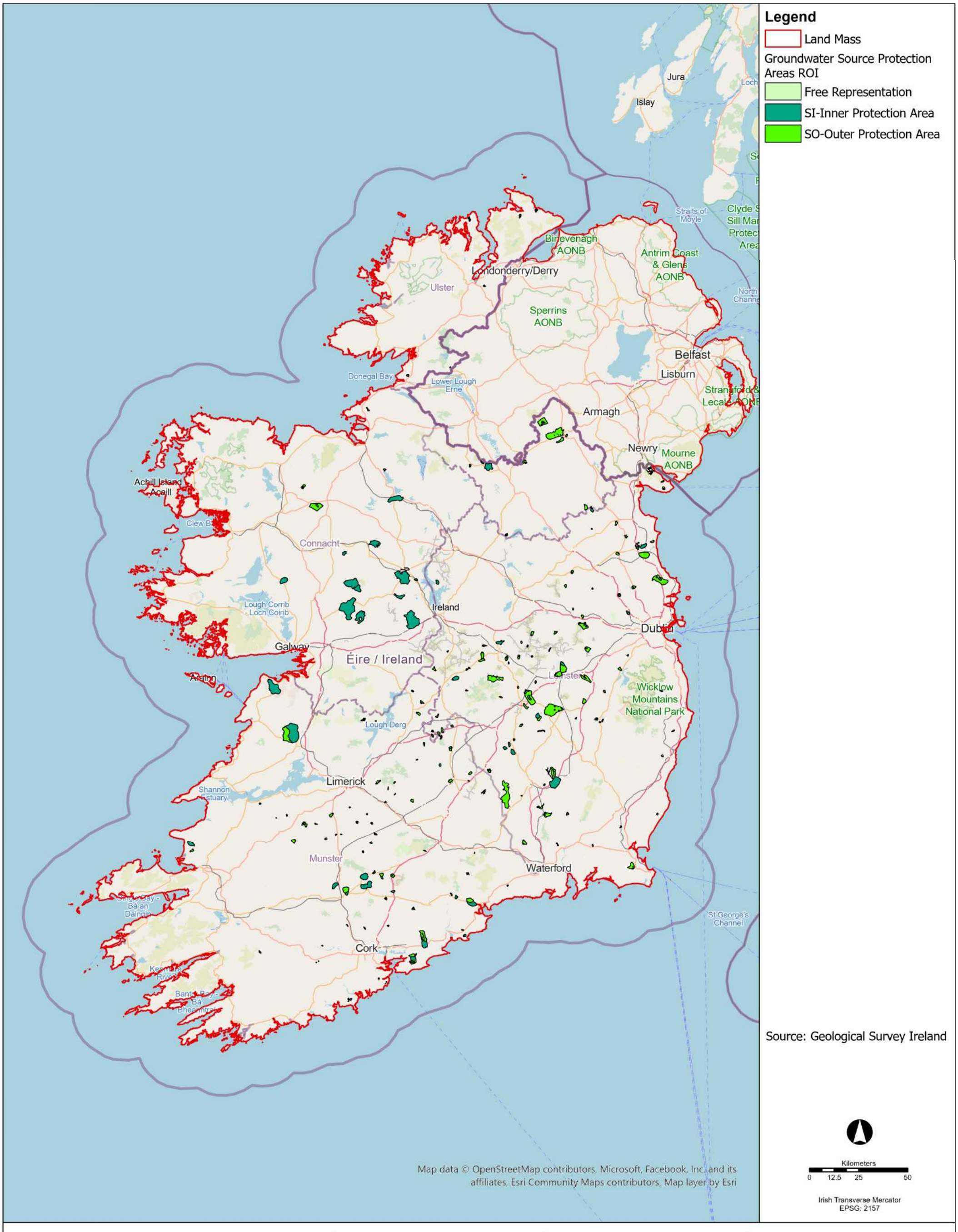
Drawing Title
Groundwater Vulnerability

Drawing Status

Figure No.
Fig B14

Project Number
295182-00



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Drawing Title
Source Protection Areas

