

TOURISM MASTERPLAN FOR THE SHANNON REGION

VOLUME 4A

ENVIRONMENTAL REPORT

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CONTENTS

NON-TECHNICAL SUMMARY	1
1.0 INTRODUCTION AND TERMS OF REFERENCE.....	7
1.1 The Tourism Masterplan for the Shannon Region	7
1.2 The Purpose of this report.....	9
1.3 Implications of the Masterplan and SEA	9
1.4 Competent Authority.....	9
1.5 Strategic Environmental Assessment – An Overview.....	9
1.5.1 SEA Directive and its Transposition into Irish Law.....	10
1.5.2 The SEA Process.....	10
1.5.3 SEA Screening	10
1.6 Statutory Consultees for SEA	1
2.0 THE SHANNON TOURISM MASTERPLAN	2
2.1 Masterplan Area	2
2.2 Strategy Objectives	3
2.2.1 Key elements of the masterplan.....	3
3.0 SEA METHODOLOGY AND CONSULTATIONS	5
3.1 Introduction	5
3.2 Screening	5
3.3 Scoping.....	5
3.3.1 Scoping Responses	5
3.4 Environmental Report.....	6
3.4.1 Difficulties and Data Gaps	7
3.4.2 Transboundary Consultations.....	7
3.5 Proposed Consultation on the Draft Masterplan and Environmental Report.....	7
3.6 Next Steps.....	7
4.0 REVIEW OF RELEVANT PLANS, POLICIES AND PROGRAMMES.....	8
4.1 Introduction	8
4.2 A Review of Relevant Plans, Programmes and Policies.....	8
5.0 ENVIRONMENTAL BASELINE AND RELEVANT ENVIRONMENTAL ISSUES.....	48
5.1 Introduction	48
5.2 Biodiversity, Flora and Fauna	48

5.2.1	Designated Sites	48
5.3	Biosecurity	55
5.3.1	Biosecurity for Invasive Species.....	55
5.4	Population and Human Health.....	58
5.4.1	Human Health.....	58
5.4.2	Population.....	59
5.4.3	Populations by County and Settlement.....	60
5.5	Geology, Soils and Land Use	64
5.6	Water	65
5.6.1	Surface Water	65
5.6.2	Shannon Upper and Lower River Basin	65
5.6.3	Groundwater.....	67
5.6.4	Lough Derg & Lower Shannon	72
5.6.5	Groundwater – Lough Ree & Mid Shannon	74
5.6.6	Groundwater – Upper Shannon	78
5.6.7	Source Protection Zones	80
5.6.8	Groundwater Quality - Groundwater Waterbodies at Risk.....	82
5.6.9	Flooding.....	82
5.6.10	Shannon CFRAM Programme	82
5.6.11	Surface Water Quality - Lake and River Waterbodies at Risk	83
5.6.12	Bathing Water.....	86
5.6.13	Transboundary Issues.....	88
5.6.14	Wastewater.....	88
5.7	Air.....	89
5.8	Climate	90
5.9	Material Assets	91
5.9.1	Fisheries and Aquaculture.....	92
5.10	Cultural, Archaeological and Architectural Heritage	92
5.10.1	Archaeological and Architectural Heritage	92
5.10.2	Industrial Heritage.....	93
5.11	Landscape and Visual Amenity	93
6.0	ASSESSMENT FRAMEWORK	100
6.1.1	SEA Objectives for Shannon Masterplan.....	100
7.0	DESCRIPTION, EVALUATION AND SELECTION OF THE ALTERNATIVE PLAN SCENARIOS ...	102
7.1	Evaluation of Alternative Scenarios	102
7.1.1	Alternative 1: Consolidation and Improvement to existing Tourism Infrastructure, Visitor Attractions and Experiences 102	
7.1.2	Alternative 2: Develop major new visitor attractions on or alongside the water/river.	102

7.1.3	Alternative 3: Do nothing	103
7.2	Selection of Preferred Alternative	103
8.0	ASSESSMENT OF PLAN EFFECTS LIKELY SIGNIFICANT EFFECTS ON THE ENVIRONMENT... 104	
8.1	Do Nothing / Evolution of the Environment in the Absence of the Masterplan	104
8.1.1	Biodiversity, Flora and Fauna.....	104
8.1.2	Population and Human Health.....	104
8.1.3	Geology, Soil and Land Use.....	104
8.1.4	Water	105
8.1.5	Air	105
8.1.6	Climate	105
8.1.7	Material Assets	105
8.1.8	Cultural, Archaeological and Architectural Heritage	106
8.1.9	Landscape and Visual Impact.....	106
8.2	Masterplan Appraisal	107
8.3	Habitats Regulation Assessment.....	147
8.4	Cumulative Effects	147
9.0	MITIGATION AND MONITORING MEASURES	149
9.1	Mitigation Measures incorporated into the Draft Masterplan	149
9.2	Further Mitigation Measures Recommended.....	149
9.3	Mitigation by SEA Topic	151
9.4	Habitats Regulations Assessment	158
9.4.1	Natura Impact Report - Proposed Mitigation	158
9.5	Monitoring	159

DOCUMENT REFERENCES

TABLES

Table 1:	Record of Pre-Draft Submissions Received	5
Table 2:	Report layout for the requirements of the Regulations.....	6
Table 3	Summary of Relevant Key Plans and Programmes Relevant to the Masterplan.....	8
Table 4	Summary Legislation, Plans & Policies: Environmental Objectives and Targets	11
Table 5	Figures of Population with Good or Very Good Health in Ireland.....	58
Table 6:	Settlements Identified Per County within 5km Inclusion Zone of Masterplan Area.....	59
Table 7	Population by Settlement in Masterplan 5km Inclusion Zone	60
Table 8	Total Population by County within 5km Inclusion Zone	63

Table 9 Groundwater Body Summary	69
Table 10 Bathing Water Directive Quality Limits for Inland Water.....	87
Table 11 Planned Upgrade to Wastewater Treatment Plants in the Masterplan Area	88
Table 12 Air Quality Monitoring Stations.....	89
Table 13 European Air Quality PM ¹⁰ Obligations.....	90
Table 14 Weather Averages 1978-2010.....	91
Table 15: SEA Objectives for Shannon Masterplan.....	101
Table 16 Evaluation of the Likely Significant Effects of the Draft Tourism Masterplan.....	107
Table 17: Summary of Key Environmental Considerations.....	152
Table 18 Proposed Monitoring Framework: Tourism Masterplan for the Shannon.....	160
Table 19 Summary of Scoping Consultation Responses.....	165

FIGURES

Figure 1 Masterplan Area.....	8
Figure 2 Tourism Masterplan for the Shannon Region– Environmentally Sensitive Areas.....	12
Figure 3 Extent of Shannon Masterplan Area	4
Figure 4 Location of Natura 2000 in the context of proposals in the Tourism Masterplan (Overall)	50
Figure 5 Location of Natura 2000 in the context of proposals in the Tourism Masterplan (North)..	51
Figure 6 Location of Natura 2000 in the context of proposals in the Tourism Masterplan (Lough Ree)	52
Figure 7 Location of Natura 2000 in the context of proposals in the Masterplan (Shannon Callows)	53
Figure 8 Location of Natura 2000 in the context of proposals in the Tourism Masterplan (Lower) .	54
Figure 9 Freshwater Biosecurity for Small Boats	57
Figure 10: Biosecurity for Large Craft.....	59
Figure 11 Percentage of persons with very good and good health, 2016 - Source CSO Profile 9	59
Figure 12 Population Pyramid of Ireland 2016.....	64
Figure 13 Location of Groundwater Bodies in the Masterplan Area	68
Figure 14 Shannon Masterplan Area - Source Protection Zones	81
Figure 15 Lake Water Bodies at Risk	84
Figure 16 River Water Bodies at Risk	85
Figure 17 Landscape Character, Scenic Routes and Viewpoints (1a).....	96
Figure 18 Landscape Character, Scenic Routes and Viewpoints (1b).....	97
Figure 19 Landscape Character, Scenic Routes and Viewpoints (1c).....	98
Figure 20 Landscape Character, Scenic Routes and Viewpoints (1d).....	99

Non-Technical Summary

Section 1 Introduction and Terms of Reference

This is the Non-Technical Summary of the SEA Environmental Report (ER) for the Tourism Masterplan for the Shannon (encompassing the River Shannon and Shannon Erne Waterway¹). The purpose of the ER is to provide information on the likely environmental consequences of decisions regarding the future development of the plan area. This report should be read in conjunction with the Draft Tourism Masterplan for the Shannon.

What is an SEA?

Strategic environmental assessment (SEA) is a systematic process of predicting and evaluating the likely environmental effects of implementing a proposed plan, or other strategic action, in order to ensure that these effects are appropriately addressed at the earliest appropriate stage of decision-making on a par with economic, social and other considerations.

Why is it needed?

The SEA is being carried out to comply with the provisions of the SEA Regulations and in order to improve planning and environmental management. The output of the process is an ER and SEA Statement, both of which should be read in conjunction with the Masterplan.

How does it work?

All of the main environmental issues in the plan area are assembled and presented to the team who prepare the Plan. This helped them to devise a Masterplan that protects whatever is sensitive in the environment. It also helped to identify wherever there are environmental problems in the area and ideally the Masterplan tries to improve these. In order to decide how best to make a Masterplan that protects the environment as much as possible, the planners examined alternative versions of the Masterplan. This helped to highlight the type of Masterplan that is least likely to harm the environment.

What is included in the Environmental Report which accompanies the Masterplan?

The ER contains the following information:

- A description of the environment and the key environmental issues;
- A description and assessment of alternatives for the Masterplan;
- An assessment of the Plan objectives; and,
- Mitigation measures which set out to aid compliance with important environmental protection legislation - e.g. the Water Framework Directive, the Habitats Directive - and which will avoid/reduce the environmental effects of implementing the Plan.

What happens at the end of the process?

Upon the making of the Plan a document will be made public, referred to as the SEA Statement. The SEA Statement includes information on how environmental considerations have been integrated into the Plan and why the preferred alternative was chosen for the Plan in light of the other alternatives.

Section 2 Shannon Masterplan Development Strategy

The Plan has been prepared for Waterways Ireland and comprises a written document with maps and appendices. The Plan will set the strategic context for planning applications within the Plan area. The contents of the Plan (as set out in its chapter headings) are as follows:

¹ The term 'Shannon' will be used hereinafter to include the River Shannon and the Shannon Erne Waterway.

1. Introduction and Terms of Reference
2. Shannon Masterplan Development Strategy
3. SEA Methodology and Consultations
4. Review of Relevant Plans, Policies and Programmes
5. Environmental Baseline and Relevant Environmental Issues
6. Description, Evaluation and Selection of the Alternative Plan Scenarios
7. Assessment of Plan Effects and Likely Significant Effects on the Environment
8. Mitigation and Monitoring Measures
9. Implementation

Section 3 SEA Methodology and Consultations

The Shannon Masterplan has been developed to provide a high quality sustainable tourism plan for the Shannon region. This SEA Environmental Report has been produced to assess the environmental impacts of the various objectives and developments(alternatives) proposed within the Masterplan.

In parallel to this, an AA Screening and Nature Impact Report has been prepared to inform the decision making process. Both environmental assessments have been central to the development of the draft Masterplan.

Section 4 Review of Relevant Plans, Policies and Programmes

The Plan sits within a hierarchy of other plans. The Plan must comply with higher level strategic plans. The higher level plans include the following:

- A Biodiversity Strategy for Northern Ireland to 2020 (Department of the Environment, 2015)
- A National Landscape Strategy for Northern Ireland (DAGH, 2011)
- Air Quality Strategy for England, Scotland, Wales and Northern Ireland (DEFRA, 2007)
- Fermanagh and Omagh Landscape Character Assessment (Fermanagh & Omagh District Council, 2015)
- Fermanagh and Omagh Local Biodiversity Action Plan (Fermanagh and Omagh District Council, 2016)
- Fermanagh Area Plan 2007 (Fermanagh District Council, 1997)
- Landscape Charter for NI, 2014
- NI Climate Change Adaptation Programme (DoE, 2014)
- NI Planning Policy Statements (PPS) (Planning Service NI)
- Northern Ireland Greenhouse Gas Emissions Reduction Plan (Cross-Departmental Working Group on Greenhouse Gas Emissions, 2011)
- Preparing for a Changing Climate in Northern Ireland (SNIFFER, 2007)
- Sustainable Development Strategy (Northern Ireland Executive, 2010)
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (DEFRA, 2007)
- The Climate Change Act (2008)
- Travelwise NI: Building an Active Travel Future for Northern Ireland' (DRD, 2012)
- UK Government Sustainable Development Strategy (The Stationery Office, 2005)
- Valuing Nature - Northern Ireland Biodiversity Strategy 2015 (DoE, 2015)
- Fermanagh and Omagh District Council Local Development Plan 2030 Draft Plan Strategy

Section 5 Environmental Baseline and Relevant Environmental Issues

Introduction

The environmental baseline of the plan area is described in this section. This baseline, together with the Strategic Environmental Objectives which are identified in Section 1, are used in order to identify, describe and evaluate the likely significant environmental effects of implementing the Plan and to determine appropriate monitoring measures. The environmental baseline is described in line with the legislative requirements encompassing the following components:

1. Biodiversity, Flora and Fauna
2. Population and Human Health
3. Soil
4. Water
5. Air
6. Climatic Factors
7. Material Assets
8. Cultural Heritage (architectural and archaeological)
9. Landscape
10. The inter-relationship between these issues

Evolution of Environment in the Absence of a Plan

Problems were outlined under each heading above and historical trends were presented where possible. In the absence of the new Plan there would be no long-term area-specific framework or guidance for development within the plan area. Specifically, the following could occur:

1. Biodiversity, Flora and Fauna

Although some areas of sensitivity, such as the Natura 2000 sites, would continue to be protected under EU law, uncoordinated development and greenfield site development may impact on undesignated habitats such as hedgerows.

2. Population and Human Health

In the absence of appropriate objectives relating to the consolidation and improvement of tourism services and infrastructure in existing towns and settlements there would be no framework for concentrating development in the most accessible areas. In the absence of a coordinated plan, investment would not be appropriately directed towards improvements in recreational infrastructure. This would represent a loss of potential health benefits from appropriately planned and located walking and cycling activities.

3. Soil

There would be no framework for encouraging development to appropriate sites which could result in a loss of non-renewable soil resources.

4. Water

Water supplies, and wastewater treatment would continue to be governed by the Water Framework Directive. Without a framework that encourages development, there are increased potential for impacts affecting the quality of surface water, groundwater and locally important aquifers.

5. Air

Travel patterns would continue to occur in a dispersed pattern and this activity would intensify, leading to an increase in unsustainable travel patterns and a subsequent increase in travel related emissions.

6. Climatic Factors

Inappropriate development could take place in areas of flood risk and an unmitigated increase in travel will increase CO² emissions.

7. Material Assets

There would be no detailed framework to enhance existing navigation infrastructure.

8. Cultural Heritage

Cultural heritage is a cornerstone of the majority of tourism attractions within the masterplan area. Without the masterplan, there is no framework that will identify the measures required to achieve high quality development outcomes in these sensitive locations.

9. Landscape

In the absence of masterplan, there would be no framework guiding developments to avoid areas of high landscape value.

Section 6 Assessment Framework

The proposed Shannon Masterplan has been assessed against SEA Objectives in order to examine the significant likely environmental impacts of the Masterplan. This assessment is strategic and is designed to report likely impacts at the regional level to reflect the scale at which the Masterplan Area is being prepared. The SEA Objectives, including their indicators are identified as the assessment framework set out in Section 6.

Section 7 Description, Evaluation and Selection of the Alternative Plan Scenarios

One of the critical roles of the SEA is to facilitate an evaluation of the likely environmental consequences of a range of alternative scenarios for the future development of the plan area. In preparing this tourism masterplan, three alternatives were considered, each focusing on a different spatial approach to the development of visitor experiences and associated tourism services and infrastructure. They are:

- Alternative 1: Consolidation and Improvement to existing Tourism Infrastructure and Visitor Experiences
- Alternative 2: Develop major new visitor attractions on or alongside the water/river.
- Alternative 3: Do nothing

Evaluation of Alternative Scenarios

This section summarises the evaluation of the Alternative Scenarios that is found in Section 7 of the Environmental Report.

Alternative 1: Consolidation and Improvement to existing Tourism Infrastructure, Visitor Attractions and Experiences

Traditionally the River Shannon been a popular destination for both overseas and domestic visitors and the height of its popularity coincided with the emergence of the all island boat hire industry which acted as the cornerstone of Ireland's tourism product in the 1990. The area and the popularity of this product in particular has since declined in popularity, leaving behind a variety of underused hotels, jetties, harbours and boats. A key issue of the masterplan is the need to address the fall off in visitor number and regenerate the visitor infrastructure, services and towns that depend on the tourism industry as a basis for their economy.

Environmental impacts

The central environmental benefit of this alternative is associated with its focus on the re use and regeneration of existing tourism facilities and infrastructure. Whilst in some cases increased visitor numbers will mean that upgrades to existing infrastructure maybe required it is generally considered that the environmental impacts on air, water will be captured using these specific infrastructure upgrades and therefore minimised in this scenario. Indeed, the socio economic benefits are likely to be greatest under alternative 1 as the economic benefits will accrue in areas where the existing population is highest.

Alternative 2: Develop major new visitor attractions on or alongside the water/river.

The River Shannon and Shannon Erne Waterway extends over a vast geographical and predominantly rural area encompassing a variety of undeveloped nature areas including several sites of biodiversity importance. It is interspersed with a number of settlements, which with the exception of Limerick and Athlone, are predominantly small to medium sized in nature. This low level of urbanisation means that corresponding visitor infrastructure in terms of attractions, accommodation and associated activity is also low. Generally, speaking, the study area lacks any attractions of scale with the most popular visitor attractions of Clonmacnoise and Lough Key Forest Park enjoying visitors of up to 200,000 per annum. The development of new attractions of scale will be required to invigorate the visitor offer and experience. Several locations for new attractions were identified and considered during the preparation of the masterplan however these would require the development of green field sites.

Environmental impacts

The environmental impacts associated with developing wholly new visitor attractions within the masterplan area are dependent on the nature, scale and location of the development and are potentially wide ranging.

Alternative 3: Do nothing

The do nothing scenario was considered prior to the commissioning of the masterplan. With the emergence of Ireland's Hidden Heartlands brand, a requirement for a planned and coordinated approach was established. Without a masterplan in place, a number of potential disbenefits and environmental impacts would accrue.

Environmental impacts

The do nothing and business as usual approach was not considered appropriate on the basis that it would result in poor value for money in terms of any future investment as well as a potentially greater scale of environmental impacts associated with significant levels of unplanned and uncoordinated development. Without a masterplanning / plan led approach, the opportunity to test and consult on the strategy in accordance with the requirements of the Strategic Environmental Assessment Directive would also be missed.

Selection of Preferred Alternative

The preferred alternative which emerged from the evaluation process was Alternative 1 which is the consolidation of and improvement to existing tourism infrastructure, visitor attractions and experiences within the masterplan area, as this has the fewest potentially negative impacts on the SEA objectives set out in Section 6.

This scenario contributes towards the protection of the environment and conforms to high level planning objectives around the prioritisation of development around existing infrastructure.

By applying appropriate mitigation measures - including those which have been integrated into the Plan - potential adverse environmental effects which could arise as a result of implementing this scenario are likely to be avoided, reduced or offset.

Section 8 Assessment of Plan Effects and Likely Significant Environmental Effects

Section 8 of the Environmental Report evaluates the individual strategic aims and objectives of the Tourism Masterplan using the assessment framework developed in Section 6. The purpose of this section is to evaluate the likely significant environmental effects of the masterplan.

Habitats Regulation Assessment

Habitats Regulation Assessment was also carried out for the Masterplan and this is produced as a separate Natura Impact Report. The preparation of the Plan, SEA and AA has taken place concurrently and the findings of the AA have informed both the Plan and the SEA.

Section 9 Mitigation and Monitoring Measures

Mitigation measures are measures envisaged to prevent, reduce and, as fully as possible, offset any significant adverse impacts on the environment of implementing the Plan. Potential adverse effects have been and will be avoided, reduced or offset through:

- The consideration of alternatives;
- Through communication of environmental considerations and integration of these considerations into the Plan;
- The identification of a 'settlement strategy' which would provide the focus for new development; and
- Adherence to mitigation measures which have been integrated into the Plan.

Monitoring

The SEA Directive requires that the significant environmental effects of the implementation of plans and programmes are monitored. The Environmental Report contains proposals for monitoring the Plan which are adopted alongside the Plan. Monitoring enables the identification of unforeseen adverse effects and the undertaking of appropriate remedial action.

The Environmental Report identifies indicators which allow quantitative measures of trends and progress in the environment over time. Measurements for indicators generally come from existing monitoring sources.

1.0 Introduction and Terms of Reference

1.1 The Tourism Masterplan for the Shannon

The Tourism Masterplan for the Shannon, incorporating the River Shannon and the Shannon Erne Waterway, will be a key step in the evolution of the new Fáilte Ireland strategy for 'Ireland's Hidden Heartlands' which is one of the four key regional tourism experience brands. Ireland's Hidden Heartlands extends to cover the 'heart' of the country, from Leitrim to Limerick City and extending through Longford, West Cavan, Roscommon, East Galway, East Clare, Westmeath, North Tipperary and Offaly.

'Ireland's Hidden Heartlands' promises to bring to life the Midlands' rich natural assets including its many lakes, walkways and blueways, leveraging a growing tourism trend for outdoor activities by encouraging visitors to be 'active in nature'. At present the region has just a 3% share of overnight stays by overseas visitors to Ireland and a 3% share of overnight stays by domestic visitors. Fáilte Ireland's projected growth of future visitor numbers of c. 1.19 million to the Ireland's Hidden Heartlands region by 2030 will result in an additional 304,000 additional visitors to the region. This expected increase gives a good indication of the extent of visitor infrastructure that is likely to be required. A key target will be to 'capture' visitors on the east-west Dublin-West Coast axis by offering 'reasons to stop and stay' and by creating vibrant world class towns, villages, attractions and activities all along the Shannon.