Drawing Status

Figure No.
Fig B15

Project Number
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Project Title
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Date
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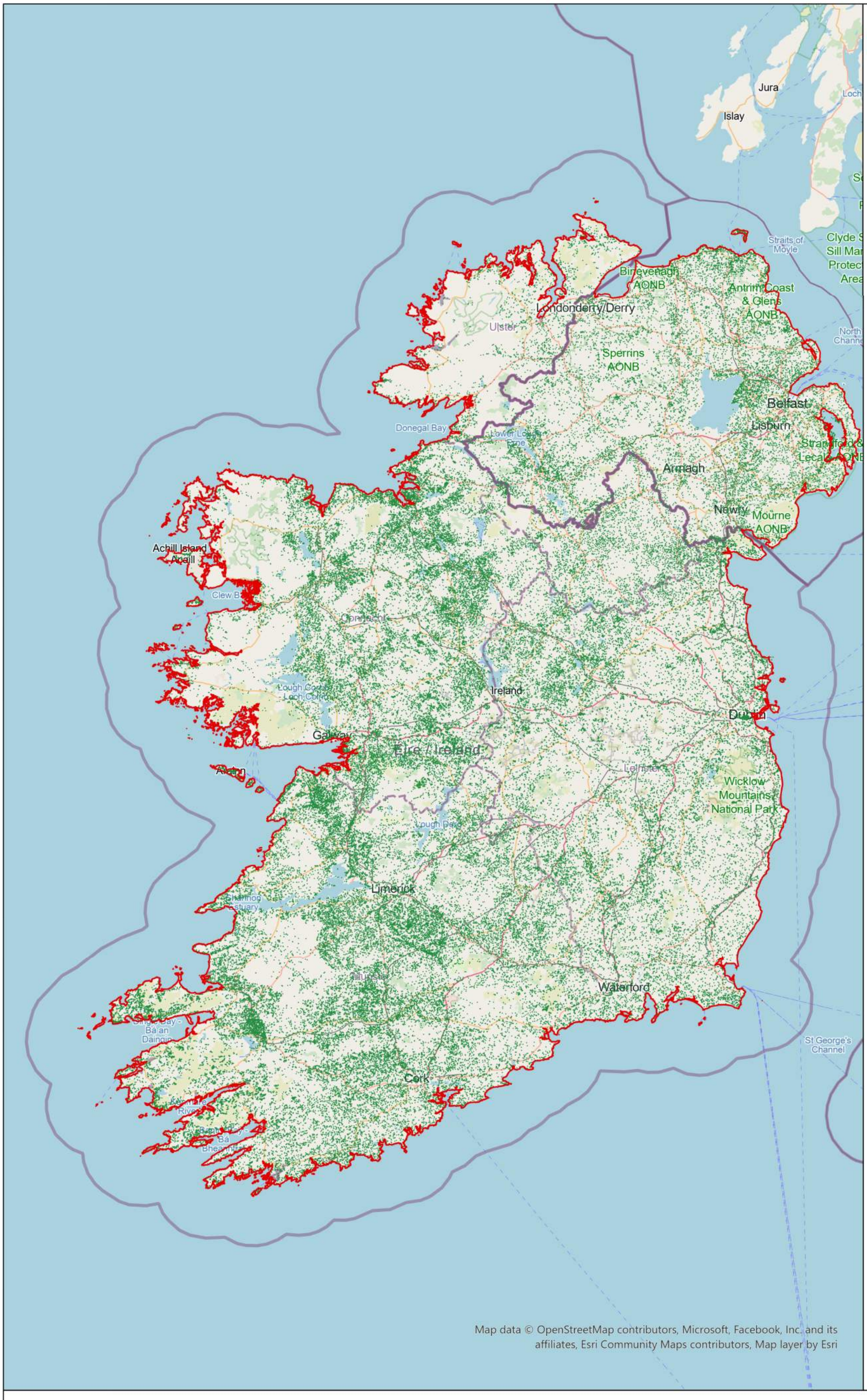
Drawing Title
Flood Risk

Drawing Status

Figure No.
Fig B16

Project Number
295182-00



Legend

- Land Mass
- Recorded Monuments

Source: Archaeological Survey of Ireland & Northern Ireland Sites and Monuments Record

Kilometers
0 12.5 25 50

Irish Transverse Mercator
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Drawing Title
Recorded Monuments