Together with the development of the *Beara Breifne Way*, Ireland's longest inland way-marked way, which spans part of the Hidden Heartlands, the Shannon has been identified as a transformative signature project of scale which will help to unlock the region's tourism potential. The Tourism Masterplan will identify signature initiatives and projects within the region to support sustainable tourism opportunities both on- and off-water, stimulating enterprises in the towns and villages surrounding it.



Figure 1 Masterplan Area: River Shannon and Shannon Erne Waterway

1.2 The Purpose of this report

This document is the Environmental Report for the purposes of the Strategic Environmental Assessment (SEA) of the Tourism Masterplan. This Environmental Report has been compiled by SLR on behalf of Waterways Ireland who are the competent authority for the Tourism Masterplan and associated SEA.

SEA is the formal, systematic evaluation of the likely significant effects of implementing the plan, before a decision is made. The process includes preparing an Environmental Report where the likely significant effects are identified and evaluated. This report has been prepared in accordance with the SEA Guidelines for Regional and Planning Authorities.

1.3 Implications of the Masterplan and SEA

In terms of scale, the masterplan extends over an area of c. 3,198.8 km² predominantly located within the Republic of Ireland but with 43.9km² located within Northern Ireland. The tourism Masterplan for the Shannon Region also provides the opportunity for a decision-making framework for future development consent of projects listed in Annex II to the EIA directive. Relevant annex II (Projects referred to in Article 4(2)) include:

- Marinas;
- Holiday villages and hotel complexes outside urban areas and associated developments;
- Permanent campsites and caravan sites;
- Theme parks

The drafting of a Masterplan provides the statutory context for the undertaking of an SEA that might otherwise be lost to examine inter-regional and inter-county environmental effects as a result of the implementation of a masterplan.

The findings of the SEA are explained in this Environmental Report, which will accompany the Shannon Tourism Masterplan and will be on public display for a period of 7 weeks. This Environmental Report may be altered in order to take account of recommendations contained in submissions received as a result of public display. It will also be altered to take account of any changes to the draft Masterplan as a result of submissions received.

Waterways Ireland will address the findings of this Environmental Report and other related SEA output during the consideration of the Draft Masterplan from draft to final stage. When the Masterplan is finalised, an SEA Statement will be prepared which will summarise how environmental considerations have been integrated into the Masterplan.

1.4 Competent Authority

Waterways Ireland is one of six North-South Implementation Bodies established in 1999 under the British – Irish Agreement Act, 1999, and the supplementary North/South Co-operation (Implementation Bodies) (Northern Ireland) Order 1999. Waterways Ireland is charged with the management, maintenance, development and restoration of the inland navigable waterway systems under its remit throughout the island of Ireland, principally for recreational purposes.

Waterways Ireland and Fáilte Ireland have formed a strategic partnership to further enhance and promote the Shannon region. This partnership has recently commissioned a Tourism Masterplan for the Shannon, whose primary focus will be an assessment of the strategic tourism potential along the Shannon Corridor, including the Shannon-erne Waterway, from Limerick northwards to Leitrim/Cavan. See Figure 1 which identifies the masterplan area.

1.5 Strategic Environmental Assessment – An Overview

SEA is a process for evaluating, at the earliest appropriate stage, the environmental consequences of implementing plan/ programme initiatives prepared by authorities at a national, regional or local level or which

are prepared by an authority for adoption through legislative means. The purpose is to ensure that the environmental consequences of plans and programmes are assessed both during their preparation and prior to adoption. The SEA process also gives interested parties an opportunity to comment on the environmental impacts of the proposed plan or programme and to be kept informed during the decision making process. Waterways Ireland is the Competent Authority for the management of navigable waterways on the island of Ireland and along with the Tourism Masterplan is also responsible for carrying out the SEA of the Tourism Masterplan for the Shannon.

1.5.1 SEA Directive and its Transposition into Northern Irish Law

The proposed masterplan has the potential to identify and deliver tourism development proposals in both Ireland and Northern Ireland as the boundary extends over two jurisdictions. The SEA will be applied to the full extent of the masterplan area which is outlined in Figure 1. This SEA process will therefore utilise the legislative framework in both Ireland and Northern Ireland.

In Northern Ireland, the European Directive (2001/42/EC) on the Assessment of the Effects of Certain Plans and Programmes on the Environment (the SEA Directive) was transposed into national legislation in Northern Ireland by the Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (S.R. 280/2004).

1.5.2 The SEA Process

The SEA process is comprised of the following principle steps:

1. **Screening:** Decision on whether or not an SEA is required;
2. **Scoping:** Consultation with the defined statutory bodies on the scope and level of detail to be considered in the assessment;
3. **Environmental Assessment:** An assessment of the likely significant impacts on the environment as a result of the Tourism Masterplan for the Shannon Region, leading to the production of an Environmental Report;
4. **Consultation** on the Tourism Masterplan for the Shannon Region and associated Environmental Report;
5. **Evaluation of the submissions and observations** made on the draft Tourism Masterplan for the Shannon Region and Environmental Report prior to finalising the Tourism Masterplan for the Shannon Region;
6. Issuance of an **SEA Statement** identifying how environmental considerations and consultation have been integrated into the Tourism Masterplan for the Shannon Region.

1.5.3 SEA Screening

The SEA Directive requires that certain plans and programmes, prepared by statutory bodies, which are likely to have a significant impact on the environment, be subject to the SEA process. As outlined above, the SEA Directive was transposed into national legislation in Northern Ireland by way of the Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (S.R. 280/2004).

The boundary of the Draft Tourism Masterplan for the Shannon 2020-2030 extends over an area of c. 3,198.8 km². Although the masterplan area is predominantly located within the Republic of Ireland, 43.9km² of the plan area is located within Northern Ireland. Although this is a comparatively small area in the context of the overall masterplan, the area extending into Northern Ireland is considered environmentally sensitive due to the presence of Natura 2000 sites including Upper Lough Erne SAC / SPA (See Figure 3).

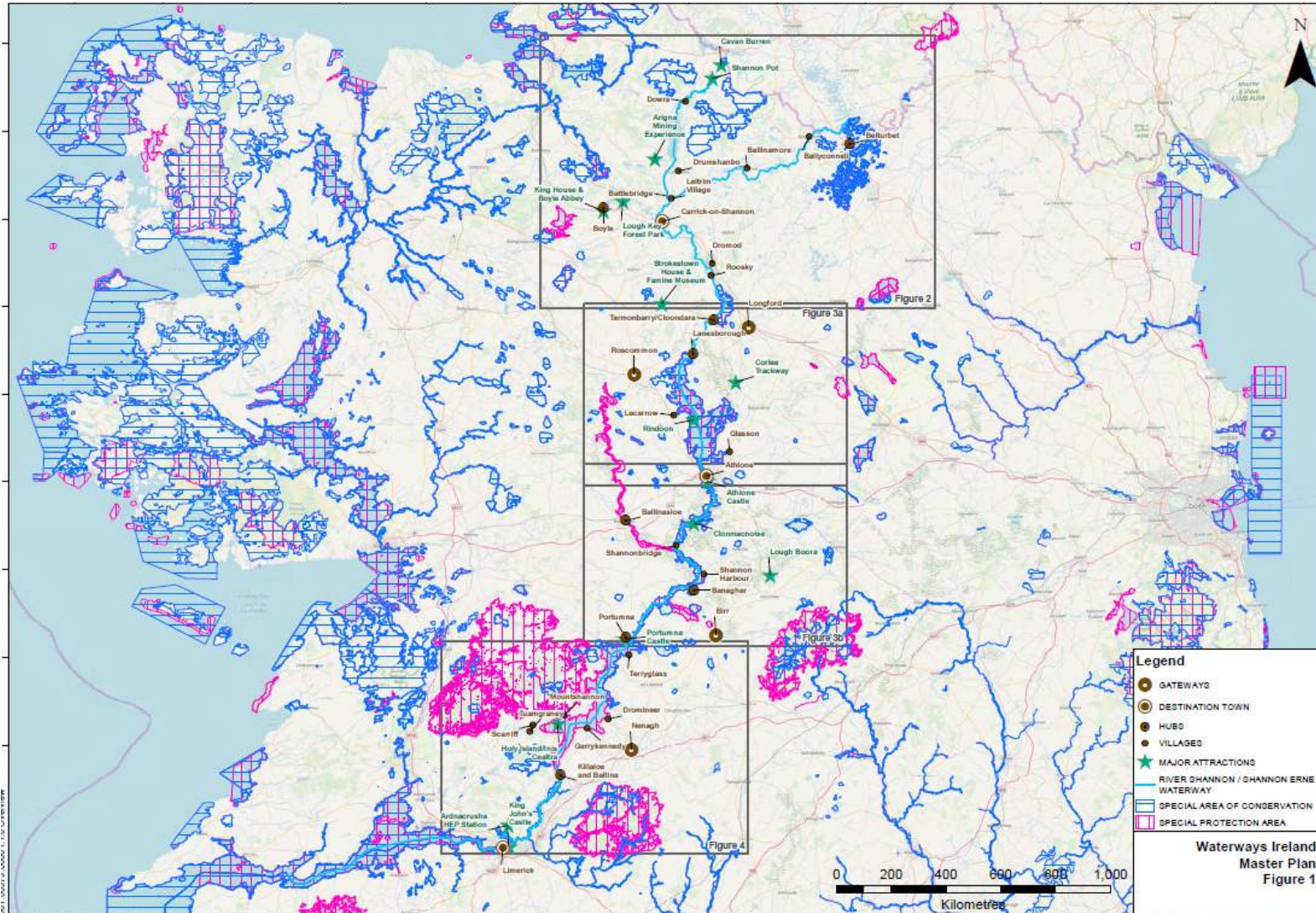
The Draft Tourism Masterplan for the Shannon 2020-2030 provides the opportunity for a decision-making framework for future development consent of projects listed in Annex II to the EIA directive. Relevant Annex II (projects referred to in Article 4(2)) include:

- Marinas;

- Holiday villages and hotel complexes outside urban areas and associated developments;
- Permanent campsites and caravan sites; and
- Theme parks.

The drafting of a Masterplan also provides the statutory context for the undertaking of an SEA that might otherwise be lost to examine inter-regional and inter-county environmental effects as a result of the implementation of a Masterplan.

As the provisions of the Habitats Directive also apply, it was determined that the provisions of Regulation 9 of the Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (S.R. 280/2004) have been met and that an SEA was required in relation to the Tourism Masterplan for the Shannon.



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Figure 2 Tourism Masterplan for the Shannon Region– Environmentally Sensitive Areas

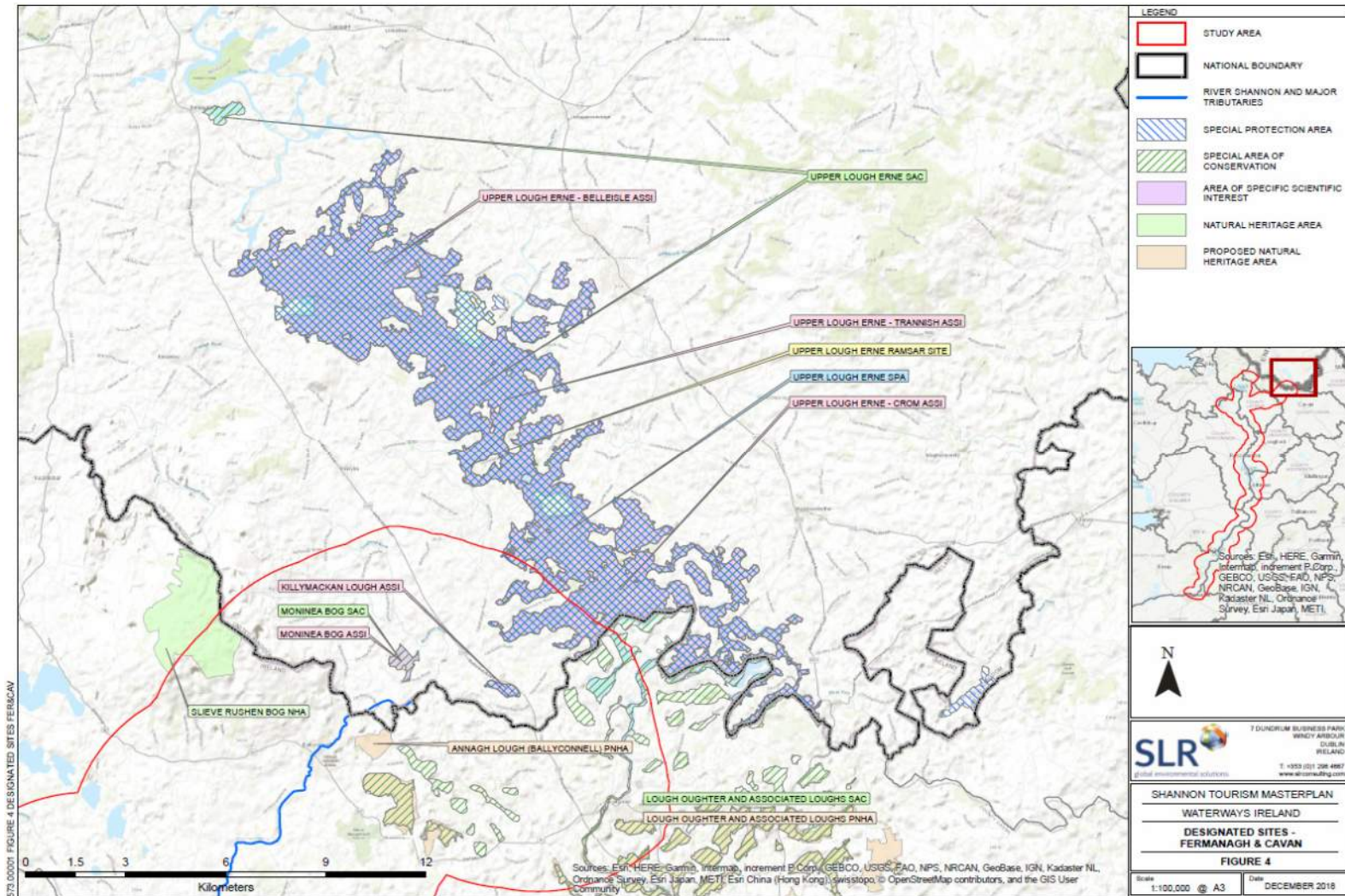


Figure 3 Designated Sites in the Northern Ireland Masterplan Area

1.6 Statutory Consultees for SEA

The SEA Directive 2001/42/EC was transposed into Northern Irish law through Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (S.R. 280/2004). Under regulation 9(5) or (6), Waterway Ireland (the responsible authority) shall prepare a report on whether the authority considers that the plan or programme, or as the case may be, the modification, is likely to have significant environmental effects.

The responsible authority shall send the report prepared in accordance with paragraph (2) to the consultation body (Department of the Environment) for consideration. The consultation body shall, within 28 days of receipt of the report prepared in accordance with paragraph (2), respond to the responsible authority with its views on that report.

Feedback from the Department of the Environment / Northern Ireland Environmental Agency is contained within Appendix 1 of this document.

2.0 The Tourism Masterplan for the Shannon

2.1 Masterplan Area

The geographical area to be covered within this project includes a 10km corridor adjoining the Shannon Navigation from Lough Allen to Limerick City and the Shannon-erne Waterway, from the border with Northern Ireland (Belturbet) to Leitrim village. The study will also include Lough Key in Co. Roscommon, linked by tributary to the Shannon. The study area encompasses mooring, boating and on-shore facilities at multiple locations along its length.

The Shannon is the longest river in Britain and Ireland and comprises the principal lakes of Loughs Allen, Ree and Derg. The river also boasts world-class angling, playing host annually to many local and international fishing competitions. In recent years, trends towards outdoor activity tourism have been encouraged and harnessed with the establishment of both land- and water-based activities and in the development of a new recreational brand, Blueways, aimed at encouraging visitors and locals alike to enjoy being active in the waterway environs.

The Shannon Navigation incorporates 257km of cruising water, covering almost 130km² from Killaloe to Lough Allen in County Leitrim, together with the Carnadoe and Boyle Waters, with seven locks. The Navigation then runs a further 113km from Killaloe to the sea at Loop Head through Limerick, with one double lock at Ardnacrusha Power Station.

The Shannon Erne Waterway is also known as the Ballinamore–Ballyconnell Canal, including the connecting canal between Lough Scur and the River Shannon, just south of Leitrim village. The canal was constructed under the Drainage Act of the 1840s, but fell into decline as the rail network developed. The canal was successfully reopened in 1994 and is used by large numbers of barges and cruisers every year, playing a major role in the region's tourism industry.

For the purpose of the masterplan, the study area has been characterised in terms of three discovery zones. The description below highlights the key attributes with each area.

- **Discovery Zone 1: Upper Shannon**
- **Discovery Zone 2: Lough Ree & Mid Shannon**
- **Discovery Zone 3: Lough Derg and the Lower Shannon**

Upper Shannon

The Upper Shannon boasts a complex network of lakes, rivers and canals. Lough Allen and Lough Key are the two major lakes in the northernmost part of the River Shannon. Lough Allen lake is overlooked on the Eastern shore by *Sliabh an Iarainn* mountain and from the Western shore by the Arigna Mountains, providing outstanding views and opportunities for exploring on foot or bike. In Co. Roscommon, Lough Key rests between the expanse of forest, parkland and hills, providing a range of outdoor activities.

The Shannon-erne Waterway, formerly the Ballinamore-Ballyconnell Canal, links the River Shannon in the Republic of Ireland to the Erne System in Northern Ireland. The navigation is approximately 61km (38 miles) long and links the village of Leitrim with the Erne system, downstream from Belturbet. Within the navigation there is a total of 16 locks and 34 bridges, with 8 locks from Leitrim to the summit level at Lough Scur, and 8 locks to the Woodford River and on to the Erne System.

Lough Ree & Mid Shannon

The Lough Ree and Mid Shannon area is steeped in history and surrounded by a variety of natural landscapes. Lough Ree is 32 kilometres long and lays claim to be the geographical centre of Ireland. The hills of Sliabh Bawn in the northwest overlook Lough Ree and its many islands, which were home to early Christian monks and inhabited by local families until the recent past. Overlooking the Inner Lakes in the southeast of Lough Ree are

the environs of Glasson. In the lake's southern narrows lies the regional centre of Athlone. The Mid Shannon area also accommodates the Callows, a complex of seasonally flooded meadows and ecologically significant area at this low point of the river.

Lough Derg and the Lower Shannon

Lough Derg and the lower Shannon is set in beautiful countryside, encompassing an attractive blend of mountain and lakeshore, woodlands and farms. It is bookended by Portumna in the north and the twin towns of Killaloe-Ballina in the south, each offering a range accommodation, activities and visitor services.

Covering 32,000 acres of waterway, Lough Derg is ideal for all kinds of water sports, cruising and angling, as well as excellent walking and cycling facilities, supported by visitor services in picturesque towns and villages such as Portumna, Terryglass, Dromineer, Garrykennedy, Mountshannon, Killaloe and Ballina.

2.2 Strategy Objectives

2.2.1 Key elements of the masterplan

Waterways Ireland is the Competent Authority for the management of the navigable waterways on the island of Ireland, as outlined in Section 1.0, and is responsible for carrying out the Tourism Masterplan for the Shannon. The key aims of this masterplan are to:

1. Identify **Products and Themes** with the most potential and offering a unique differentiator
2. **Destination Vision** – establish a shared view of the destination's desired qualities (and profile) in the long-term, including land-based activities and attractions that will complement the water-based activities, and suggest best options to deliver on this.
3. Make **recommendations on other influencing factors** that will stimulate a varied product offering and quality experience e.g. Policy changes (Bye laws), innovative programmes to support private sector (tax incentives) or investment in infrastructure.

In implementing the Masterplan for the Shannon, the objectives are to:

- Increase the distinctiveness and visitor appeal of the area and diversify the offer;
- Attract new visitors;
- Encourage repeat visits
- Increase dwell time
- Drive economic and social benefit;
- Deliver authentic experiences;
- Be of scale;
- Protect environmental sensitivities; and
- Provide for sustainable development.

The area covered under this project is included in Figure 3. It extends across a corridor of approximately 5km from the River Shannon. Exceptional experiences outside of this corridor may also be included up to 15km. This project also crosses into Northern Ireland.