Drawing Status

Figure No.
Fig B17

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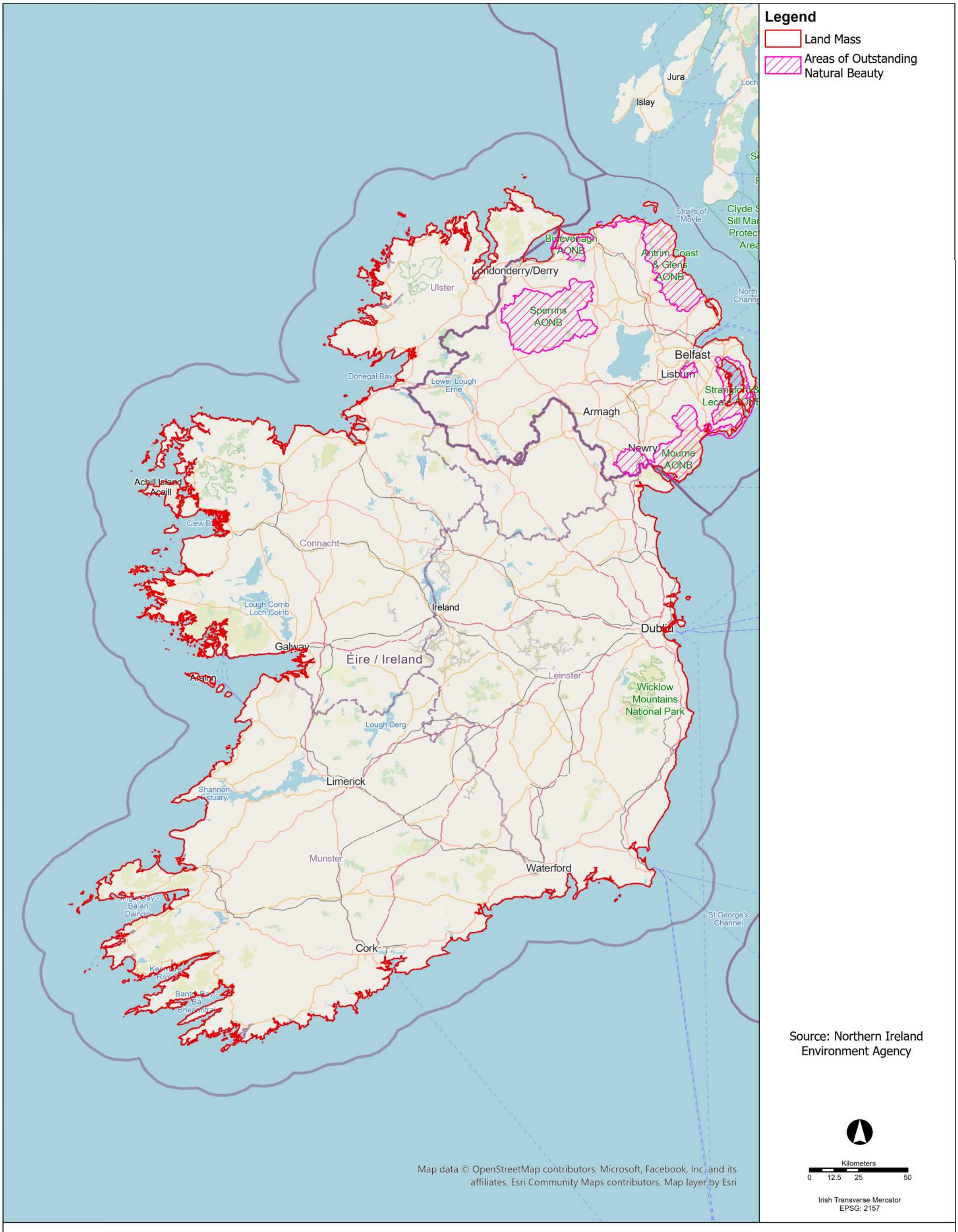
Drawing Title
UNESCO World Heritage Sites

Drawing Status

Figure No.
Fig B18

Project Number
295182-00



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Project Title
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Scale
1:1750000

Date
July 2023

Drawing Title
Areas of Outstanding Natural Beauty

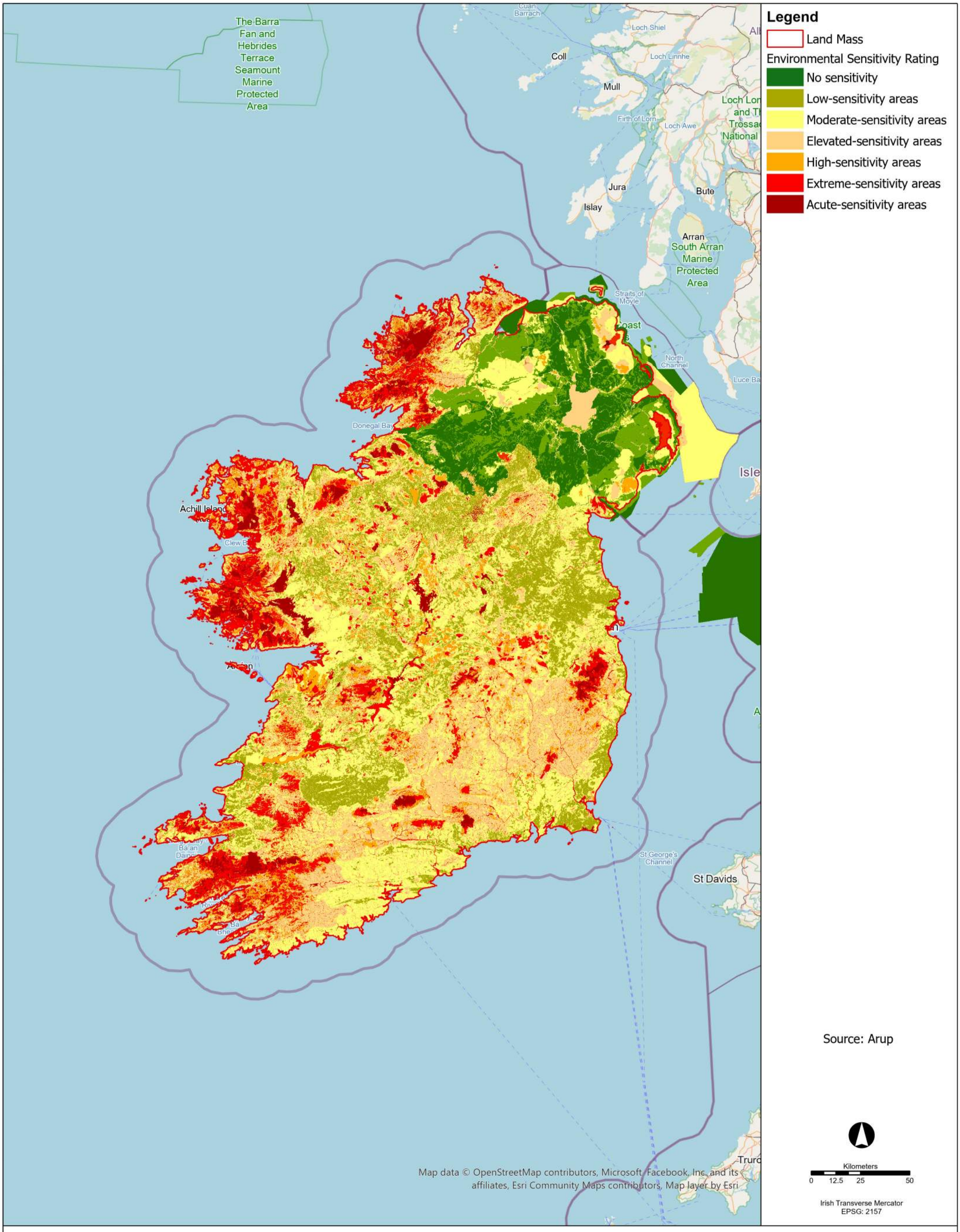
Drawing Status

Figure No.
Fig B19

Project Number
295182-00

Appendix C

Environmental Sensitivity Mapping



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Project Title
All-Island Strategic Rail Review

Scale
1:2200000

Date
July 2023

Drawing Title
Environmental Sensitivity Map

Drawing Status

Figure No.
Fig C1

Project Number
295182-00