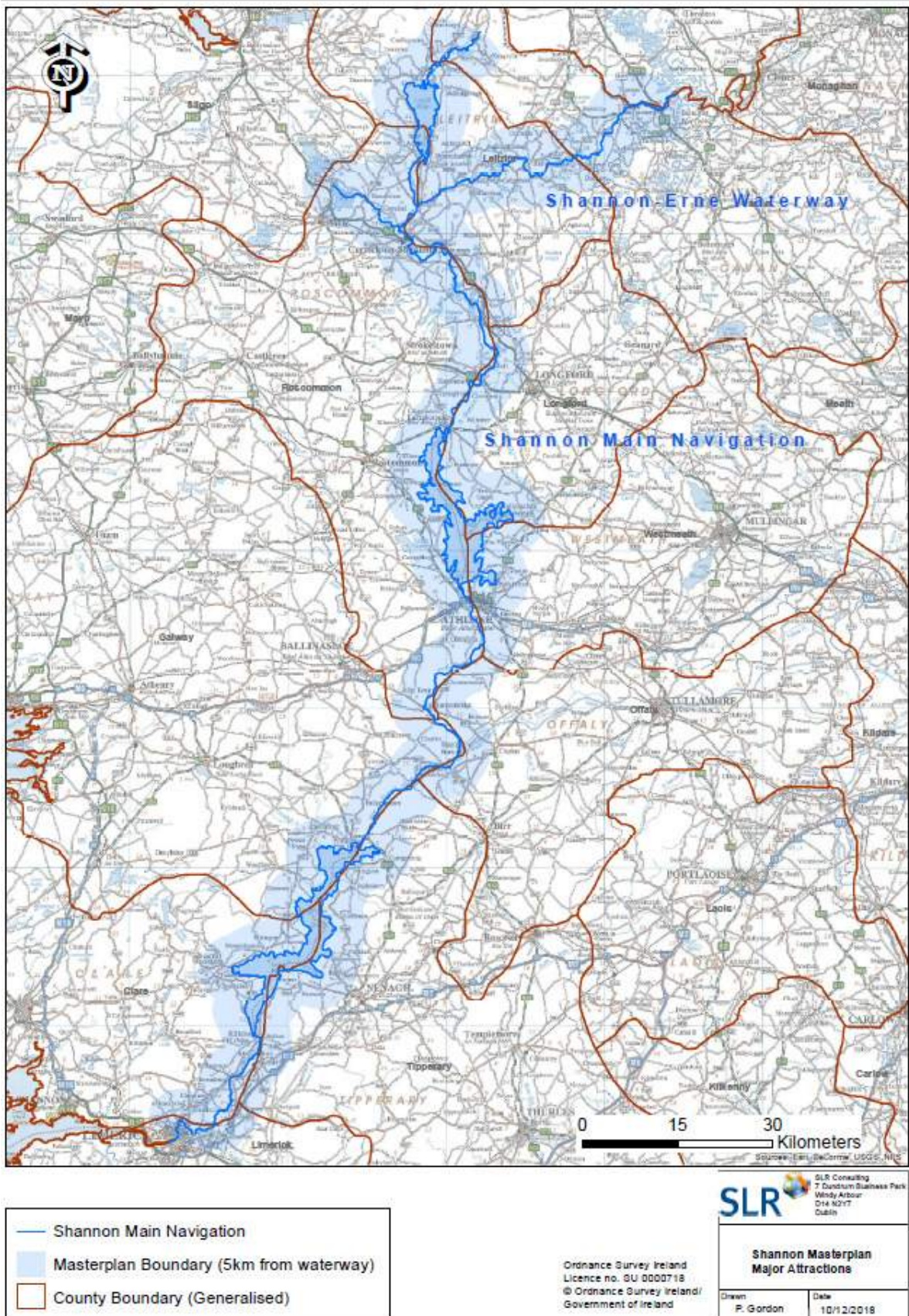


Figure 4 Extent of Shannon Masterplan Area

3.0 SEA Methodology and Consultations

3.1 Introduction

The Shannon Masterplan has been developed to provide statutory guidance to the proposed development, management and maintenance of high quality sustainable tourism plan for the Shannon region. This SEA Environmental Report has been produced to assess the environmental impacts of the various objectives and developments(alternatives) proposed within the Masterplan area.

In parallel to this, an AA Screening has been prepared to inform the decision making process, in terms of the potential for the route options to impact the integrity of any European sites in view of the conservation objectives of any site impacted. Both environmental assessments have been central to the development of the draft Masterplan.

3.2 Screening

The SEA Directive requires that certain plans and programmes, prepared by statutory bodies, which are likely to have a significant impact on the environment, be subject to the SEA process. An SEA screening of the Draft Masterplan area was undertaken in October 2018 after which it was concluded that SEA would be undertaken for the draft Shannon Tourism Masterplan. The decision to proceed with a Natura Impact Report with respect to the requirements of the Habitats Directive is considered to be a trigger for requiring an SEA.

3.3 Scoping

A scoping letter was prepared in November 2018 in accordance with the SEA Guidelines for Regional and Planning Authorities. The purpose of the scoping letter was to advise statutory consultees that the Tourism Masterplan for the Shannon was being prepared and that SEA would be carried out. It also invited submissions or observations in relation to the scope and level of detail of the information to be included in the environmental report. The purpose of the scoping stage is to ensure the identification of relevant environmental issues, so they could be addressed appropriately in the Environmental Report. The scoping stage also helps to establish the level of detail necessary for the SEA of the LAP.

Consultation

In line with the Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (S.R. 280/2004), the consultation body was given notice on the 11th February 2019 of the of the intention of Waterways Ireland to carry out an environmental assessment.

3.3.1 Scoping Responses

Prior to this public consultation date, one scoping response was received which is outlined in Table 1, following.

Table 1: Record of Pre-Draft Submissions Received

Agency	Interest	Concerns
Northern Ireland Environmental Agency	Statutory Environmental Agency	Has provided several N.I. resources and additional information for landscape, environmental impacts, historic environment. Has concern re: Ramsar site Lough Erne SPA and SAC in the Appropriate Assessment and has asked for regard to be given to trans-migratory birds.

3.4 Environmental Report

Information to be included in the Environmental Report is set out in Schedule 2 of the Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (S.R. 280/2004). The SEA Guidelines for Regional and Planning Authorities (REF) also include a recommended layout, which this Report follows for the most part. The table below sets out how the layout of this Report satisfies the requirements of the Regulations.

Table 2: Report layout for the requirements of the Regulations

Requirements of SEA Directive	Section of Environmental Report
1. an outline of the contents and main objectives of the plan and relationship with other relevant plans;	Chapter 2: Contents and Description of the Plan
2. the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan;	Chapter 5: Current state of the environment
3. the environmental characteristics of areas likely to be significantly affected;	Chapter 5: Current state of the environment
4. any existing environmental problems which are relevant to the plan including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to the Birds Directive or Habitats Directive;	Chapter 5: Current state of the environment
5. the environmental protection objectives, established at international, European Union or national level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation;	Chapter 6: Assessment Framework
6. the likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors;	Chapter 8: Likely significant effects on the environment
7. the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan;	Chapter 9: Mitigation measures
8. an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;	Chapter 7: Assessment of Plan Alternatives
9. a description of the measures envisaged concerning monitoring of the significant environmental effects of implementation of the plan;	Chapter 9: Development Plan Monitoring

Requirements of SEA Directive	Section of Environmental Report
10. a non-technical summary of the information provided under the above headings.	Non-Technical Summary

3.4.1 Challenges and Data Gaps

Challenges were encountered in the preparation of this Environmental Report for the Draft Tourism Masterplan for the Shannon 2020-2030 due to the transboundary and the multi-jurisdictional aspects of the Masterplan as its length spans 10 administrative boundaries in Ireland, and 1 administrative boundary in Northern Ireland.

There are a number of stakeholders involved in the formation of the Masterplan with differing priorities and amounts/levels of information which must feed into the Shannon Masterplan and the corresponding SEA. Due to these variances, and strategic nature of this plan, it is challenging to create an even assessment across the potential alternatives in the Shannon Masterplan as to focus into significant project details in one section, which may have more information, and will not lead to a balanced assessment of alternatives.

For these reasons, it was important to consider the environmental assessment at a strategic level that is replicable across all alternatives.

3.4.2 Transboundary Consultations

The majority of the plan area is located within the Republic of Ireland and a standalone SEA was carried out under the legislative provisions in this jurisdiction as set out by SI No. 435/2004 - European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004. See the separate Environmental Report for further detail. A transboundary consultation was therefore not required as part of this SEA process.

3.5 Proposed Consultation on the Draft Masterplan and Environmental Report

The findings of the SEA of the Shannon Masterplan are explained in this Environmental Report, which will accompany the Shannon Masterplan and will be on public display for a period of 8 weeks.

This Environmental Report may be altered in order to take account of recommendations contained in submissions received as a result of public display. It will also be altered to take into account any changes to the draft Tourism Masterplan as a result of submissions received. Waterways Ireland will consider the findings of this Environmental Report and other related SEA outputs during the consideration of the Draft Masterplan from draft to final stage.

3.6 Next Steps

When the Masterplan is finalised, an SEA Statement will be prepared which will summarise how environmental considerations have been integrated into the Masterplan.

4.0 Review of Relevant Plans, Policies and Programmes

4.1 Introduction

Article 5 of the Directive states that “where an environmental assessment is required under Article 3(1), an environmental report shall be prepared in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme, are identified, described and evaluated.”

The information to be given for the purpose of the environmental report is referred to in Annex I. In accordance with Annex I, the purpose of this section is to identify the environmental protection objectives, established at international, European Union or national level, which are relevant to the plan.

Environmental objectives and targets identified in the table below will inform the assessment framework which will use to assess the environmental performance of the Tourism Masterplan for the Shannon.

4.2 A Review of Relevant Plans, Programmes and Policies

As part of the SEA process, the context of the Masterplan must be established with regard to other Plans and programmes that have been adopted at international, European and national levels. In particular the interaction of the environmental protection objectives and standards included within these Plans and Programmes with the Masterplan requires consideration.

Table 3 identifies the main significant environmental plans, programmes and legislation, adopted at international, European Community/Member State level, which would be expected to influence or be influenced by, the Masterplan. While it is recognised that there are many Plans, Programmes and legislation that could relate to the Masterplan, it is considered appropriate to only deal with those significant texts, to keep the assessment at a strategic level.

Table 3 Summary of Relevant Key Plans and Programmes Relevant to the Masterplan

Level	Name
EU Level	<ul style="list-style-type: none"> ○ A 2030 Framework for Climate and Energy Policies [COM (2013) 169] ○ Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) ○ Birds Directive [2009/147/EC] and Habitats Directive [92/43/EEC] ○ Bonn Convention [L210, 19/07/1982 (1983)] ○ Communication from the Commission to the European Parliament, The Council, the European Economic and Social committee and the Committee of the Regions COM/2010/0352 ○ EC (Birds and Natural Habitats) Regulations 2011 ○ EIA Directive [85/337/EEC] [2014/52/EU] ○ Environmental Liability Directive [2004/35/EC] ○ Environmental Quality Standards Directive [2008/105/EC] ○ EU 2020 Growth Strategy [COM (2010) 2020] ○ EU Biodiversity Strategy to 2020 [COM (2011)244] ○ EU Floods Directive [2007/60/EC] ○ EU Water Framework Directive (2000/60/EC) ○ EU Strategy on Adaption to Climate Change [EC, 2013] ○ European Landscape Convention [ETS No. 176] ○ Groundwater Directive (2006/118/EC) (Groundwater Regulations Ireland, 2010) ○ Invasive Species Regulation [EU/1143/2014] ○ SEA Directive [2001/42/EC] ○ Soils Thematic Strategy [COM (2006) 231]

Level	Name
	<ul style="list-style-type: none"> ○ The RAMSAR Strategic Plan (Ramsar Convention Secretariat, 2016)
Trans-National Level	<ul style="list-style-type: none"> ○ Climate Action Plan 2019: to Tackle Climate Breakdown (Department of Communications, Climate Action & Environment) ○ Ensuring a Sustainable Transport Future: A New Approach to Regional transportation (Department for Regional Development, 2011) ○ River Basin Management Plan for Ireland 2018-2021 ○ Groundwater Regulations 2010 ○ Interim Guidelines for Planning Authorities on Statutory Plans, Renewable Energy and Climate Change – July 2017 ○ Ireland’s National Biodiversity Plan 2011-2016 (Dept. of Arts, Heritage and the Gaeltacht, 2011) ○ Irish Geological Heritage (IGH) Programme (GSI 1998) ○ National Adaptation Framework, Planning for a Climate Resilient Ireland, 2018 ○ National Biodiversity Action Plan 2017-2021 ○ National Climate Change Policy, 2013 ○ National Cycle Policy Framework (Dept. of Transport, Tourism and Sport) ○ National Landscape Strategy for Ireland (Draft) 2014 – 2024 (DAHG, 2014) ○ National Mitigation Plan, 2017 ○ National Planning Framework 2040: Our Plan ○ National Spatial Strategy 2002-2020 (DELG, 2002) ○ Natural Heritage Areas and proposed Natural Heritage Areas ○ Prioritised Action Framework for Natura 2000 (Dept. of the Environment, 2012) ○ Programme for Government Framework (Northern Ireland Executive, 2016) ○ Smarter Travel: A Sustainable Transport Future, 2009 – 2020 ○ Strategic Planning Policy Statement (Dept. of the Environment, 2015) ○ Sustainable Development – A Strategy for Ireland (Dept. of Environment, Heritage and Local Government, 1997) ○ The National Landscape Strategy for Ireland 2015-2025 ○ The National Mitigation Plan, 2017 ○ The Wildlife Acts 1976 – 2012 ○ Border Regional Authority Planning Guidelines 2010-2022 (The Border Regional Authority, 2010) ○ Leitrim County Development Plan 2015 - 2021 ○ Cavan County Development Plan 2014 – 2020
National Level	<ul style="list-style-type: none"> ○ A Biodiversity Strategy for Northern Ireland to 2020 (Department of the Environment, 2015) ○ A National Landscape Strategy for Northern Ireland (DAGH, 2011) ○ Air Quality Strategy for England, Scotland, Wales and Northern Ireland (DEFRA, 2007) ○ Fermanagh and Omagh Landscape Character Assessment (Fermanagh & Omagh District Council, 2015) ○ Fermanagh and Omagh Local Biodiversity Action Plan (Fermanagh and Omagh District Council, 2016) ○ Fermanagh Area Plan 2007 (Fermanagh District Council, 1997) ○ Landscape Charter for NI, 2014 ○ NI Climate Change Adaptation Programme (DoE, 2014) ○ NI Planning Policy Statements (PPS) (Planning Service NI) ○ Northern Ireland Greenhouse Gas Emissions Reduction Plan (Cross-Departmental Working Group on Greenhouse Gas Emissions, 2011) ○ Preparing for a Changing Climate in Northern Ireland (SNIFFER, 2007) ○ Sustainable Development Strategy (Northern Ireland Executive, 2010)

Level	Name
	<ul style="list-style-type: none">○ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (DEFRA, 2007)○ The Climate Change Act (2008)○ Travelwise NI: Building an Active Travel Future for Northern Ireland' (DRD, 2012)○ UK Government Sustainable Development Strategy (The Stationery Office, 2005)○ Valuing Nature - Northern Ireland Biodiversity Strategy 2015 (DoE, 2015)
County Level	<ul style="list-style-type: none">○ Fermanagh and Omagh District Council Local Development Plan 2030 Draft Plan Strategy

Table 4 Summary Legislation, Plans & Policies: Environmental Objectives and Targets

International / National / Regional	Outline of Targets and Objectives	SEA Topic
European Level		
<p>A 2030 Framework for Climate and Energy Policies [COM (2013) 169]</p>	<p>The 2030 climate and energy framework includes EU-wide targets and policy objectives for the period from 2021 to 2030.</p> <p>Key targets for 2030:</p> <ul style="list-style-type: none"> • At least 40% cuts in greenhouse gas emissions (from 1990 levels); • At least 32% share for renewable energy; • At least 32.5% improvement in energy efficiency <p>The framework was adopted by the European Council in October 2014. The targets for renewables and energy efficiency were revised upwards in 2018. A transparent and dynamic governance process will help deliver the objectives of the Energy Union, including the 2030 climate and energy targets, in an efficient and coherent manner. The EU has adopted integrated monitoring and reporting rules to ensure progress towards the 2030 climate and energy targets and its international commitments under the Paris Agreement. Based on the better regulation principles, the governance process involves consultations with citizens and stakeholders. Member States are obliged to adopt integrated National Climate and Energy Plans (NECPs) for the period 2021-2030. Member States had to submit their draft plans by the end of 2018. The final plans must be submitted by the end of 2019</p>	<p>Climate, Air & Human Beings</p>
<p>Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC)</p>	<p>The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) was published in May 2008, superseding its three previous Directives and incorporating a subsequent Directive. The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999 and incorporates SI58 of</p>	<p>Climate, Air & Human Beings</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<p>2009. The CAFE Directive outlines set targets on air quality and long term objectives for all known air pollutants to 2030.</p>	
<p>Birds Directive [2009/147/EC] and Habitats Directive [92/43/EEC]</p>	<p>Flora and fauna in Ireland are protected at a European level by the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (79/409/EEC) which is transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011). Under this legislation sites of nature conservation importance are designated in order to legally protect faunal and floral species and important/vulnerable habitats. The legal protection set out within the EC (Birds and Natural Habitats) Regulations 2011 applies to all faunal species listed in Annex IV of the Habitats Directive. Part 6, Section 51(2) of the Regulations makes it an offence to:</p> <ul style="list-style-type: none"> • deliberately capture or kill any specimen of these species in the wild, • deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration, • deliberately take or destroy eggs of those species from the wild, • damage or destroy a breeding site or resting place of such an animal, or • keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive. <p>The legal protection set out within in Section Part 6, Section 52 of the EC (Birds and Natural Habitats) Regulations 2011 applies to species of plants listed on Annex IV of the Habitats Directive. Plants are afforded protection under Part 6, Section 52(2) of the Regulations boundaries of the sites'. In Section 27(5)(c) public authorities are required to 'take the appropriate steps to avoid disturbance of the species for which European Sites have</p>	<p>Biodiversity</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<p>been established, in so far as such disturbance could be significant in relation to the objectives of the Birds Directive or the Habitats Directive’.</p>	
<p>Bonn Convention (Convention on Migratory Species) [L210, 19/07/1982 (1983)]</p>	<p>The Bonn Convention provides legislative context for international cooperation for the protection and conservation of migratory species. To avoid any migratory species becoming endangered, the parties must endeavour:</p> <ul style="list-style-type: none"> • to promote, cooperate in or support research relating to migratory species; • to provide immediate protection for migratory species included in Appendix I; and • to conclude Agreements covering the conservation and management of migratory species listed in Appendix II. <p>To protect endangered migratory species, the parties to the Convention will endeavour:</p> <ul style="list-style-type: none"> • to conserve or restore the habitats of endangered species; • to prevent, remove, compensate for or minimise the adverse effects of activities or obstacles that impede the migration of the species; and • to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species. 	<p>Biodiversity</p>
<p>Communication from the Commission to the European Parliament, The Council, the European Economic and Social committee and the Committee of the Regions COM/2010/0352</p>	<p>This communication from the European Commission outlines the strategic economic and social impacts of tourism to the EU in 2010. This document provides clear evidence of tourism figures to the EU, and an action framework stimulating competitiveness in the sector while maintaining sustainability in the tourism sector.</p> <p><i>The European tourism industry generates over 5 % of EU GDP, a figure which is steadily rising. Tourism therefore represents the third largest socioeconomic activity in the EU after the trade and distribution and construction sectors. Taking into account the sectors linked to it, tourism's contribution to GDP is even greater; it is estimated to generate over 10 %</i></p>	<p>Human Health and Population</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<p><i>of the European Union's GDP and provide approximately 12 % of all jobs. In this regard, observing the trend over the last ten years, growth in employment in the tourism sector has almost always been more pronounced than in the rest of the economy.</i></p> <p><i>In addition, the European Union remains the world's No 1 tourist destination, with 370 million international tourist arrivals in 2008, or 40 % of arrivals around the world, 7.6 million of them from the BRIC countries (Brazil, Russia, India and China), a significant increase over the 4.2 million in 2004. These arrivals generated revenues of around EUR 266 billion, 75 billion of which was from tourists coming from outside the Union. As regards journeys by Europeans themselves, they are estimated at approximately 1.4 billion, some 90 % of which were within the EU. According to estimates by the World Tourism Organisation (WTO), international tourist arrivals in Europe should increase significantly in the coming years. Finally, European tourists are one of the largest groups travelling to third countries, providing an extremely important source of revenue in many countries.</i></p>	

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>EC (Birds and Natural Habitats) Regulations 2011</p>	<p>Flora and fauna in Ireland are protected at a European level by the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (79/409/EEC) which is transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011). Under this legislation sites of nature conservation importance are designated in order to legally protect faunal and floral species and important/vulnerable habitats. The legal protection set out within the EC (Birds and Natural Habitats) Regulations 2011 applies to all faunal species listed in Annex IV of the Habitats Directive. Part 6, Section 51(2) of the Regulations makes it an offence to:</p> <ul style="list-style-type: none"> • deliberately capture or kill any specimen of these species in the wild, • deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration, • deliberately take or destroy eggs of those species from the wild, • damage or destroy a breeding site or resting place of such an animal, or • keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive. <p>The legal protection set out within in Section Part 6, Section 52 of the EC (Birds and Natural Habitats) Regulations 2011 applies to species of plants listed on Annex IV of the Habitats Directive. Plants are afforded protection under Part 6, Section 52(2) of the Regulations.</p>	<p>Biodiversity</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
EIA Directive [85/337/EEC] [2014/52/EU]	The EIA Directive (85/337/EEC) is in force since 1985 and applies to a wide range of defined public and private projects, which are defined in Annexes I (Mandatory requirement for EIA) and Annex II (Screening). . The competent authority, at the developer’s request, can say what should be covered by the EIA information to be provided by the developer (Scoping), the developer then is required to provide information on the environmental impact (EIAR). The environmental authorities and the public (and in instances of transnational impacts, the adjoining member state affected by the proposed development) must be informed and consulted. The Competent authority then determines, after review and consideration of all concentration and information presented, whether the EIAR contains all relevant information and makes a decision on the proposed development. The public is informed of this decision, and can challenge the decision to ABP, and to the Courts.	All Topics
Environmental Liability Directive [2004/35/EC]	This Directive was released in April of 2004 regarding environmental liability and the prevention and remedying of environmental damage.	Biodiversity
Environmental Quality Standards Directive [2008/105/EC]	Article 16 of the Water Framework Directive required a first list of priority substances. Directive 2008/105/EC produced the list of priority substances deemed to be a significant risk to the aquatic environment in Annex II. This list has been subsequently amended under (COM (2011)846). The proposal accompanies a report (COM (2011)875) from the Commission to the European Parliament and the Council on the outcome of the review of Annex X to Directive 2000/60/EC of the European Parliament and of the Council on priority substances in the field of water policy.	Water
EU 2020 Growth Strategy [COM(2010) 2020]	The EU 2020 Growth Strategy is the EU growth and jobs strategy for 2020-2029. The strategy emphasises sustainable, smart and inclusive growth to overcome what is perceived to be structural weaknesses to Europe’s economy and to improve the competitiveness, productivity and sustainable economy.	Population and Human Health

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>EU Biodiversity Strategy to 2020 [COM(2011)244]</p>	<p>The EU Biodiversity Strategy is an overarching support which works in independently from the Habitats and Birds Directives while these Directives are implemented across the Member States. The Strategy has six targets:</p> <ul style="list-style-type: none"> • Target 1 commits EU Member States to a full and swift implementation of the Birds and Habitats Directives. • Target 2 commits EU Member States to establish green infrastructure and to restore 15% of degraded ecosystems in the EU. • Target 3 commits the European Commission to reform the Common Agricultural Policy so that increases its contribution to biodiversity conservation on farmland and to improve forest management • Target 4 commits the European Commission to reform the Common Fisheries Policy so that it reduces its ecological impacts, including its impacts on marine ecosystems. • Target 5 commits the European Commission to combat Invasive Alien Species including through preventing the establishment of these species and through control and eradication. • Target 6 commits the EU to step up its contribution to combatting global biodiversity loss. 	<p>Biodiversity</p>
<p>EU Floods Directive [2007/60/EC]</p>	<p>EU Floods Directive works in coordination with the Water Framework Directive, via requiring Member States to coordinate their flood risk management plans, and not take measures that that will increase flood risk in neighbouring countries. Member States shall in take into consideration long term developments, including climate change, as well as sustainable land use practices in the flood risk management cycle addressed in this Directive.</p>	<p>Climate, Water</p>
<p>EU Water Framework Directive (2000/60/EC)</p>	<p>Establishes a framework for the protection of both surface and ground waters. Transposing legislation (S.I. 792 of 2009, European Communities Environmental Objective (Surface Water) Regulations 2009 as amended) outlines the water protection and water management measures required in Ireland to maintain high status of waters where it exists, prevent any</p>	<p>Water, Climate</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	deterioration in existing water status and achieve at least 'good' status for all waters.	
EU Strategy on Adaptation to Climate Change [EC, 2013]	<p>The EU Strategy on Adaptation to Climate Change is a strategy which aims to make Europe more climate resilient. This is brought about by three overarching objectives:</p> <ul style="list-style-type: none"> • Promoting action by Member States: The Commission encourages all Member States to adopt comprehensive adaptation strategies and provides funding to help them build up their adaptation capacities and take action. • Climate-proofing' action at EU level by further promoting adaptation in key vulnerable sectors such as agriculture, fisheries and cohesion policy, ensuring that Europe's infrastructure is made more resilient, and promoting the use of insurance against natural and man-made disasters. • Better informed decision-making by addressing gaps in knowledge about adaptation and further developing the European climate adaptation platform (Climate-ADAPT). <p>Upon evaluation of this strategy in November 2018, it was found that the strategy delivered on its objectives with progress on its 8 actions, but it has identified where Europe is still vulnerable to climate impacts.</p>	Climate, Population and Human Health
European Landscape Convention [ETS No. 176] (Florence Convention)	The European Landscape Convention provides a framework for international cooperation on the protection, management and planning of landscapes and landscape issues.	Landscape

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>Groundwater Directive (2006/118/EC) (Groundwater Regulations Ireland, 2010)</p>	<p>Under Regulation 4 of the Groundwater Regulations 2010, a duty is placed on public authorities to promote compliance with the requirements of the regulations and to take all reasonable steps including, where necessary, the implementation of programmes of measures, to:</p> <ul style="list-style-type: none"> • “prevent or limit, as appropriate, the input of pollutants into groundwater and prevent the deterioration of the status of all bodies of groundwater; • protect, enhance and restore all bodies of groundwater and ensure a balance between abstraction and recharge of groundwater with the aim of achieving good groundwater quantitative status and good groundwater chemical status by not later than 22 December 2015; • reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order to progressively reduce pollution of groundwater; • achieve compliance with any standards and objectives established for a groundwater dependent protected area included in the register of protected areas established under Regulation 8 of the 2003 Regulations [S.I. No. 722 of 2003] by not later than 22 December 2015, unless otherwise specified in the Community legislation under which the individual protected areas have been established.” 	<p>Water</p>
<p>Invasive Species Regulation [EU/1143/2014]</p>	<p>The EU Invasive Species Regulation provides a set of measures to be taken across the EU to any invasive alien species found on the list of Invasive Alien Species of Union Concern. There are three measures proposed:</p> <ul style="list-style-type: none"> • Prevention: to prevent the intentional or unintentional introduction of Invasive Alien Species of Union concern into the European Union; • Early detection and rapid eradication: Member States were required to institute a surveillance system to detect the present of Invasive Alien Species of Union concern as early as possible and take rapid measures to eradicate them to prevent establishment of the IAS; 	<p>Biodiversity</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<ul style="list-style-type: none"> • Management – a concerted management action plan required for Member States for the IAS which have already established themselves to prevent the spread of IAS anywhere else and to minimise the harm that they cause. 	
<p>SEA Directive [2001/42/EC]</p>	<p>The SEA Directive augments the Espoo Directive by requiring all individual Parties to integrate Environmental Assessment into their plans and programmes at the earliest stages, laying the groundwork for sustainable development.</p> <p>The SEA Directive applies to a wide range of public plans and programmes. These plans and programmes must be adopted by an authority (national, regional or local level) and be required through the legislative, regulatory and administrative provisions.</p> <p>SEA is mandatory for all plans and programmes which are prepared for</p> <ul style="list-style-type: none"> • agriculture, forestry, fisheries, energy, industry, transport, waste/ water management, telecommunications, tourism, town & country planning or land use and which set the framework for future development consent of projects listed in the EIA Directive. <p>OR</p> <ul style="list-style-type: none"> • have been determined to require an assessment under the Habitats Directive. <p>SEA and EIA are very similar, except:</p> <ul style="list-style-type: none"> • SEA requires the environmental authorities to be consulted at the screening stage, • scoping (i.e. the stage of the SEA process that determines the content and extent of the matters to be covered in the SEA report to be submitted to a competent authority) is obligatory under the SEA. 	<p>All Topics</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>Soils Thematic Strategy [COM (2006) 231]</p>	<p>Communication (COM (2006) 231) explains why further action is required to ensure a high level of soil protection, an overall objective of the Strategy and what kind of measures must be taken. This Communication sets out common principles for protecting soils across the EU, providing a framework for Member States to decide how best to protect soil and use it sustainably in their own territory.</p>	<p>Soils</p>
<p>The RAMSAR Strategic Plan (Ramsar Convention Secretariat, 2016))</p>	<p>The RAMSAR Convention discusses the <i>“conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world.”</i></p> <p>Wetlands are defined as <i>“areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6m.”</i></p> <p>The 4th RAMSAR Strategic Plan is a strategy which is updated routinely, following an assessment of the previous Strategy and provides new strategic and operational goals. The 4th Strategic Plan addresses:</p> <ul style="list-style-type: none"> • The drivers of wetland loss and degradation • Conserving and management of the RAMSAR site network, • Wisely using all wetlands; • Enhancing the implementation of RAMSAR guidance and methodologies. <p>The 4th Strategic Plan includes 19 targets in addition to the 4 overarching goals outlined above. These include:</p> <ul style="list-style-type: none"> • Recognising wetland benefits in several sectoral strategies; • Ensure water for wetland ecosystem needs; • Apply wise use guidelines in private and public sectors; • Control or eradicate invasive alien species; 	<p>Biodiversity</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<ul style="list-style-type: none"> • Maintain ecological character through integrated management; • Increase wetland area under RAMSAR designation; • Address threats to ecological character; • Complete national wetland inventories; • Strengthen wise use through integrated river basin management or coastal zone management; • Respect and use traditional knowledge and practices; • Document wetland services and benefits; • Restore degraded wetlands; • Enhance sustainability of projects in key sectors; • Develop scientific and policy guidance; • Reinforce RAMSAR Regional Initiatives for implementation of the Convention; • Mainstream wetland conservation and wise use through CEPA; • Mobilise resources for implantation; • Strengthen international cooperation; • Build capacity to implement the Convention and Strategic Plan. 	
Transnational		
<p>Climate Action Plan 2019: To Tackle Climate Breakdown (Department of Communications, Climate Action and Environment)</p>	<p>A Plan adopted by the Government of Ireland to reduce Greenhouse Gas Emissions, improve energy security and address current air pollutants in line with the United Nations Sustainable Development Goals which together, will help form and promote a sustainable economic development pathway for the population of Ireland. This is done through the provision of 183 actions that must be taken across the topics of Carbon Pricing and cross-cutting policies, electricity, enterprise, built environment, transport, agriculture/forestry/land use, waste and the circular economy, public sector leading by example, Irelands international action on climate breakdown, citizen engagement, community leadership/Just Transition and Adaptation.</p>	<p>Biodiversity, Population and Human Health, Climate</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>Ensuring a Sustainable Transport Future: A New Approach to Regional transportation (Department for Regional Development, 2011)</p>	<p>This document sets out the Department for Regional Development's new approach to regional transportation and particularly future decisions on investment. This policy outlines Strategic Performance Indicators which must be used for a benchmark, and thereafter, biennial status reports are published to monitor progress and to develop new Strategic Performance Indicators dependent on each report's findings.</p>	<p>Air, population and human health</p>
<p>River Basin Management Plan for Ireland 2018-2021</p>	<p>The Plan sets out the actions that Ireland will take to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2027. Ireland is required to produce a river basin management plan under the Water Framework Directive (WFD). An enhanced evidence base has been developed to guide national policies and the targeting of local measures. Technical assessments of 4,829 water bodies have been carried out, examining their status (quality) and whether they are 'at risk' of not meeting status objectives in the future. Using this information, the River Basin Management Plan sets out national policies and regional prioritised measures. It builds on lessons learned from the first planning cycle in a number of areas:</p> <ul style="list-style-type: none"> • Stronger and more effective delivery structures have been put in place to build the foundations and momentum for long-term improvements to water quality • A new governance structure, which brings the policy, technical and implementation actors together with public and representative organisations. This will ensure the effective and coordinated delivery of measures. • The newly-established Local Authority Waters and Communities Office will help people to get involved in improving water quality at a local level. An Fóram Uisce, also newly established, is a forum for stakeholders, community groups and sectoral representatives. It will analyse and raise awareness of water issues. <p>Among the main actions that will be taken through the Plan are:</p>	<p>Water</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<ul style="list-style-type: none"> • Improved wastewater treatment: €1.7 billion in investment by Irish Water in over 250 wastewater treatment projects between 2017 and 2021. This will help improve water quality and prevent deterioration of quality in targeted water bodies, including ‘protected areas’. • Conservation and leakage reduction: Irish Water will implement important measures to make water use more sustainable and efficient, reducing leakage in our water network from 45% of all water produced down to 37% by 2021, based on 2017 figures. • Scientific assessments of water bodies and implementation of local measures by 43 new, specialist, local authority investigative assessment personnel: they will carry out scientific assessments of water bodies and lead on local implementation measures. • A new collaborative Sustainability and Advisory Support Programme: this partnership between the State and the dairy industry, consisting of 30 Sustainability Advisers, will promote best farming practice in 190 areas chosen for action, for up to 5,000 farmers. • Dairy Sustainability Initiative to help improve water quality: 18,000 dairy farmers to receive advice on sustainable farming practices in the 190 areas for action. • The development of water and planning guidance for local authorities: this will help local authorities to consider the risks to water quality during planning and development decision-making. • Extension of the Domestic Waste Water Treatment Systems grant scheme: the scheme will assist with the costs of septic tank remediation in High Status water areas. • A Blue Dot Catchments Programme: the new programme will create a network of excellent river and lake areas. Agencies will work together to protect or restore excellent water quality in these water bodies. 	

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<ul style="list-style-type: none"> • A new Community Water Development Fund: this will enable and support community water initiatives. 	
<p>Interim Guidelines for Planning Authorities on Statutory Plans, Renewable Energy and Climate Change – July 2017</p>	<p>These interim guidelines state that local authority development plans are a critical part of translating overall national policy on energy, renewable energy and wind energy in a manner that supports the achievement of Ireland’s international obligations relating to climate change and renewable energy and taking account of local circumstances. As provided for in section 10(2) (n) of the Planning and Development Act (2000), as amended, (the Act), development plans are required to include objectives to mitigate against climate change and reduce reliance on fossil fuels.</p>	<p>Climate, Air & Human Beings</p>
<p>Ireland’s National Biodiversity Plan 2017-2021 (Dept. of Arts, Heritage and the Gaeltacht, 2017)</p>	<p>A national action plan to tackle the loss of biodiversity through 7 overarching objectives:</p> <ul style="list-style-type: none"> • Mainstream biodiversity into decision-making across all sectors • Strengthen the knowledge base for conservation, management and sustainable use of biodiversity • Increase awareness and appreciation of biodiversity and ecosystem services • Conserve and restore biodiversity and ecosystem services in the wider countryside • Conserve and restore biodiversity and ecosystem services in the marine environment • Expand and improve management of protected areas and species • Strengthen international governance for biodiversity and ecosystem services 	<p>Biodiversity</p>
<p>Irish Geological Heritage (IGH) Programme (GSI 1998)</p>	<p>This Programme has been set up to protect and promote Irish sites of international and national geological importance</p>	<p>Soils, Land use and Geology</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>Climate Action Plan 2019 To Tackle Climate Breakdown</p>	<p>Ireland will support the ambition emerging within the European Union to achieve a net zero target by 2050, the plan commits to evaluate in detail the changes required to adopt such a goal in Ireland. Key features of the approach adopted in the plan include:</p> <ul style="list-style-type: none"> • A five year Carbon Budget and sectoral targets with a detailed plan of actions to deliver them • A Climate Action Delivery Board overseen by the Department of the Taoiseach to ensure delivery • An independent Climate Action Council to recommend the Carbon Budget and evaluate policy • Strong accountability to an Oireachtas Climate Action Committee • Carbon proofing all Government decisions and major investments <p>A detailed sectoral roadmap has been set out, which is designed to deliver a cumulative reduction in emissions, over the period 2021 to 2030, of 58.4 MtCO₂eq. outside the ETS, 17 MtCO₂eq. within the ETS, and 26.8 MtCO₂eq. from land use. The following sectoral targets are relevant:</p> <p>Electricity</p> <ul style="list-style-type: none"> • Increase reliance on renewables from 30% to 70% adding 12GW of renewable energy capacity (with peat and coal plants closing) with some of this delivered by private contracts • Put in place a coherent support scheme for micro-generation with a price for selling power to the grid Buildings • Introduce stricter requirements for new buildings and substantial refurbishments 	<p>Climate</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<ul style="list-style-type: none"> • Increase attention to Energy and Carbon ratings in all aspects of managing property assets <p>Transport</p> <ul style="list-style-type: none"> • Accelerate the take up of EV cars and vans so that we reach 100% of all new cars and vans being EVs by 2030. This will enable achieving our target of 950,000 EVs on the road by 2030. This means approximately one third of all vehicles sold during the decade will be Battery Electric Vehicle (BEV) or Plug-in Hybrid Electric Vehicle (PHEV) • Make growth less transport intensive through better planning, remote and home-working and modal shift to public transport • Set targets for the conversion of public transport fleets to zero carbon alternatives <p>Enterprise and Services</p> <ul style="list-style-type: none"> • Embed energy efficiency, replacement of fossil fuels, careful management of materials and waste, and carbon abatement across all enterprises and public service bodies • Mobilise clusters regionally and sectorally to become centres of excellence for the adoption of low carbon technologies <p>Waste and the Circular Economy</p> <ul style="list-style-type: none"> • Develop coherent reduction strategies for plastics, food waste, and resource use • Increase the level and the quality of recycling, with less contamination and greater replacement of virgin materials by recycling. • Eliminate non-recyclable plastic 	

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<ul style="list-style-type: none">• Reduce the reliance on landfill with sharp reductions in plastics and compostables entering landfill.	

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>National Adaptation Framework, Planning for a Climate Resilient Ireland, 2018</p>	<p>Ireland's first statutory National Adaptation Framework (NAF) was published in January 2018. The NAF sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change. The NAF was developed under the Climate Action and Low Carbon Development Act 2015. In relation to the 'Built Environment and Spatial Planning' it states that</p> <p>'It is clear that climate change considerations need to be taken into account as a matter of course in planning-related decision making processes and that the deepening of adaptation considerations in the planning and building standards processes is considered the most appropriate way of increasing the resilience of the built environment.</p> <p>Integrating climate considerations into decision making should ensure that inappropriate forms of development in vulnerable areas are avoided and compact development in less vulnerable areas is promoted.</p> <p>Other considerations include the spatial implications of water stress. Land use policies may also facilitate the conversion or maintenance of land at risk of flooding to less vulnerable uses (e.g. parks, gardens and open spaces for natural habitats, etc.).</p> <p>Local Authorities are required to prepare Adaptation Strategies and the Guidelines for their preparation recommend that, once approved, strategies should be used to assess the adaptation fitness of spatial plans and ensure that climate change adaptation considerations are mainstreamed into the process.</p> <p>The measures proposed by the National Mitigation Plan lay the foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. The Plan includes over 100</p>	<p>Climate, Air & Human Beings</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<p>individual actions for various Ministers and public bodies to take forward as we move towards implementation.</p> <p>Chapter 4 outlines proposals to ‘Decarbonise the Built Environment’, with the overall objective of use less energy and for most of the energy to come from low or zero-carbon fuels. This can be achieved by ensuring that new buildings are low or “nearly zero emission” standard and energy efficiency upgrades, known as retrofits, are carried out with respect to the existing building stock. The mitigation plan states that ‘as well as expecting buildings to consume much less energy, the mix of fuels providing that energy should be transitioning to a much lower carbon content.’</p>	

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>National Biodiversity Action Plan</p>	<p>National Biodiversity Action Plan for 2017-2021 demonstrates Ireland’s continuing commitment to meeting and acting on its obligations to protect our biodiversity for the benefit of future generations through a series of targeted strategies and actions. The Plan sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland’s ‘Vision for Biodiversity’ and follows on from the work of the first and second National Biodiversity Action Plans. It has been developed in line with the EU and International Biodiversity strategies and policies. 119 targeted actions are contained in the Plan, underpinned by seven strategic objectives. The objectives lay out a clear framework for Ireland’s national approach to biodiversity, ensuring that efforts and achievements of the past are built upon, while looking ahead to what can be achieved over the next five years and beyond. They include:</p> <ul style="list-style-type: none"> • mainstreaming biodiversity across the decision making process in the State; • strengthening the knowledge base underpinning work on biodiversity issues; • increasing public awareness and participation; • ensuring conservation of biodiversity in the wider countryside; • ensuring conservation of biodiversity in the marine environment; • expanding and improving on the management of protected areas and protected species; • enhancing the contribution to international biodiversity issues. <p>The National Biodiversity Plan is aspirational in nature and does not benefit from any policy or legislative support.</p>	<p>Biodiversity</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>National Climate Change Policy,2013</p>	<p>The extent of the challenge to reduce Green House Gas (GHG) emissions in line with our International and EU obligations is reflected in the National Policy Position on Climate Action and Low Carbon Development (2014) and the Climate Action and Low Carbon Development Act 2015. The National Policy Position establishes the fundamental national objective of achieving transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. ‘</p> <p>It clarifies the level of GHG mitigation ambition envisaged; and establishes the process to pursue and achieve the overall objective. Specifically, the National Policy Position envisages that policy development will be guided by a long-term vision based on:</p> <ul style="list-style-type: none"> • an aggregate reduction in carbon dioxide (CO2) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors, • in parallel, an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production. 	<p>Climate, Air & Human Beings</p>
<p>National Cycle Policy Framework (Dept. of Transport, Tourism and Sport)</p>	<p>The mission of the National Cycle Policy Framework is to create a strong cycling culture in Ireland. the Framework can provide a common, integrated basis for the long term development and implementation of cycling policies among various sectors and levels of government. The preparation, and implementation, of an NCPF is part of the contribution to a sustainable travel vision and contributes to cultural development. The objectives developed in the policy document cover; Infrastructure, Communication/Education, Financial Resources, Legislation and Enforcement, Human Resources and Coordination, and Evaluation and Effects. They are listed as follows:</p> <ul style="list-style-type: none"> • Objective 1: Support the planning, development and design of towns and cities in a cycling and pedestrian friendly way. 	<p>Air, Population and Human Health</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<ul style="list-style-type: none"> • Objective 2: Ensure that the urban road infrastructure (with the exception of motorways) is designed/retrofitted so as to be cyclist-friendly and that traffic management measures are also cyclist friendly. • Objective 3: Provide designated rural cycle networks especially for visitors and recreational cycling. • Objective 4: Provide cycling-friendly routes to all schools, adequate cycling parking facilities within schools, and cycling training to all school pupils. • Objective 5: Ensure that all of the surfaces used by cyclists are maintained to a high standard and are well lit. • Objective 6: Ensure that all cycling networks - both urban and rural - are signposted to an agreed standard. • Objective 7: Provide secure parking for bikes; • Objective 8: Ensure proper integration between cycling and public transport. • Objective 9: Provide public bikes in cities. • Objective 10: Improve the image of cycling and promote cycling using “soft interventions” such as promotional campaigns, events etc. • Objective 11: Improve cyclists’ cycling standards and behaviour on the roads. • Objective 12: Improve driver education and driving standards so that there is a greater appreciation for the safety needs of cyclists. • Objective 13: Support the provision of fiscal incentives to cycle. • Objective 14: Provide appropriate levels of, and timely, financial resources towards implementing the NCPF. • Objective 15: Introduce changes to legislation to improve cyclist safety. • Objective 16: Improve enforcement of traffic laws to enhance cyclist safety and respect for cyclists. 	

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<ul style="list-style-type: none"> Objective 17: Develop a structure that can coordinate the implementation of activities across the many Government Departments, Agencies and NGO's. Objective 18: Provide design professionals with suitable training / guidance to develop and implement the policies of the NCPF. Support the deepening of knowledge of the subject of planning for cyclists in Ireland. Objective 19: Evaluate the cycling policy and monitor the success as the measures are implemented. 	
<p>National Landscape Strategy for Ireland (Draft) 2014 – 2024 (DAHG, 2014)</p>	<p>The National Landscape Strategy for Ireland 2015-2025 (NLS) was published in line with the European Landscape Convention, of which Ireland is a signatory. This strategy places importance on the protection of landscape and sets out high level objectives and actions to support this protection. With regard to threats/opportunities to the landscape, the NLS states that “a broad range of national and sectoral policies and activities can have considerable effects – positive and negative – on landscape character or quality, including agriculture, forestry, marine, industry, energy, spatial and development planning, transport, infrastructure, tourism, recreation, natural and cultural heritage, and economic planning</p>	<p>Cultural heritage</p>
<p>National Mitigation Plan, 2017</p>	<p>The measures proposed by the National Mitigation Plan lay the foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. The Plan includes over 100 individual actions for various Ministers and public bodies to take forward as we move towards implementation. Chapter 4 outlines proposals to ‘Decarbonise the Built Environment’, with the overall objective of use less energy and for most of the energy to come from low or zero-carbon fuels. This can be achieved by ensuring that new buildings are low or “nearly zero emission” standard and energy efficiency upgrades, known as retrofits, are carried out with respect to the existing building stock. The mitigation plan states that ‘as well as expecting buildings to consume much less energy, the</p>	<p>Climate, Biodiversity, Population and Human Health</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	mix of fuels providing that energy should be transitioning to a much lower carbon content.'	
National Planning Framework 2040: Our Plan	The National Planning Framework (NPF2040) is the national planning policy providing overarching guidance for the provision of land use, housing provision and overall development from 2018-2030.	All
Natural Heritage Areas and proposed Natural Heritage Areas	<p>Natural Heritage Areas (NHA) are areas that are considered to be important for the habitats present or for the species of plants and animals supported by those habitats. Under the Wildlife Amendment Act 2000, NHAs are legally protected from damage from the date they were formally proposed for designation. Section 19(1) of the Act states that 'Where there is a subsisting natural heritage area order in respect of any land, no person shall carry out, or cause or permit to be carried out, on that land any works specified in the order or any works which are liable to destroy or to significantly alter, damage or interfere with the features by reason of which the designation order was made'.</p> <p>In addition, a list of proposed NHAs (pNHAs) was published in 1995 but to date these have not had their status confirmed. Prior to statutory designation, pNHAs are subject to limited protection under various agri-environment and forestry schemes and under local authority planning strategies such as County Development Plans.</p>	Biodiversity
Prioritised Action Framework for Natura 2000 (Dept. of the Environment, 2012)	This document provides an overarching funding framework for priority actions which underpin protecting habitats and birds. This document is to be utilised in tandem with the Habitats and Birds Directives.	Biodiversity

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>Smarter Travel: A Sustainable Transport Future, 2009 – 2020</p>	<p>SmarterTravel, A Sustainable Transport Future, is the transport policy for Ireland for the period 2009-2020. In addition to prudent investment in new infrastructure, this document sets out necessary steps to ensure that people choose more sustainable transport modes such as walking, cycling and public transport. This key national policy has sustainability at its core and clearly indicates that future population and economic growth will have to take place predominantly in sustainable, compact urban and rural areas which discourage dispersed development and long commuting. This document sets out national transport policy according to five key goals:</p> <ul style="list-style-type: none"> • To reduce overall travel demand; • To maximise the efficiency of the transport network; • To reduce reliance on fossil fuels; • To reduce transport emissions; and • To improve accessibility to transport. 	<p>Climate and Air</p>
<p>The National Landscape Strategy for Ireland 2015-2025</p>	<p>The National Landscape Strategy for Ireland 2015-2025 (NLS) was published in line with the European Landscape Convention, of which Ireland is a signatory. This strategy places importance on the protection of landscape and sets out high level objectives and actions to support this protection. With regard to threats/opportunities to the landscape, the NLS states that “a broad range of national and sectoral policies and activities can have considerable effects – positive and negative – on landscape character or quality, including agriculture, forestry, marine, industry, energy, spatial and development planning, transport, infrastructure, tourism, recreation, natural and cultural heritage, and economic planning</p>	<p>Cultural heritage</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>The National Mitigation Plan, 2017</p>	<p>The measures proposed by the National Mitigation Plan lay the foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. The Plan includes over 100 individual actions for various Ministers and public bodies to take forward as we move towards implementation. Chapter 4 outlines proposals to ‘Decarbonise the Built Environment’, with the overall objective of use less energy and for most of the energy to come from low or zero-carbon fuels. This can be achieved by ensuring that new buildings are low or “nearly zero emission” standard and energy efficiency upgrades, known as retrofits, are carried out with respect to the existing building stock. The mitigation plan states that ‘as well as expecting buildings to consume much less energy, the mix of fuels providing that energy should be transitioning to a much lower carbon content.’</p>	<p>Climate, Air, Population and Human Health</p>
<p>The Wildlife Acts 1976 – 2012</p>	<p>Flora and fauna in Ireland are protected at a national level by the Wildlife Acts 1976 – 2012 and the Flora (Protection) Order 2015.</p> <p>Wildlife Act 1976 The Wildlife Act 1976 provides additional protection for certain species. Section 23 makes it an offence to:</p> <ul style="list-style-type: none"> • hunt a protected wild animal, • injure a protected wild animal, • wilfully interfere with or destroy the breeding place of any protected wild animal, • Other than when certain exemptions apply. <p>Species protected under the Act are those listed on Schedule 5. Since the publication of the Wildlife Act 1976, the list of Schedule 5 species has been extended through the publication of Wildlife Act 1976 (Protection of Wild Animals) Regulations in 1980 and 1990.</p>	<p>Biodiversity</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<p>Section 23(7) establishes that the offences described under Section 23 shall not apply for a person:</p> <ul style="list-style-type: none"> • who is engaged in agriculture, fishing or forestry, or in zoology or in any other scientific pursuit, and who unintentionally injures or kills a protected wild animal, or • who is engaged in these activities interferes with or destroys the breeding place of such an animal, or • who is constructing a road or carrying on any archaeological operation, building operation or work of engineering construction, kills or injures such an animal or destroys or injures the breeding place of such an animal, or • who captures an injured or disabled protected wild animal for the purpose of killing it humanely or with the intention of tending it and of later releasing it, or • who kills humanely a protected wild animal which is injured. <p>Wildlife (Amendment) Act 2000 The Wildlife (Amendment) Act 2000 sets out various amendments to the Wildlife Act 1976 that generally provide clarification and, in some cases, provide additional protection. Through this legislation Section 21(3) of the Wildlife Act 1976 was amended so that it is now an offence to:</p> <ol style="list-style-type: none"> a) cut, pick, collect, uproot or otherwise take, injure, damage, or destroy any specimen [plant] to which this section applies or the flowers, roots, seeds, spores or other part of such specimen, b) purchase, sell, keep for sale, transport for sale or exchange, offer for sale or exchange or be in possession of any such specimen whether alive or dead or the flowers, roots, seeds, spores or any part, product or derivative thereof; 	

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<p>c) Section 22(g) of the Wildlife Act 1976 now makes it an offence to destroy or remove a nest which is built in or on an occupied building if the nest contains the eggs or young of a protected wild bird.</p> <p>d) Section 23(5)(d) of the Act has extended the legal protection to include the resting places of protected wild animals such that it is now an offence to wilfully interfere with or destroy the breeding place or resting place of any protected wild animal.</p> <p>Flora Protection Order 2015 The current list of plant species protected by Section 21 of the Wildlife Act, 1976 is set out in the Flora (Protection) Order, 2015, which supersedes orders made in 1980, 1987 and 1999.</p> <p>It is illegal to cut, uproot or damage the listed species in any way, or to offer them for sale. This prohibition extends to the taking or sale of seed. In addition, it is illegal to alter, damage or interfere in any way with their habitats. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation. The plant species protected by the Flora (Protection) Order 2015 are listed on five schedules, A - E.</p> <p>Under Section 21 of the Wildlife Act a person may apply for a licence to take, alter or otherwise interfere, with the habitat or environment of a species of protected flora. Licences will only be issued in the absence of any viable alternative and where no significant damage will be caused to the conservation status of the species and where the adverse impact on the local population of species is kept to a minimum.</p>	
<p>Government of Ireland. Outdoor Recreation Plan for Public Lands and Waters in Ireland 2017-2021: https://www.coillte.ie/media/2017/06/GRP_Screen.pdf</p>	<p>Let by the Department of Culture Heritage and the Gaeltacht (DCHG), the Plan was prepared jointly by Coillte, NPWS, Waterways Ireland, Bord na Móna and Inland Fisheries Ireland.</p>	<p>Population and Human</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<p>It was developed by five public landowning organisations as ‘creating step change’ in delivery of outdoor recreation opportunities on public lands and waters, comprising 15% of Ireland’s land surface.</p> <p>It focused on 7 strategic themes:</p> <ul style="list-style-type: none"> (i) managing & maintenance of recreational infrastructure; improving recreational facilities; (ii) developing consistent standards; (iii) promotion of outdoor recreation; (iv) professional development of staff; (v) developing a culture of outdoor recreation and volunteering in Ireland; and (vi) maximising the benefits to communities. <p>The Outdoor Recreation Plan (2017-2021) estimates the value of outdoor recreation annually to Ireland’s economy is €1.2 billion. Also estimated that €165 million investment is required over five years (2017-2021) to manage, maintain and upgrade the recreational assets on public lands, with the potential to generate an additional €142 million per annum as the market grows.</p>	<p>Health, Biodiversity</p>
<p>RSES for the Southern Region</p>	<p>The RSES for the Southern Region identifies the role of the Limerick – Shannon Metropolitan Area. It refers to Limerick City as Ireland’s third largest city. The nearby town of Shannon in Co. Clare is a significant employment centre with assets such as Shannon International Airport, Shannon Free-Zone and the International Aviation Services Centre (IASC).</p> <p>Nenagh is identified as a Key Town with major synergies with MASP (Metropolitan Area Strategic Plan). Nenagh and its hinterland area have potential as a location for a vibrant and diverse enterprise mix including major research and development functions, tourism, water-based and outdoor recreation, renewable energy and emerging sectors such as agritech, life sciences, financial services and engineering.</p>	<p>Population and Human Health, Biodiversity</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<p>Regional policy in relation to Nenagh highlights high quality of life, strong retail offering, attractive town centre, vibrant cafe and restaurant offering as well as</p> <ul style="list-style-type: none"> • Delivery of the Nenagh Traffic Management plan and associated public realm works and a Local Transport Plan • Continued investment and development of the historic core of the town as a key driver of tourism. Identification and development of Nenagh as the Gateway to Ireland’s Hidden Heartlands. • Proximity to Lough Derg and the Silvermines Mountains and tourism-focused settlements such as Ballina, Killaloe and Dromineer <p>Examples of attractions in the Mid-West include, inter alia, the promotion of Ireland’s Lakelands, the Shannon Estuary and its islands as tourism and recreation destination, greenways, blueways, effective place making, Munster Vales, the Burren, Cliffs of Moher, West Clare NST tourism route, Loop Head, Bunratty, Holy Island, Lough Derg, Shannon Estuary Way, festivals (e.g. Willie Clancy Festival), Limerick City’s St. Johns Castle. It is an objective to support utilisation and realisation of the Mid-West’s existing and emerging tourism assets.</p> <p>It states that promotion of enhanced transport networks including public transport services is essential to attract and enable ease of movement around the region by tourists and visitors. Improvements are needed at key arrival points such Ferry Ports with better public transport connections and improvements to the existing road and rail networks/services to remove bottlenecks and increase and improve connectedness to and between key tourism destinations. The identification of strategic corridors can assist in the development of the network between our cities, towns and rural areas.</p>	

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<p>Regional Policy Objective 51: Tourism It is an objective to:</p> <ul style="list-style-type: none"> a. Enhance provision of tourism and leisure amenity to cater for increased population in the Region including recreation, entertainment, cultural, catering, accommodation, transport and water infrastructure inter alia; b. Promote activity tourism; c. Sustainably develop the road network and public transport services and facilities for improved visitor access, longer dwell times due to improved connectivity to ports and airports and tourism growth; d. Sustainably develop walking and cycling trails opening greater accessibility to the marine and countryside environment by sustainable modes and promote the sustainable designation and delivery of Greenway and Blueway Corridors. e. facilitate appropriate tourism development and in particular a National Greenways, Blueways and Peatways Strategy, prioritising sustainable projects that achieve maximum impact and connectivity at national and regional level; f. identify and map catchment areas concerning Culture, Heritage and Tourism of regional significance/scale. Such catchments should have the potential to deliver small scale economic development and using wider local services such as Post Offices and local public transport. g. Support the relevant authorities in the development of specific monitoring protocols for visitor pressure to ensure that tourism activities are maintained within sustainable limits for the European sites in the region. 	

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>RSES for the Eastern and Midlands Regional Assembly</p>	<p>Athlone’s central and accessible location nationally at a key nodal point between Dublin and Galway and at a principal crossing point on the River Shannon further enhances its role and potential. Athlone’s strong historic and cultural core, along with its attractive natural environment along the banks of the River Shannon, provides for significant tourism opportunities and an enhanced quality of life for both residents and visitors to the town.</p> <p>In order to enhance co-ordination of development in Athlone where the town and its environs lie within the combined functional area of two Local Authorities, the preparation and adoption of a Joint Urban Area Plan (UAP) shall be a priority for Westmeath County Council and Roscommon County Council following the adoption of the RSES.</p> <p>The Joint UAP shall support and provide for an enhanced urban environment and improve sustainable modes of transport with a particular focus on the following key objectives:</p> <ul style="list-style-type: none"> • Support the implementation of the Athlone Waterfront Strategy (2011) to provide for a strategic approach to waterfront management, amenity provision, tourist related developments and environmental awareness along the waterfront within the town. • Support construction of a new pedestrian and cycleway bridge across the River Shannon in Athlone as part of the Galway to Dublin Cycleway. • Support the role of lands on the Western Bank as a Cultural and Tourism Quarter. • Support public realm enhancement works along the River Shannon’s waterfront at The Quay and along The Strand to maximise tourist footfall along the river. • Provide for a public park within the Monksland/ Bellanamullia (Athlone West) LAP lands. 	<p>Population and Human Health</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
	<ul style="list-style-type: none"> • Provide a walkway and nature park adjacent to the Cross River. <p>Significant opportunities to develop a number of flagship greenways in the Region are highlighted. They are;</p> <ul style="list-style-type: none"> • Greenways: The Dublin-Galway National Cycling Greenway offers potential to link the marketing of the Wild Atlantic Way, Ireland’s Ancient East and the Hidden Heartlands and connect to the EuroVelo network of long-distance European cycling trails. Other regional greenways under development include the Old Rail Trail between Athlone to Mullingar, which highlights the potential to develop disused railway lines in the Region. • Blueways: The development of navigable inland waterways in collaboration with Waterways Ireland including; the Shannon and Shannon-Erne connecting the islands of Lough Ree, Clonmacmoise and Shannon Harbour; linking the Royal Canal with the Grand Canal along the River Shannon. • Peatways: There is potential in the midlands to develop a regional peatway interconnecting a range of biodiversity and cultural hotspots such as the Mesolithic (first settlers) site in Lough Boora, Co. Offaly and the Iron Age bog road in Corlea, Co. Longford. 	
<p>RSES for the Northern and Western Regional Assembly Area</p>	<p>The Draft RSES provides for targeted growth in the Regional Centres and the network of Key Towns will take the lead in a regional context. In order to address the weak urban structure in the northern and western region, it is necessary to target growth of the Regional Centres by at least 40% and the Key Towns to have a targeted growth of at least 30%.</p>	<p>Population and Human Health</p>
<p>National</p>		

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>A Biodiversity Strategy for Northern Ireland to 2020 (Department of the Environment, 2015)</p>	<p>The Strategy sets out how Northern Ireland plans to meet its international obligations and local targets to protect biodiversity and ensure that the environment can continue to support its people and economy. It builds upon the first Biodiversity Strategy published in 2002 but adopts the modern and internationally agreed approach that emphasises the management of biological systems to deliver the materials and services upon which people depend – the ecosystem services approach. While protection of individual species and habitats is essential, the thrust of the Strategy is to manage natural and man-modified systems to deliver a multitude of outputs which support society and the economy. Protection of individual species and habitats is both a tool for delivery and a result of this approach. However, recognition of and a focus upon ensuring the interconnectedness and complexity of biological systems enables a more coherent approach, producing an intelligible and evocative Strategy that makes it clear that biodiversity protection is absolutely fundamental to society and the economy.</p>	<p>Biodiversity</p>
<p>Programme for Government Framework (Northern Ireland Executive, 2016)</p>	<p>This programme is targeted at improving the well-being of the citizens of Northern Ireland through 12 outcomes:</p> <ul style="list-style-type: none"> • prosper through a strong, competitive, regionally balanced economy • live and work sustainably –protecting the environment • have a more equal society • enjoy long, healthy, active lives • an innovative, creative society, where people can fulfil their potential • more people working in better jobs • a safer community • care for each other and help those in need • a diverse society • create a place where people want to live and work • connect to people and opportunities through infrastructure <p>give children the best start in life</p>	<p>Population and Human Health</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
<p>A National Landscape Strategy for Northern Ireland (DAGH, 2011)</p>	<p>The National Landscape Strategy for Northern Ireland was created to promote landscape protection, management and planning, and to organise European cooperation on landscape issues and to facilitate sustainable management of change rather than the freezing of the landscape at a particular point in its evolution.</p>	<p>Landscape, Cultural Heritage</p>
<p>Air Quality Strategy for England, Scotland, Wales and Northern Ireland (DEFRA, 2007)</p>	<p>The Air Quality Strategy for England, Scotland, Wales and Northern Ireland is an air quality strategy which sets out air quality objectives and policy options to further improve air quality in the UK. This strategy contains several air quality policies (both amended and new) based on a thorough and detailed analysis of estimating reductions in emissions and concentrations from existing policies and new policy measures.</p> <p>This document outlines by pollutant what each objective is and the date it should be attained by and measures against European obligations. Particles, nitrogen dioxide, ozone, sulphur dioxide, polycyclic aromatic hydrocarbons, benzene, butadiene, carbon monoxide, lead, nitrogen oxides, are outlined as the pollutants to monitor.</p> <p>Of specific interest:</p> <ul style="list-style-type: none"> • Nitrogen Oxides objective is: 30µg.m-3 by December 2000 • Sulphur Dioxide objective is: 20µg.m-3 by December 2000 <p>Ozone objective is: Target value of 18,000µg m-3 based on AOT40 to be calculated from 1 hour values from May to July, and to be achieved, so far as possible, by January 2010</p>	<p>Transport, Climate and Human Beings</p>
<p>Fermanagh and Omagh Landscape Character Review (Fermanagh & Omagh District Council, 2018)</p>	<p>The Fermanagh and Omagh Landscape Character Review (2018) provides an in-depth review of the 2015 Landscape Character Assessment issued by the Fermanagh and Omagh District Council. This document provides a detailed cross-border analysis of landscape character types, area, sensitivity, capacity and other important factors on the overall landscape of the border region of Fermanagh and Omagh.</p>	<p>Landscape</p>

International / National / Regional	Outline of Targets and Objectives	SEA Topic
Fermanagh and Omagh Local Biodiversity Action Plan (Fermanagh and Omagh District Council, 2016)	This Biodiversity Action Plan is developed with the aim of conserving local habitats and species and to raise general awareness of biodiversity. This document, released in 2016, informs many planning related regulatory documents with conservation objectives and development control to preserve as much as is possible, the biodiversity of an area.	Biodiversity, Flora and Fauna
Draft Fermanagh & Omagh Local Development Plan 2030 (Fermanagh & Omagh District Council, 2018)	The Draft Local Development Plan provides the development guidance to planning related matters within the administrative area of Fermanagh & Omagh. It is relevant for cross-border development, guidance on tourism, cultural and natural heritage. The draft LDP has completed its statutory requirement for public consultation and is currently undergoing an independent examination. The adoption of the draft LDP is imminent.	All topics
Framework for Co-Operation – Spatial Strategies of NI and ROI	This document discusses the key planning challenges which are faced by both Northern Ireland and the Republic of Ireland jurisdictions and discusses the potential for cooperation in spatial planning. This framework discusses the key planning challenges which are faced by both jurisdictions on the island of Ireland and the cooperation strategies at different levels within the public sector which should result in mutual benefits both at the local and wider levels. This document is rooted in the RDS 2035 for Northern Ireland and the NSS in the Republic of Ireland to provide an all island development of urban and rural services for the efficient provision of infrastructure and services.	All topics

5.0 Environmental Baseline and Relevant Environmental Issues

5.1 Introduction

In order to assess the environmental effects of the Masterplan it is necessary to understand the present state of the environment (the baseline environment) of the area. In particular, aspects of the environment that are already experiencing specific issues have been highlighted in order to establish whether these issues are likely to worsen as a consequence of the masterplan.

The environmental baseline is analysed in accordance with SEA topic areas and under the following headings below.

- Biodiversity, Flora and Fauna
- Population and Human Health
- Geology, Soils and Land use
- Water
- Air
- Climate
- Material Assets
- Cultural Heritage (architectural and archaeological)
- Landscape
- The inter-relationship between these issues

Where possible, historical data and trends are outlined in order to provide a picture of the do nothing scenario; i.e. what would happen if current development trends in a certain area were to continue into the future.

5.2 Biodiversity, Flora and Fauna

The United Nations Convention on Biological Diversity (CBD) defines “biological diversity” (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 genetic diversity within species, between species and of ecosystems.

The Habitats Directive ensures the conservation of a wide range of rare, threatened or endemic animal and plant species. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora was adopted in 1992 and aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. It forms the cornerstone of Europe's nature conservation policy with the Birds Directive and establishes the EU wide Natura 2000 ecological network of protected areas, safeguarded against potentially damaging developments.

The Natura 2000 network of protected areas is known as Special Areas of Conservation (SAC) and Special Protection Areas (SPA). In general terms, they are considered to be of exceptional importance in terms of rare, endangered or vulnerable habitats and species within the European Community. The requirements of the Habitats Directive have been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I. No. 477/2011]. This legislation affords protection to both Special Protection Areas and Special Areas of Conservation.

5.2.1 Designated Sites

Special Areas of Conservation (SAC) are designated under the Conservation of Natural Habitats and of Wild Fauna and Flora Directive 92/43/EEC (Habitats Directive) which is transposed into Irish law by the EC (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). Special Protection Areas (SPA) are classified under the Birds Directive (2009/147/EC on the Conservation of Wild Birds).

Flora and fauna in Ireland are protected at a national level by the Wildlife Acts 1976 to 2012 and the Flora (Protection) Order 2015. Natural Heritage Areas (NHA) are areas that are considered to be important for the habitats present or for the species of plants and animals supported by those habitats. Under the Wildlife Amendment Act 2000, NHAs are legally protected from damage from the date they were formally proposed for designation. Section 19 (1) of the Act states that *'Where there is a subsisting natural heritage area order in respect of any land, no person shall carry out, or cause or permit to be carried out, on that land any works specified in the order or any works which are liable to destroy or to significantly alter, damage or interfere with the features by reason of which the designation order was made'*.

In addition, a list of proposed NHAs (pNHAs) was published in 1995 but to date these have not had their status confirmed. Prior to statutory designation, pNHAs are subject to limited protection under various agri-environment and forestry schemes and under local authority planning strategies such as County Development Plans.

As set out in the Natura Impact Report, the integrity of the 39 Natura 2000 sites is likely to be affected by increased human activity and the development and operation of associated supporting infrastructure and services within the core area of the Shannon Tourism Masterplan. Habitat loss and degradation could result from increased use of footpaths and water ways within Natura 2000 sites. Disturbance and resultant displacement of species such as birds and otter could occur due to proposed recreational activities and development in close proximity to the river and other key habitats. Water pollution could impact aquatic species such as lamprey (sea, river and brook) and salmon. These effects could result in population reduction through mortality or reduction in the distribution of habitat. Increased movement of people and transport of a wide area of countryside potentially in and out of number of Natura 2000 site also has high potential to spread non-native invasive species. The effects described could undermine the conservation objectives for the features of interest affected which would adversely affect the Natura 2000 sites.

Maps illustrating the location of Natura 2000 in the context of proposals in the Tourism Masterplan are provided below.

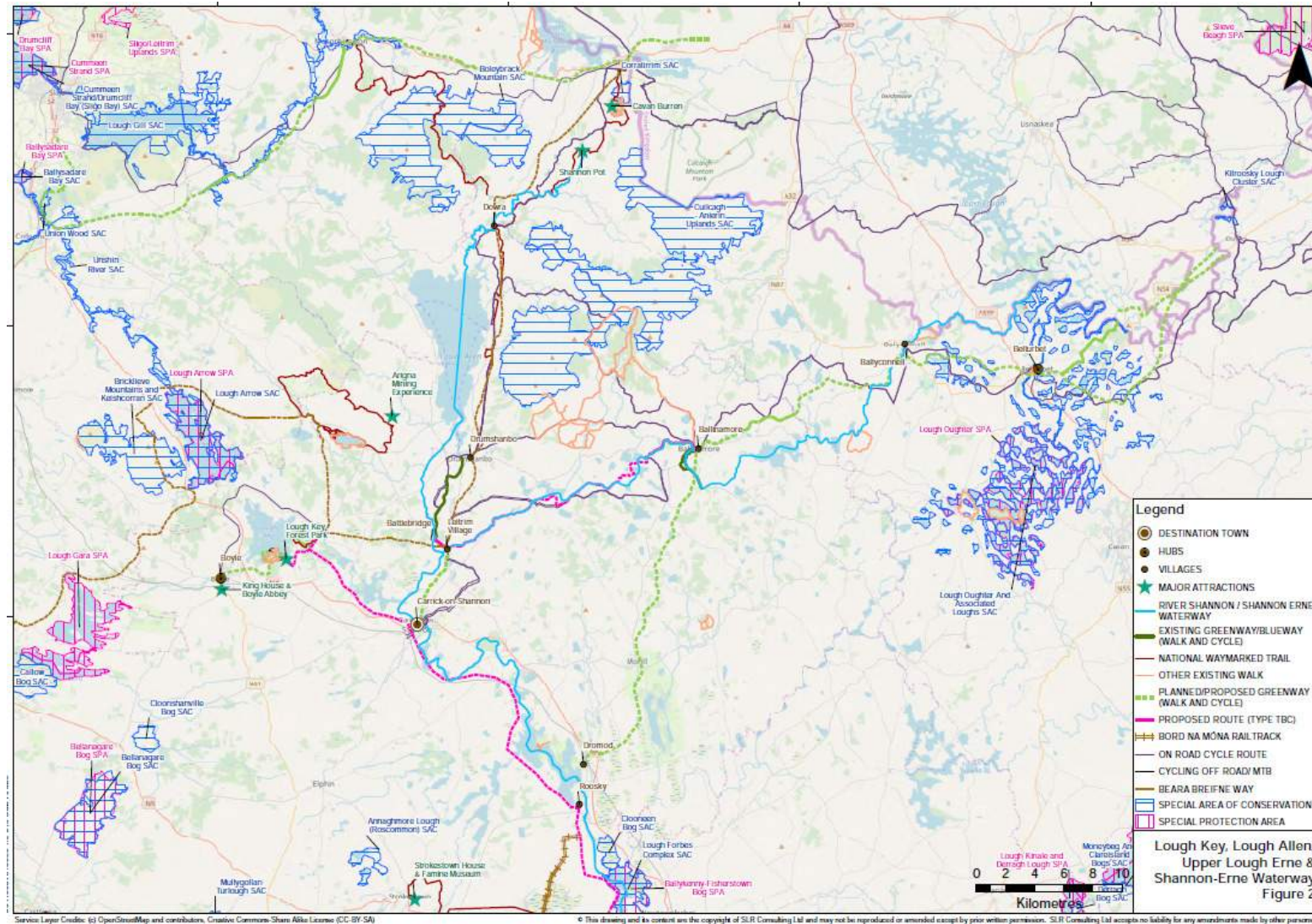


Figure 6 Location of Natura 2000 in the context of proposals in the Tourism Masterplan (North)

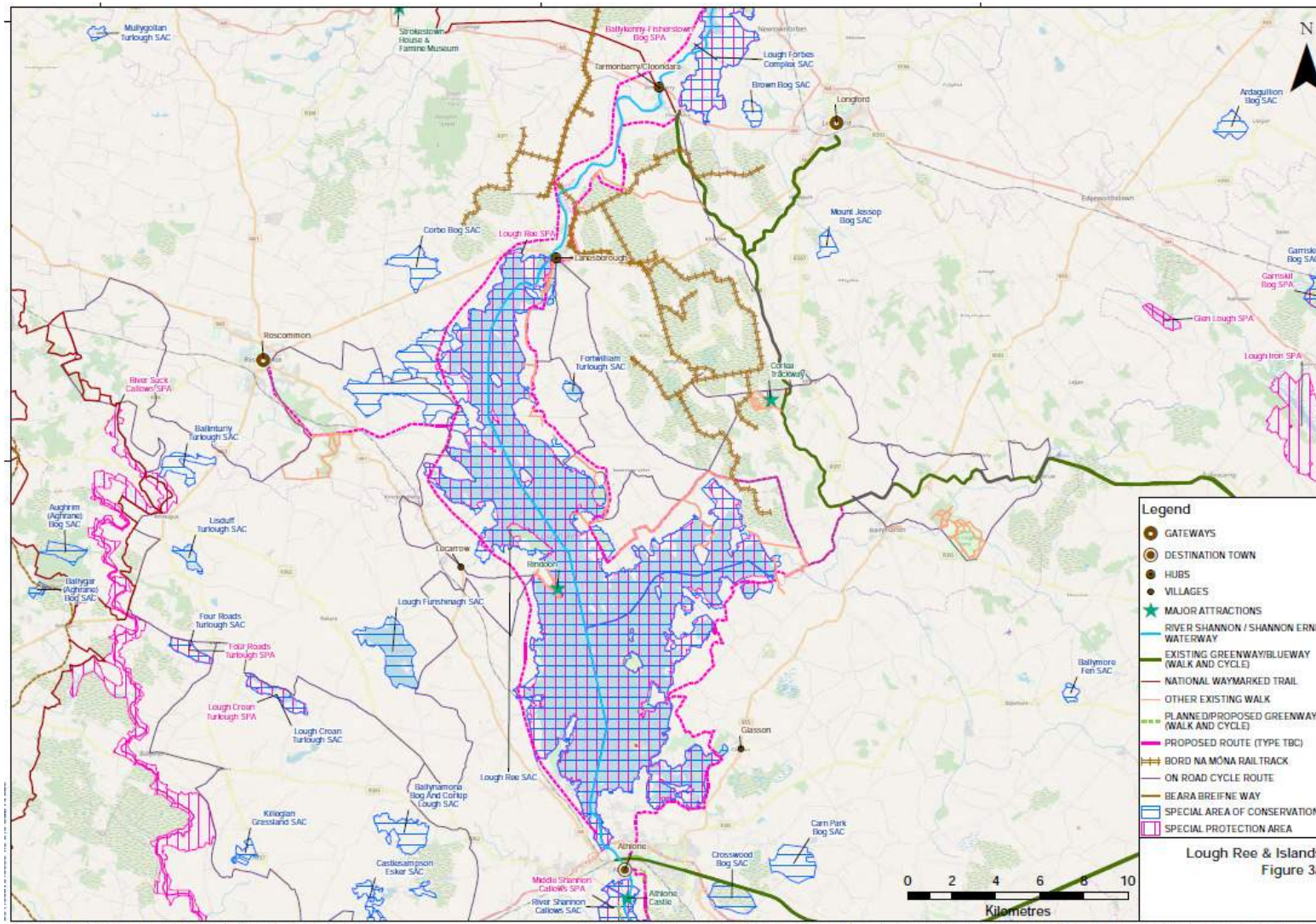


Figure 7 Location of Natura 2000 in the context of proposals in the Tourism Masterplan (Lough Ree)

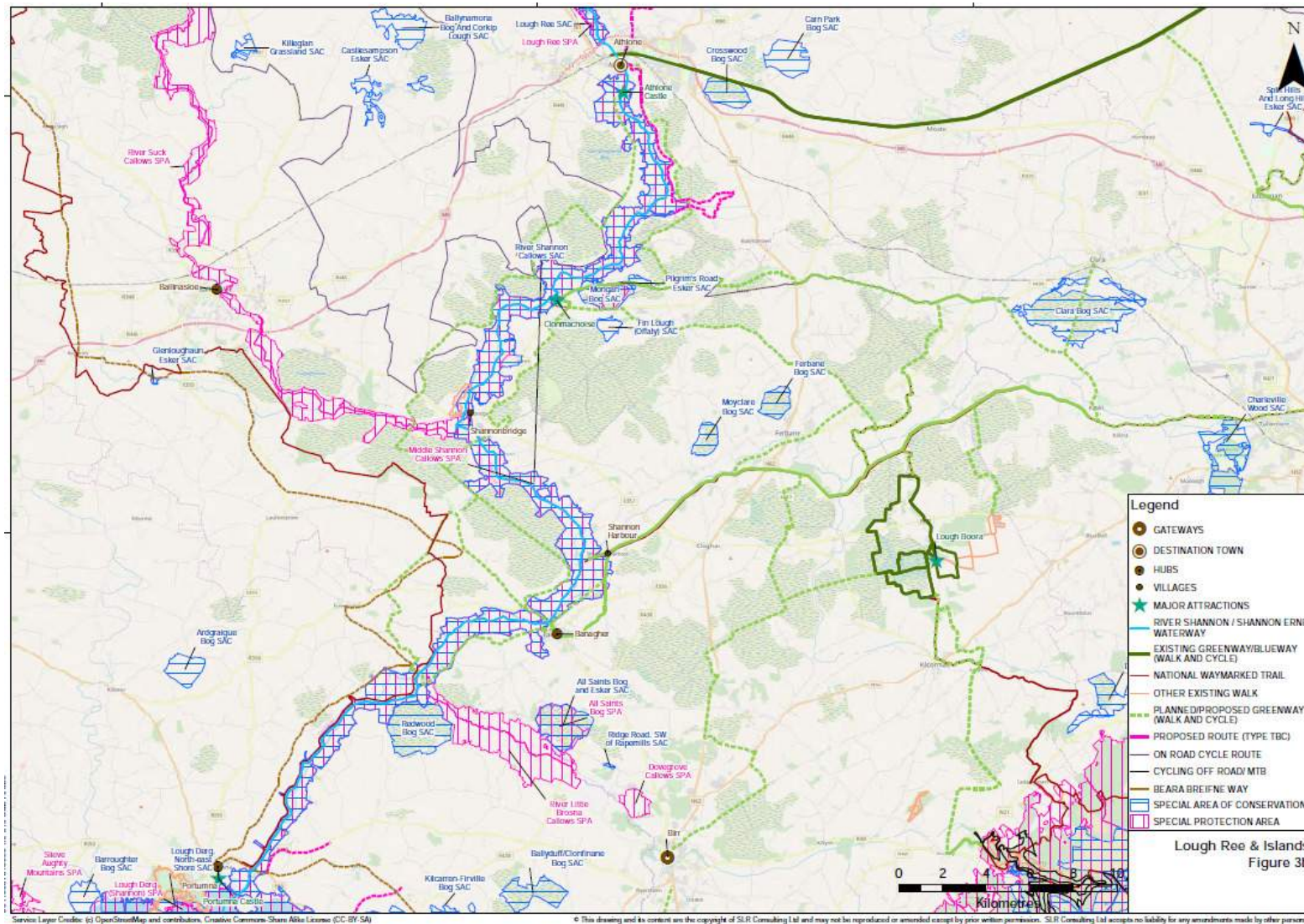


Figure 8 Location of Natura 2000 in the context of proposals in the Tourism Masterplan (Shannon Callows)

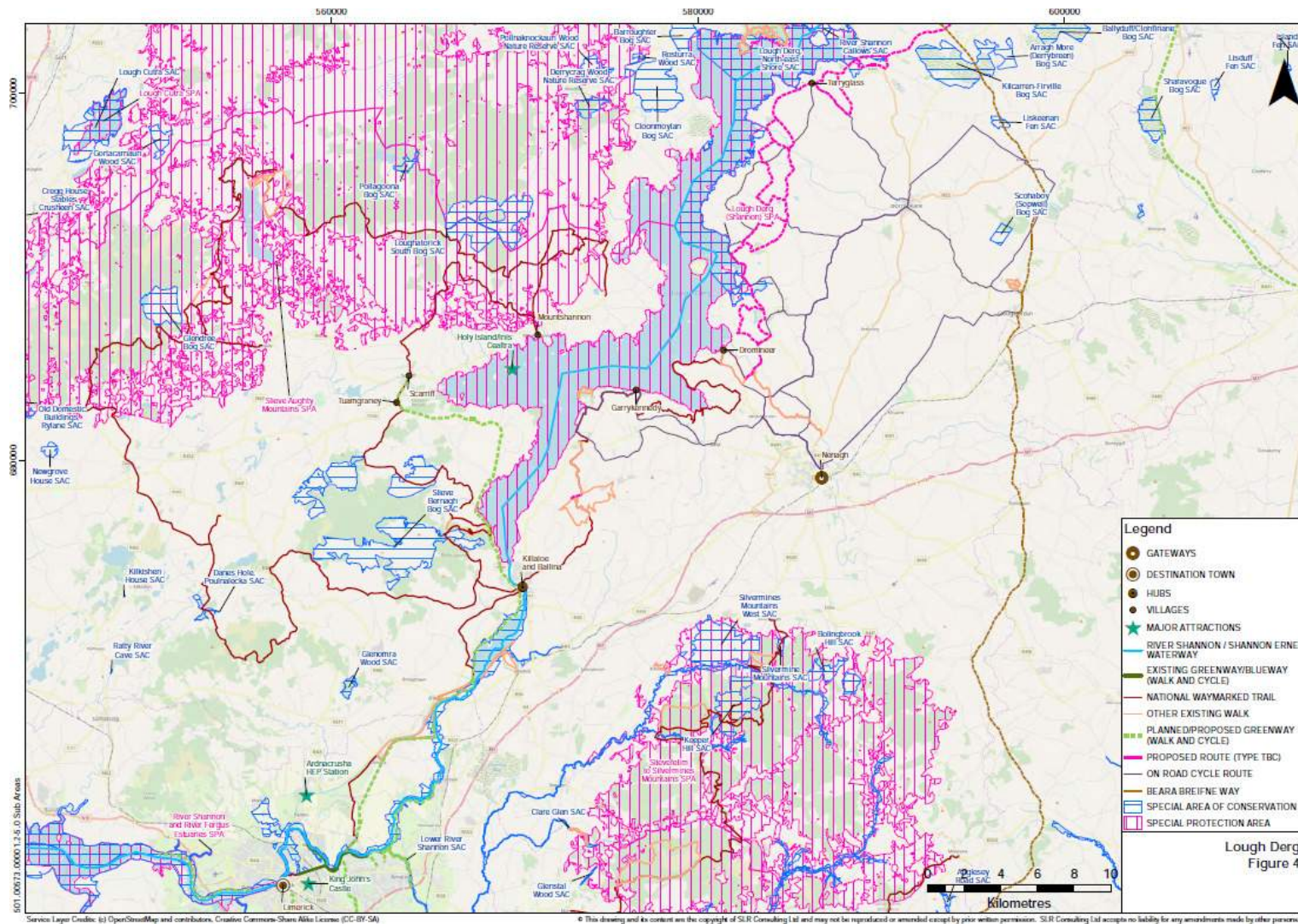


Figure 9 Location of Natura 2000 in the context of proposals in the Tourism Masterplan (Lower)

5.3 Biosecurity

Invasive species present issues which concern the whole of the island of Ireland and pose threat to biodiversity. Under the objective of conserving and restoring biodiversity and ecosystem services in the wider countryside the national biodiversity plan identifies Target 4.4. which is for 'Harmful invasive alien species to be controlled and there is reduced risk of introduction and/or spread of new species.

Regulations on the prevention and management of the introduction and spread of IAS came into force in the EU in 2015 (Regulation (EU) No. 1143/2014; EU, 2014). These regulations seek to protect native biodiversity and ecosystem services from damage caused by IAS, as well as minimising and mitigating the effects they can have on human health and the economy.

The Regulations require Member States to implement early warning and eradication systems for listed species as well as establishing border controls and licensing systems to manage trade. Individual countries are also required to prepare management plans for the eradication or containment of listed species.

The National Biodiversity Data Centre (NBDC) has also developed an online invasive species database and an early warning system. In 2014, a report entitled Ireland's Invasive and Non-native Species – Trends in Introductions was published by the centre (O'Flynn et al., 2014). This report found that 13% of invasive alien species recorded in Ireland are high-impact IAS. The percentage of high impact species in Ireland is similar to that reported for other European countries.

Species such as the zebra mussel was recorded in 70 lakes, which is an increase of 20 lakes from the known populations in the previous report. As one of the identified sectoral Impacts of Climate Change for Ireland, it is anticipated that projected shifts in climate, temperature and precipitation may result in the increased occurrence of invasive species and competitive pressures on Ireland's native species. (Source: Climate Ireland).

5.3.1 Biosecurity for Invasive Species

Boats and watercraft have been known to introduce and spread environmentally damaging organisms such as invasive species and fish pathogens between waterbodies. These organisms, species and pathogens are transferred between waterbodies via a boat's bilge, wet well water, trailers, outboard motors anchor chains and boat hulls.

While there are currently no official biosecurity plans in place within the existing Shannon Navigation area, there are several standard practices and measures which are currently employed by anglers and routine users of most waterbodies, particularly before and after entering different waterbodies. Such standard practices include:

- Before moving between watercourses, to stop the boat and visually inspect all exposed engine parts, hull, for attached plant or animal material and debris. If the debris is present:
 - remove and safely dispose of the debris;
 - clean and disinfect all livewells and baitwells or any other source of contaminant water with aquatic disinfectant;
 - flush the bilge with aquatic disinfectant prior to proceeding to the new watercourse.
- Regularly cleaning the exposed part of the bilge area, hull, live wells, baitwells, decking and fixed equipment with aquatic disinfectant;
- Regularly cleaning the trailer and mobile equipment with aquatic disinfectant;
- Expelling the contents of, then cleaning the bilge pump with aquatic disinfectant;
- When the boat is removed from the water, the boat should be drained of all water. All cleaning and disinfecting protocols as mentioned above must be followed again to ensure that the boat is decontaminated prior to its next launch.
- When handling aquatic disinfectant, protective gloves should always be worn.

Other measures, dependent upon the type of watercraft or boat include:

- Routinely spraying the trailer, hull, bilge, livewells, baitwells, deck and fixed equipment with heated water (60 °C/140 °F) or aquatic disinfectant
- Routinely thoroughly cleaning all non-motorised watercraft (canoes, kayaks and sailboats) inside and out with aquatic disinfectant,
- All associated PPE and other equipment should be submerged in aquatic disinfectant for a minimum of 15 minutes. Where practicable, the interior of all non-motorised craft should also be immersed.

These basic biosecurity measures are the baseline activity for all boat and watercraft operators to prevent the threat of spreading invasive species, organisms and pathogens to aquatic and riparian systems. Figures 5 and 6 following provide more information on freshwater security.

Bio-security for Leisure and Industrial crafts

WHAT IS DIFFERENT ABOUT THESE BOATS?

Industrial and Leisure crafts remain in the water for longer than their smaller counterparts as it is often not feasible to remove them in between use. These long periods in the water can cause hull fouling invasive species to accumulate on mooring lines, equipment and the exterior of the boat. Harmful microscopic organisms may also accumulate in bilge water. As a result of this, larger watercraft can act as an effective vector for invasive species to be transported around a catchment or to other water-bodies.

WHAT CAN BE DONE TO HELP?

BIO-SECURITY MEASURES

While larger boats may not be able to adhere to the same Bio-Security guidelines as smaller vessels that can easily be removed from the water, there are still measures that can be taken to reduce the chances of spreading harmful invasive species.



PROPER ANTI-FOULING TREATMENT

Boats should be submitted for yearly anti-fouling. Following your manufacturer's guidelines and applying the appropriate anti-fouling treatments can help reduce the chances of invasive species colonising the exterior of your boat. Ensure 100% coverage of anti fouling treatments - paying extra attention to smaller, awkward areas.

INSPECT AND DRY FOULED MOORING LINES

The exterior of a boat is not the only area invasive species can accumulate. Mooring lines can harbour harmful invasive species too. Any fouled mooring lines should be cleaned and thoroughly dried before being used again.



DO NOT DISCHARGE UNTREATED BILGE WATER

Untreated bilge water can harbour harmful microscopic organisms. Correct protocol should always be followed regarding bilge water discharge and it should never be discharged untreated, as it could have lasting negative effects on a freshwater ecosystem.



INSPECT AND REMOVE BEFORE LONG JOURNEYS

When travelling long distances remaining in the water there is an increased chance of introducing invasive species elsewhere in a catchment area. Before undertaking long journeys boats should be cleared of all fouling and anti-fouling procedures should be renewed.



Freshwater Bio-Security for small boats

WHAT IS DIFFERENT ABOUT THESE BOATS?

Smaller boats and their accompanying equipment can harbour harmful invasive species, which can easily spread to other areas within a catchment. However, smaller boats can more readily be removed from the water for Bio-Security treatments and visual inspections, which contribute to slowing the spread of invasive species in Irish waters.

PREVENTING THE SPREAD

BIO-SECURITY MEASURES

One of the simplest ways invasive species can be controlled is by acknowledging the importance of Bio-Security. By following correct Bio-Security protocols the public help protect freshwater ecosystems and ensure their future viability for recreational and economic use.



INSPECT EQUIPMENT THAT HAS BEEN USED IN THE WATER

A thorough check of any equipment that has been in the water, including hulls and clothing. Paying particular attention to areas that are difficult to inspect and awkward to reach.



CLEAN AND DISINFECT EQUIPMENT

While a thorough inspection of equipment is a good start, it should be cleaned and disinfected after each use to ensure no harmful organisms survive. Equipment should be submerged in disinfectant for 15 minutes and ideally power-washed with 60°C water. If this is not possible the equipment should be washed before leaving the catchment area and not reintroduced to the water for a period of 5 days.



DRY ALL EQUIPMENT COMPLETELY BEFORE IT IS RETURNED TO THE CATCHMENT

Transferring water elsewhere in a catchment contributes to the spread of invasive species and harmful pathogens. Ensuring all your equipment is dry before returning it to the water decreases the chance of any organisms surviving.



Figure 10 Freshwater Biosecurity for Small Boats

Figure 11: Biosecurity for Large Craft

5.4 Population and Human Health

5.4.1 Human Health

The 2016 Census provided some indicators regarding health. One question on the Census related to how the respondent felt about their overall health. The findings of the 2016 Census indicate that 87% of the population of Ireland consider themselves to be in “good or very good” health. Only 1.6% of the overall population reported themselves as being in “bad or very bad” health. Figure 5, following, provides a “heatmap” on the self-reporting of health by administrative area. It is noted that along the Shannon corridor, health figures range in the 82-88% range.

Table 5 Figures of Population with Good or Very Good Health in Ireland

County	Total Population by County	Very good health	Good health	Total	Percentage
Cavan	76,176	46,165	20,446	66,611	87.44%
Leitrim	32,044	18,237	9,260	27,497	85.81%
Roscommon	64,544	37,025	18,880	55,905	86.62%
Longford	40,873	22,853	12,002	34,855	85.28%
Westmeath	86,164	51,061	24,842	75,903	88.09%
Offaly	77,961	44,640	22,743	67,383	86.43%
Galway	179,390	106,570	50,910	157,480	87.79%
Tipperary	159,553	91,935	46,506	138,441	86.77%
Clare	118,817	69,375	34,397	103,772	87.34%
Limerick	194,899	110,934	56,865	167,799	86.10%
TOTALS	1,030,421	598,795	296,851	895,646	Average 86.92%

Source: CSO Census 2016 Theme 12

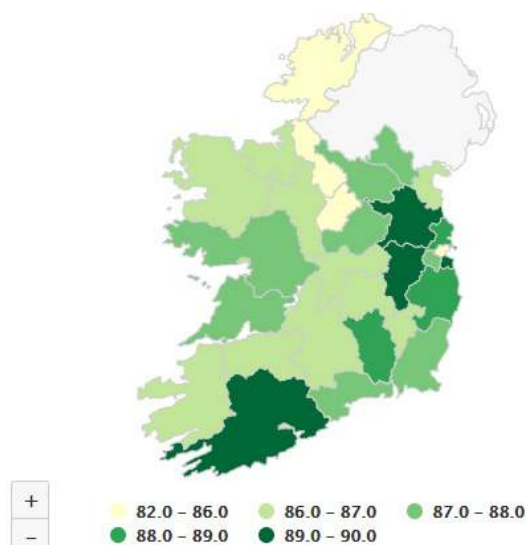


Figure 12 Percentage of persons with very good and good health, 2016 - Source CSO Profile 9

5.4.2 Population

The 2016 Census has shown that there are 172,738 people living within 5km of the proposed Shannon Masterplan inclusion area. As of 2016, there were an estimated 1,030,421 people residing within the counties bordering the Shannon Masterplan area.

The Masterplan area is a moderately populated area. CSO data does not relate exactly to the Masterplan boundary, but the Masterplan area encompasses ten counties in the Republic of Ireland and one county in Northern Ireland. Baseline population data is quantified by county first and settlement within the 5km inclusion zone of the Masterplan area. After investigation into each county, the following settlements in Table 6, following, have been identified as within the 5km inclusion zone of the Masterplan:

Table 6: Settlements Identified Per County within 5km Inclusion Zone of Masterplan Area

County	Settlement
County Fermanagh	Teamore (statistics encompass both Aghalane and Corraquill)
County Cavan	Belturbet Ballyconnell Dowra
County Leitrim	Ballinamore Keshcarrigan Drumshambo Leitrim Village Carrick-on-Shannon Drumsna Drumod
County Roscommon	Boyle Cootehall Rushport/Sheehaun Rooskey Tarmonbarry Lanesborough/Ballyleague

County	Settlement
	Portrunny Lecarrow
County Longford	Longford Newtown Forbes Ballymahon
County Westmeath	Athlone
County Offaly	Shannonbridge Shannon Harbour Banagher
County Galway	Ballinasloe Portumna
County Tipperary	Terryglass Ballinderry Dromineer Portroe Nenagh Ballina
County Clare	Scariff-Tuamgraney Killaloe O'Briensbridge Ardnacrusha
County Limerick	Castleconnell Cloonlara Limerick

5.4.3 Populations by County and Settlement

An analysis of total resident population figures is critical to understanding the number of key receptors and users of the waterways within the area. The Central Statistics Office changed a number of key measurements between the 2011 and 2016 census, including the boundaries of settlements. To compare population trends between 2011 and 2016, an analysis of Small Area Statistics were the only manner by which to record the population of settlement area where the settlement area has been changed. Table 8 in this section provide a clear breakdown of resident population by each settlement (2011) and by small area statistic (which encompass each settlement) for 2016. For consistency in measurements, Small Area Population statistics have been utilised for the overall population within the 5km Shannon Masterplan Inclusion Zone.

Table 7 Population by Settlement in Masterplan 5km Inclusion Zone

County	Settlement	Population by Settlement 2011	Population by Small Area Statistic (within 5 km of MP Area)
Fermanagh/Omagh	Teemore	184*	574*
Cavan	Belturbet	1,378	1,369
Cavan	Ballyconnell	1,061	1,105
Cavan	Dowra	121	115
Leitrim	Ballinamore	889	914
Leitrim	Keshcarrigan	163	155

County	Settlement	Population by Settlement 2011	Population by Small Area Statistic (within 5 km of MP Area)
Leitrim	Drumshambo	857	902
Leitrim	Leitrim Village	485	594
Leitrim	Carrick-on-Shannon	3,980	4,062
Leitrim	Drumsna	247	240
Leitrim	Drumod	432	555
Roscommon	Boyle	2,588	2,568
Roscommon	Cootehall	146	184
Roscommon	Rushport/Sheehaun	184	178
Roscommon	Rooskey	523	564
Roscommon	Tarmonbarry	366	443
Roscommon	Lanesborough/Ballyleague	1,377	1,454
Roscommon	Portrunny	127	135
Roscommon	Lecarrow	314	334
Longford	Longford	8,002	8,723
Longford	Newtown Forbes	759	778
Longford	Ballymahon	1,563	1,877
Westmeath	Athlone	20,153	21,349
Offaly	Shannonbridge	206	175
Offaly	Shannon Harbour	334	324
Offaly	Banagher	1,653	1,760
Galway	Ballinasloe	6,659	6,660
Galway	Portumna	1,530	1,450
Tipperary	Terryglass	142	144
Tipperary	Ballinderry	139	133
Tipperary	Dromineer	145	126
Tipperary	Portroe	468	461
Tipperary	Nenagh	8,439	8,656
Tipperary	Ballina	2,442	2,632
Clare	Scariff-Tuamgraney	816	770
Clare	Killaloe	1,292	1,484
Clare	O'Briensbridge	383	396
Clare	Ardnacrusha	1,414	1,383
Limerick	Castleconnell	1,917	2,107
Limerick	Cloonlara	627	713
Limerick	Limerick (City and Suburbs)	91,454	94,192
TOTAL		165,959	172,738

Source: Northern Ireland Neighbourhood Information Services (NINIS) and CSO SAPMAP 2011 and 2016 by legal settlement, towns/cities and small areas

Note* availability of detailed statistical data from NINIS by Settlement. Small Area Statistic encompasses a 5km radius from Corraquill and Aghalane.

Northern Ireland and County Fermanagh

Northern Ireland has been factored strictly by the area within 5km of the Masterplan area. The population figures are from 2011 and the next Census won't take place until 2021. It should be noted that due to the pervasiveness of Lough Erne, there are potentially many more users outside the 5km area which may utilise the Shannon-Erne and Shannon Navigation corridors.

Republic of Ireland and Counties Cavan, Leitrim, Roscommon, Longford, Westmeath, Offaly, Galway, Tipperary, Clare and Limerick

County Cavan

County Cavan is one of the largest areas by distance which encompass both the Shannon-Erne and Shannon Navigation Corridor. The population is sparse in this area but is growing as evidenced by the population statistics obtained from the CSO.

County Leitrim

County Leitrim is the area with the most boating infrastructure of the 10 ROI counties within this Masterplan study area, largely centred around the Carrick-on-Shannon settlement. It is a large area which is encompassed by lakes and is moderately populated. Table 7 shows that in almost all settlements identified within the 5km inclusion zone of the Masterplan have experienced some growth in population statistics since 2011.

County Roscommon

County Roscommon has a large proportion of water infrastructure relative to its populations. This area includes Boyle and is in close proximity to Carrick-on-Shannon in the upper Shannon region. These two settlements, while on opposing sides of county boundaries make up a substantial population for the overall area and appear to be a regional hub by population. While most settlements within this area are relatively small in size, nearly all identified settlements in Roscommon have seen a growth in population since 2011.

County Longford

County Longford, while it does not have a large proportion of land area within the 5km inclusion zone nonetheless, due to the proximity of Longford town to the River Shannon and the canal system which links to the Masterplan area, has a substantial number of people within the study area.

County Westmeath

Similarly, County Westmeath also has a small land area within the 5km inclusion zone of the study area. However, Athlone is a regional gateway within the area, with people from Counties Roscommon and Westmeath living and working in this town, and with regional public transportation connections which connect to places around the country. Athlone has a significant population for the size of the area adjoining the Masterplan area.

County Offaly

County Offaly shares a significant area of coastline along the Shannon, however there are very few settlements and a low population within the 5km study area. Birr, Co. Offaly is just outside the study area, and therefore should be considered when determining infrastructural connections and usage patterns.

County Galway

County Galway has a significant area of coastline along the Shannon, though similarly to Co. Offaly, the region is sparsely populated. However, Ballinasloe is hydrologically connected to (via the River Suck), and within the 5km inclusion zone of the Masterplan area. Portumna is on the northern entrance to Lough Derg. A significant proportion of the population of County Galway would be utilising these two settlements both as access and as a passage through to the next area. While the population is slightly lower in 2016 figures to 2011 figures, infrastructure at these locations should be supportive to additional population figures due to the connections to the Masterplan area.

County Tipperary

County Tipperary also has a substantial quantity of coastline at the eastern boundary of the County as a result of Lough Derg. There are several settlements along this area, however the population numbers are lower than in other areas and the population is more disbursed. There are several key connections within this area, including the Terryglass, and Ballina/Killaloe (Co. Clare) connections at either end of Lough Derg. It appears from examining the population statistics for the identified settlements that in smaller areas, the population is staying relatively stable, or is shrinking slightly while larger areas are experiencing a population increase since 2011.

County Clare

County Clare is a strategic region of the Masterplan area, which includes important destinations within its identified areas. Killaloe/Ballina (Co. Tipperary) is a choice destination town for tourism and for those who utilise the waterway. Ardnacrusha currently is the only throughway for river travellers who traverse between Limerick and any other point along the Shannon Navigational area. While the population is comparatively lower in this area to other areas, it has still experienced a population growth since 2016.

County Limerick

County Limerick is a destination area for many tourists and is home to a significant population. The mouth of the River Shannon is located within the City of Limerick, and it is possible to navigate to this area.

Table 8 Total Population by County within 5km Inclusion Zone

County	Total Population of Settlements in 5km Radius 2011	Total Population of Settlements and Small Area Statistics in 5km Radius 2016
County Fermanagh	184	574
County Cavan	2,560	2,589
County Leitrim	7,053	7,422
County Roscommon	5,625	5,860
County Longford	10,324	11,378
County Westmeath	20,153	21,349
County Offaly	2,193	2,259
County Galway	8,189	8,110
County Tipperary	11,775	12,152
County Clare	3,905	4,033
County Limerick (including Limerick City/Suburbs)	93,998	97,012
TOTAL	165,959	172,738

Source: Northern Ireland Neighbourhood Information Services (NINIS) and CSO SAPMAP 2011 and 2016 by legal settlement, towns/cities and small area population statistics

Table 9 above provides a total population of settlements by county within the Masterplan Inclusion Zone.

Age Profile of Ireland

Census 2016 indicated that the population of Ireland was 4.7 million people, with a 63% urban and 37% rural divide. The average age of the population was 37.4 years, making Ireland one of the youngest populations in Europe. While the population has increased substantially in Leinster, it is noted that Ulster, Connacht and Munster have also experienced substantial growth. Figure 6 following provides a snapshot of the population pyramid of Ireland.

It is worth noting the following:

- There are two majority age groups- these are the aged 30-45 and the aged 0-5 groups;
- Age groups 0-45 make up 66% of the overall population;
- There is a significantly sized upcoming generation (currently aged 0-5)

These indicators demonstrate that the majority of the population is young, perhaps with young families, and that a significant portion of the population are young children. These age groups would be most likely to benefit from the proposed Shannon Masterplan.

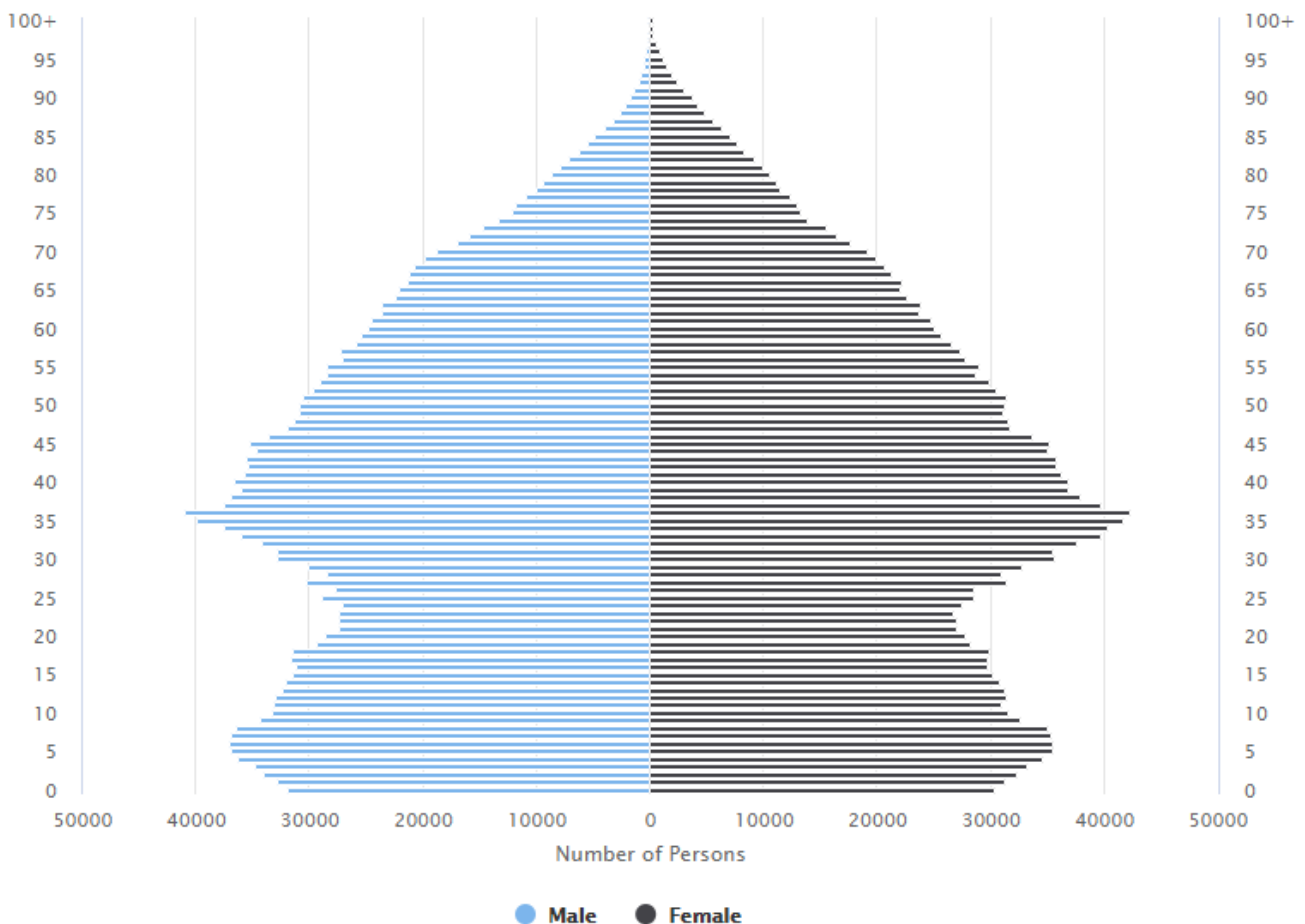


Figure 13 Population Pyramid of Ireland 2016

5.5 Geology, Soils and Land Use

Geology

Much of the masterplan area in the southern area is underlain by limestones and bioclastic mudstones. The massive Waulsortian limestones are over 1200m thick in the Shannon Estuary area but are more typically 300 - 500 m thick. They are overlain by undifferentiated Visean limestones in the Lower Shannon area and around Lough Ree. Northwards, the rocks are younger, with exposure of the Bricklieve Limestone Formation around Lough Allen, which consists of bioclastic cherty limestone.

In the Lough Key area, the Bellavally Shale Formation is present which consists of grey micrite, shale and evaporites. The dominant rock types comprise limestone and shale.

Karst features included in the Masterplan area comprise dolines, swallow holes, springs, enclosed depression, turloughs and caves, as exemplified in the Cavan Burren.

5.6 Water

Since 2000, Water Management in the EU has been governed by the Water Framework Directive 2000/60/EC (WFD). Transposing legislation (S.I. 792 of 2009, European Communities Environmental Objective (Surface Water) Regulations 2009 as amended) outlines the water protection and water management measures required in Ireland to maintain high status of waters where it exists, prevent any deterioration in existing water status and achieve at least 'good' status for all waters.

The WFD requires that all Member States implement the necessary measures to prevent deterioration of the status of all waters - surface, ground, estuarine and coastal - and protect, enhance and restore all waters with the aim of achieving "good status" by 2015. All public bodies are required to coordinate their policies and operations so as to maintain the good status of water bodies which are currently unpolluted and improve polluted water bodies to good status by 2015.

An enhanced evidence base has been developed to guide national policies and the targeting of local measures. Technical assessments of 4,829 water bodies have been carried out, examining their status (quality) and whether they are 'at risk' of not meeting status objectives in the future. Using this information, the River Basin Management Plan sets out national policies and regional prioritised measures.

Under Regulation 4 of the Groundwater Regulations 2010, a duty is placed on public authorities to promote compliance with the requirements of the regulations and to take all reasonable steps including, where necessary, the implementation of programmes of measures, to:

- a) *"prevent or limit, as appropriate, the input of pollutants into groundwater and prevent the deterioration of the status of all bodies of groundwater;*
- b) *protect, enhance and restore all bodies of groundwater and ensure a balance between abstraction and recharge of groundwater with the aim of achieving good groundwater quantitative status and good groundwater chemical status by not later than 22 December 2015;*
- c) *reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order to progressively reduce pollution of groundwater;*
- d) *achieve compliance with any standards and objectives established for a groundwater dependent protected area included in the register of protected areas established under Regulation 8 of the 2003 Regulations [S.I. No. 722 of 2003] by not later than 22 December 2015, unless otherwise specified in the Community legislation under which the individual protected areas have been established."*

River Basin Management

On April 17th, 2018 the Government published the River Basin Management Plan for Ireland 2018-2021. The Plan sets out the actions that Ireland will take to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2027. Ireland is required to produce a river basin management plan under the Water Framework Directive (WFD).

5.6.1 Surface Water

WFD Monitoring Programmes are undertaken in Ireland by the EPA and in Northern Ireland by the Department of the Environment/Northern Ireland Environmental Agency (DoE/NI)³⁵. Overviews of the status for monitored waterbodies are published and made available online.

5.6.2 Shannon Upper and Lower River Basin

The Shannon masterplan boundary falls within the Shannon RBD Upper and Lower River Basin. It drains land from fifteen counties; Limerick, Clare, Tipperary, Offaly, Meath, Westmeath, Longford, Roscommon, Galway,

Leitrim, Cavan, Sligo, Mayo, Laois, and a small portion of Fermanagh in Northern Ireland. The total area draining into the Shannon Upper and Lower River Basin is approximately 11, 600 km².

The River Shannon rises in the Cuilcagh Mountains, at a location known as the Shannon Pot in the counties of Cavan and Fermanagh. The river is joined in its very upper reaches by a number of tributaries as it flows into Lough Allen.

Downstream of Lough Allen, the River Shannon is joined by a number of tributaries, the largest of which is the River Boyle. At this location between Lough Corry and Lough Tap, the River Shannon naturally narrows as it meanders between these two loughs. Also located between Lough Corry and Lough Tap is the Albert canal and the Jamestown sluices. The Albert canal diverts boats from Jamestown to upstream of Lough Tap.

Downstream of Lough Tap, the River Shannon flows through a series of lakes including; Lough Boderg, Lough Bofin and Lough Forbes. The River Shannon continues to flow in a southerly direction before discharging into Lough Ree at Lanesborough.

The River Shannon, from downstream of Lough Allen to upstream of Lough Ree, falls a vertical height of 6.6m over this 58km reach.

Current Management of Surface Water Levels at the Shannon

The Shannon Flood Risk State Agency Co-ordination Working Group was established by the Government to enhance on-going co-operation across all of the State Agencies involved with the River Shannon (<https://www.opw.ie/en/latestnews/articleheading,36110,en.html>).

The river level is primarily the result of the amount of rain that falls on the river catchment area. The water levels on the 3 lakes (Lough Allen, Lough Ree and Lough Derg) are controlled and managed by the ESB. The levels of Lough Derg are managed for the purpose of electricity generation. Levels in Lough Allen and Lough Ree are managed to assist with navigation levels to ensure that floods are passed safely and to ensure minimum navigation levels in the river during dry periods. The levels in between the lakes are managed by Waterways Ireland for navigation purposes.

ESB's statutory role on the Shannon is to generate electricity at Ardnacrusha. The relevant legislation is the Shannon Electricity Act 1925, Electricity Supply Act 1927 and Electricity Supply (Amendment) Act 1934. In broad terms, under this legislation, ESB generates electricity at Ardnacrusha and manages the weirs, sluices and other works that are part of the Shannon Scheme.

Waterways Ireland is a navigation authority established under statute. As such Waterways Ireland is responsible for the management, maintenance and development of those waterways principally for recreation purposes. Waterways Ireland has no statutory function in relation to drainage matters or flood relief.

There is daily communication and a co-ordinated approach to management of the levels between Waterways Ireland and the ESB with the ESB managing levels for electricity production and Waterways Ireland managing the levels for navigation in the boating season.

The ESB manage the outlets of the major lake through sluice barrages at Bellantra (Lough Allen), Athlone (Lough Ree) and Parteen/Ardnacrusha (Lough Derg). The outlets at Bellantra and Parteen/Ardnacrusha are controlled and managed by the ESB. Waterways Ireland provides manual assistance at Athlone working to instruction from the ESB. There are interim sluices/weirs at Jamestown, Roosky Tarmonbarry and Meelick/New Cuts. The function of these weirs is to allow a minimum level of 1.8m of water depth to be retained in the summer periods to allow boats to use the waterways. Waterways Ireland control these interim gates.

When levels rise above 1.8m, sluice gates are progressively opened to bring the level back towards the 1.8m depth requirement. When all gates at the weirs are open and the weir boards are removed from Meelick Weir, there is no further action to prevent further rising water level. At this stage the water is running through all open gates and over adjacent weir.

ESB Shannon Scheme

ESB generates electricity at Ardnacrusha by diverting water from the River Shannon downstream of Lough Derg. As such, the operation of Ardnacrusha generating station alleviates flooding in the lower Shannon by diverting flood waters away from the “old” river. If there was no generating station at Ardnacrusha the full flood would be flowing down the “old” Shannon river and downstream flooding in these areas would be more severe.

Ardnacrusha generating station uses up to a maximum of 400 cubic metres per second (tonnes per second) of water, and so up to this amount of water is diverted away from the “old” river. This water therefore bypasses areas that historically have been at greater risk of flooding. In a flood with 800 cubic metres per second (such as happened in December 2015), the ESB can divert nearly half of the water through Ardnacrusha and away from the “old” river. During large floods, excess water that exceeds the capacity of Ardnacrusha will flow down the “old” course of the Shannon, controlled by the operation of the gates at Parteen Weir.

5.6.3 Groundwater

The groundwater conditions of the Masterplan area have been assessed using the GSI’s characterisation of the main groundwater bodies (GWBs) in the Lower, Mid and Upper Shannon regions. The groundwater bodies are summarised in Table 9 and the locations are shown in Figure 13.

Details of each groundwater body are provided, including aquifer categories and lithologies. Karst features, where present, are also described as well as details on groundwater flow and discharges in the groundwater body. Regionally important aquifers are present in some groundwater bodies particularly in the upper and mid Shannon regions. The aquifer categories are also shown on Figure 13.

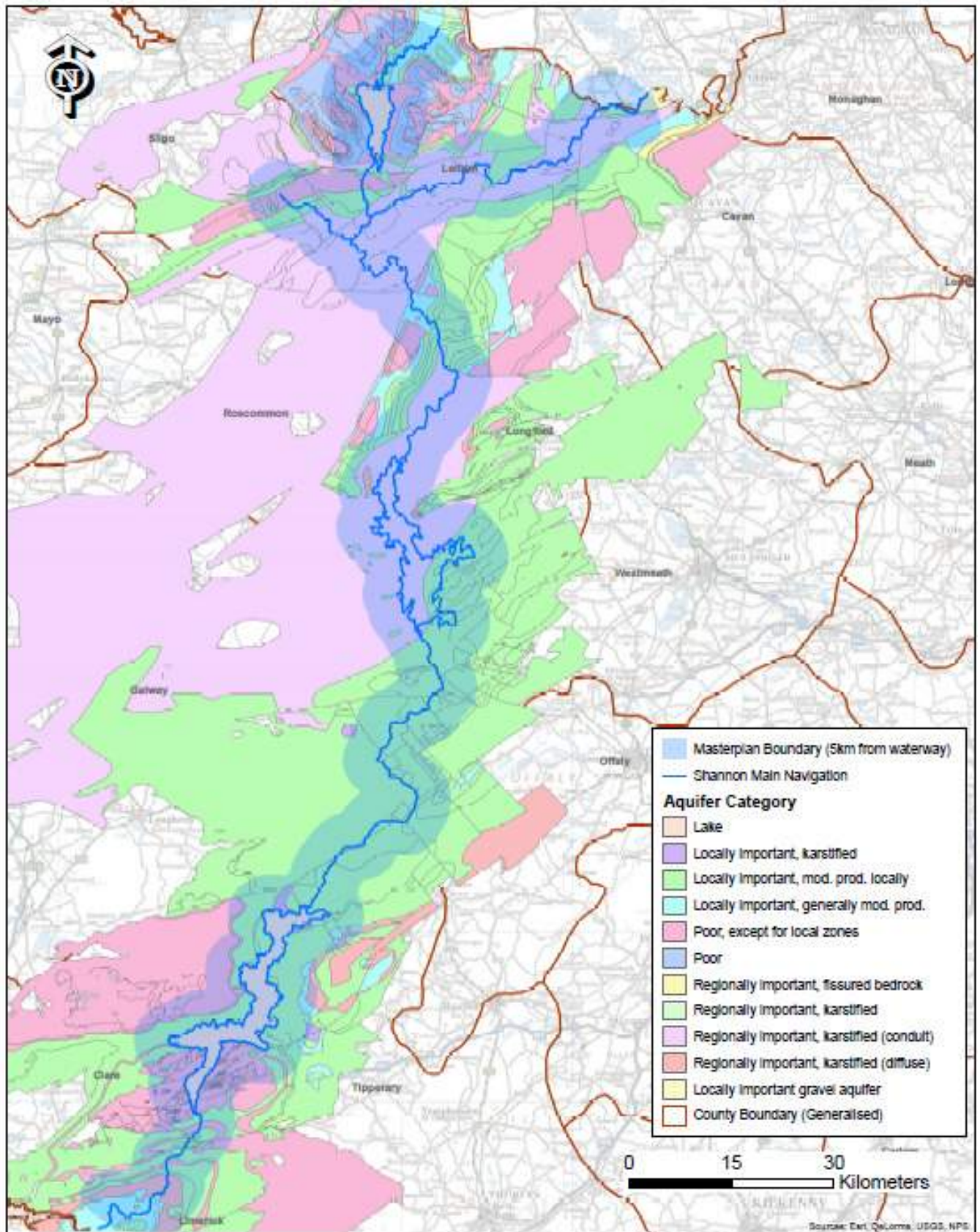


Figure 14 Location of Groundwater Bodies in the Masterplan Area (after GSI)

Table 9 Groundwater Body Summary

Groundwater Body	Key Characteristics
Lough Derg and Lower Shannon	
Nenagh	<p>Aquifer Categories: LI, PI, Lm, Rkd</p> <p>Mountainous in areas underlain by Silurian and Devonian rocks to flat-lying or gently undulating in areas underlain by the impure and pure limestones</p> <p>Generally low transmissivity and storativity rocks</p> <p>Groundwater discharges to springs and to the numerous streams and rivers crossing the aquifer, and to Lough Derg.</p> <p>There are several ecosystems in the GWB dependent on groundwater, including mineralised flushes.</p> <p>Three turloughs and two swallow holes known in the GWB.</p>
Lough Graney	<p>Aquifer Categories: LI, PI</p> <p>The terrain ranges between mountainous in areas underlain by Silurian and Devonian rocks to flat-lying or gently undulating in areas underlain by the impure and pure limestones.</p> <p>Groundwater discharges to springs and to the numerous streams and rivers crossing the aquifer, and to Lough Derg.</p> <p>There are several ecosystems in the GWB dependent on groundwater. Groundwater and surface water interactions require special attention where the terrestrial ecosystems within this GWB are dependent on a sustainable balance between the two.</p>
Tynagh	<p>Aquifer Categories: Mostly LI, PI to south west</p> <p>Springs occur especially where changes in topography around the base of the Slieve Aughty cause the water table to intersect the ground surface.</p> <p>There are several ecosystems in the GWB dependent on groundwater, including mineralised flushes and turloughs.</p>
Lough Ree and Mid Shannon	
Banagher	<p>Aquifer Categories: LI</p> <p>The terrain is generally flat-lying or gently undulating.</p> <p>There are several ecosystems in the GWB dependent on groundwater, including mineralised flushes.</p> <p>The most extensive of these are the Birr-Rapemills-Rahan (Aghall) Gravels and Birr Gravels that radiate NW and NE-wards out from Birr in the south of the GWB.</p>
Clara	<p>Aquifer Categories: LI</p> <p>The GWB is comprised of generally low transmissivity and storativity rocks.</p>

Groundwater Body	Key Characteristics
	<p>There are several ecosystems in the GWB dependent on groundwater, including mineralised flushes.</p> <p>There are several gravel aquifers or potential gravel aquifers overlying this bedrock GWB: The most extensive of these are the potential Little River Gravel Aquifer in the SW, the Ballycumber-Clara potential Gravel Aquifer in the centre of the GWB, and the potential Horseleap Gravels in the north of the GWB.</p>
Athlone West	<p>Aquifer Categories: LI</p> <p>The area is flat and low lying with large areas of bog cover adjacent to the River Shannon.</p> <p>This groundwater body is composed primarily of low permeability rocks which have localised zones of enhanced permeability.</p> <p>Groundwater surface water interactions may be an issue the margins of the raised bogs within this groundwater body. Removal of the peat cover and alterations to drainage patterns post harvesting may influence groundwater surface water interactions in these areas.</p> <p>There may be a limited number of karst features, such as swallow holes and enclosed depressions, within the body, however karstification is quite rare in the limestones found in this groundwater body.</p>
Inny	<p>Aquifer Categories: LI and PI</p> <p>The terrain is flat and low-lying in the vicinity of Lough Inny, gently rising in the northwest, and hilly in the southeast, east and north of the body.</p> <p>This groundwater body is composed primarily of low permeability rocks</p>
Funshinagh	<p>Aquifer Categories: Mostly RkC, small areas of LI</p> <p>The topography of the body is generally flat with some small hills and low ridges.</p> <p>The GWB is composed primarily of high transmissivity karstified limestone. Karst features such as dolines, swallow holes and turloughs occur within the body.</p> <p>Groundwater flows along interconnected fractures, joints, faults and bedding planes, many of which have been enlarged by solution. Much of the groundwater flow is concentrated in conduits. Rapid groundwater flow velocities have been recorded through groundwater tracing.</p> <p>Some areas in this GWB are of extremely vulnerable due to the thin nature of the subsoil, as well as the frequency of karst features. Groundwater storage in karstified bedrock is low and the potential for contaminant attenuation in such aquifers is limited.</p> <p>Groundwater discharges to the streams and rivers crossing the body and to large high yielding springs, some of which are used for water supply. There is a high degree of interaction between surface water and groundwater in this GWB. Groundwater supports turloughs,</p>

Groundwater Body	Key Characteristics
	sensitive terrestrial ecosystems, which are highly dependent on groundwater.
Upper Shannon	
Carrick on Shannon	<p>Aquifer Categories: RKc</p> <p>This body occupies a large area in north County Roscommon south of the Curlew Mountains.</p> <p>The GWB is composed primarily of high transmissivity karstified limestone. A large number of karst features such as dolines, swallow holes and turloughs occur within the body.</p> <p>Some areas in this GWB are of extreme groundwater vulnerability due to the thin nature of the subsoil, as well as the frequency of karst features.</p> <p>Groundwater discharges to the streams and rivers crossing the body and to the large high yielding springs, many of which are used for water supply.</p> <p>There is a high degree of interaction between surface water and groundwater in this GWB. Groundwater supports many sensitive terrestrial ecosystems, including turloughs, which are highly dependent on groundwater.</p>
Lough Allen Uplands	<p>Aquifer Categories: LI, PI, Pu</p> <p>This groundwater body is composed of low permeability rocks. The topography is mountainous, consisting primarily of steep-sloped upland cut by narrow river valleys.</p> <p>Due to the low permeability nature of the rocks in this groundwater body, groundwater flow will be of a local nature. Flow path lengths will be relatively short, and in general are between 30 and 300 m. Local flow directions are controlled by local topography.</p> <p>Overall, groundwater flow within the body will be generally towards the River Shannon and Lough Allen in the centre of the body.</p>
Curlew Mountains	<p>Aquifer Categories: LI, PI, Lm</p> <p>The body includes both the upland slopes of the Curlew Mountains and more low-lying areas in the vicinity of Lough Gara and Lough Key.</p> <p>The groundwater body is composed primarily of low permeability rocks.</p> <p>Groundwater discharges to the streams crossing the aquifer, and locally to Lough Gara and Lough Key.</p>
Glenade Dowra	<p>Aquifer Categories: Lm</p> <p>This groundwater body underlies the valleys of the upper River Shannon and its main tributary, the Owenmore, northeast of Lough Allen.</p> <p>The GWB is composed of Dinantian Sandstone (Glenade Sandstone Formation) which overlies the Dinantian Mixed Sandstone, Shale and Limestones (Meenymore Formation) of the Lough Allen Uplands GWB.</p>

Groundwater Body	Key Characteristics
	<p>The Dinantian Sandstones are considered to have the potential for relatively high fissure permeability.</p> <p>Groundwater discharges are to the River Shannon and its tributaries and to Lough Allen in the southwest.</p>

5.6.4 Lough Derg & Lower Shannon

Nenagh Groundwater Body

The Nenagh groundwater body is bounded to the west by Lough Derg, and to the northeast by the contact between the Pure Unbedded and Lower Impure Limestones of this GWB and the Pure Bedded Limestones of the adjacent Lismaline GWB. The terrain ranges between mountainous in areas underlain by Silurian and Devonian rocks to flat-lying or gently undulating in areas underlain by the impure and pure limestones.

The groundwater body is comprised of generally low transmissivity and storativity rocks. The older rock units (i.e., Silurian and Devonian) are likely to have the lowest transmissivities, whereas the Pure Unbedded and Upper Impure (i.e. younger rock units) will have better flow properties. Where gravels, extensive alluvium or very sandy till overlies the bedrock aquifer, this can contribute to the storage.

Flow occurs along fractures, joints and major faults. Within the pure limestones, transmissivity may have been enhanced further by dissolution of calcium carbonate along fracture and bedding planes. Flows in the aquifer are typically concentrated in a thin zone at the top of the rock. An epikarstic layer exists at the top of the Pure Unbedded Limestones, at least in the vicinity of Lough Derg.

Recharge occurs particularly in the upland areas, and where rock outcrops, or subsoils are thin. Much of the potential recharge runs off in the upland areas. Where the water table is close to the surface in upland or lowland areas, potential recharge may be rejected.

Depending upon the local topography, the water table can vary between a few metres up to >10 m below ground surface. Overall, groundwater flow follows topography, flowing generally westwards. Locally, groundwater flows to the surface water bodies.

Flow path lengths in the upland areas are short (≤ 300 m). The increased hydraulic gradient, due to the sloping topography, will allow groundwater to flow faster than if it were flowing through a similar rock type in low-lying land.

Groundwater discharges to springs and to the numerous streams and rivers crossing the aquifer, and to Lough Derg.

Due to the shallow groundwater flow in this aquifer the groundwater and surface waters are closely linked. There are several ecosystems in the GWB dependent on groundwater, including mineralised flushes.

In areas underlain by Pure Unbedded Limestones, there are three turloughs and two swallow holes known; swallow holes accept point recharge from surface waters, and turloughs act as both groundwater discharge and recharge points.

Lough Graney Groundwater Body

This groundwater body is bounded to the west, north and northeast by surface water catchments, to the southeast by Lough Derg and the River Shannon, and to the south by the contact with the karstified limestones of the Ardnacrusha GWB. The terrain ranges between mountainous in areas underlain by Silurian and Devonian rocks to flat-lying or gently undulating in areas underlain by the impure and pure limestones.

The groundwater body is comprised of generally low transmissivity and storativity rocks. As above, the older rock units (i.e., Silurian and Devonian) are likely to have the lowest transmissivities, whereas the Pure Unbedded and Lower Impure Limestones (i.e. younger rock units) will have better flow properties. Transmissivities are generally lower in the northern part of the GWB than in the south. Aquifer specific yield is low in all aquifers. However, where gravels, extensive alluvium or very sandy till overlies the bedrock aquifer (such as at Killaloe), this can contribute to the storage.

Flow occurs along fractures, joints and major faults. Faults within the rocks may act both as groundwater flow conduits and barriers. Within the pure limestones, transmissivity may have been enhanced further by dissolution of calcium carbonate along fracture and bedding planes. Flows in the aquifer are typically concentrated in a thin zone at the top of the rock. An epikarstic layer may exist at the top of the Pure Unbedded Limestones.

Recharge occurs particularly in the upland areas, and where rock outcrops, or subsoils are thin. Much of the potential recharge runs off in the upland areas. Where the water table is close to the surface in upland or lowland areas, potential recharge may be rejected.

Aquifers within this GWB are mainly unconfined. They are probably only confined where raised bogs with low permeability clayey bases overlie the aquifers. Depending upon the local topography, the water table can vary between a few metres up to >10 m below ground surface. Locally, groundwater flows to the surface water bodies and is determined by local topography; there is no regional flow system. Flow path lengths in the upland and lowland areas are short (30-300 m). The increased hydraulic gradient, due to the sloping topography in the upland areas, will allow groundwater to flow faster than if it were flowing through a similar rock type in low-lying land.

Groundwater discharges to springs and to the numerous streams and rivers crossing the aquifer, and to Lough Derg. Due to the shallow groundwater flow in this aquifer the groundwater and surface waters are closely linked. There are several ecosystems in the GWB dependent on groundwater. Groundwater and surface water interactions require special attention where the terrestrial ecosystems within this GWB are dependent on a sustainable balance between the two.

Tynagh Groundwater Body

The groundwater body is bounded to the west, north and northeast by surface water catchments, to the southeast and south by Lough Derg.

The groundwater body contains older rock units (i.e. Silurian and Devonian) and younger rock units (Pure Unbedded and Upper Impure) has properties as above.

Flow occurs along fractures, joints and major faults. The faults within the Old Red Sandstone act both as groundwater flow conduits and barriers. Within the pure limestones and to a much more limited extent the Upper Impure Limestones, transmissivity may have been enhanced further by dissolution of calcium carbonate along fracture and bedding planes. Flows in the aquifer are typically concentrated in a thin zone at the top of the rock. An epikarstic layer probably exists at the top of the Pure Unbedded Limestones, at least in the vicinity of Lough Derg.

Recharge occurs as outlined above.

Aquifers within the GWB are mainly unconfined. They are probably only confined where raised bogs with low permeability clayey bases overlie the aquifers. Depending upon the local topography, the water table can vary between a few metres up to >10 m below ground surface. Overall, groundwater flow follows topography, flowing generally eastwards and southeastwards.

Locally, groundwater flows to the surface water bodies. Flow path lengths in the upland and lowland areas are short (≤ 300 m). The increased hydraulic gradient, due to the sloping topography in the upland areas, will allow groundwater to flow faster than if it were flowing through a similar rock type in low-lying land.

Groundwater discharges to springs and to the numerous streams and rivers crossing the aquifer, and to Lough Derg. Springs occur especially where changes in topography around the base of the Slieve Aughty cause the water table to intersect the ground surface.

Due to the shallow groundwater flow in this aquifer the groundwater and surface waters are closely linked. There are several ecosystems in the GWB dependent on groundwater, including mineralised flushes and turloughs. Groundwater and surface water interactions require special attention where the terrestrial ecosystems within this GWB are dependent on a sustainable balance between the two.

5.6.5 Groundwater – Lough Ree & Mid Shannon

Banagher Groundwater Body

The groundwater body is bounded on the southwestern edge by the contact between the low transmissivity rock units of this GWB and the karstified Pure Bedded Limestones of the adjacent Birr GWB. Surface water catchment divides define the SW and NE edges of the GWB, whilst the NW edge coincides with the Lower River Shannon. The terrain is generally flat-lying or gently undulating. There is a small ridge in the west of the GWB.

The groundwater body is comprised of generally low transmissivity and storativity rocks. Where gravel deposits or potential gravel aquifers overlie the bedrock aquifer, this can contribute to the storage.

Flow occurs along fractures, joints and major faults. Flows in the aquifer are typically concentrated in a thin approximately 15m zone at the top of the rock although deeper groundwater flow in hydraulically isolated fault zones can occur. Within the pure limestones, transmissivity may have been enhanced further by dissolution of calcium carbonate along fracture and bedding planes. An epikarstic layer of 1-2 m is likely to exist at the top of the Pure Unbedded Limestones. Limited karstification has taken place in the Upper Impure Limestones.

Diffuse recharge occurs across the entire GWB, but particularly where rock outcrops or where subsoils are thin. Where the water table is close to the surface potential recharge may be rejected.

The aquifers within the GWB are generally unconfined. Areas where confined conditions occur include beneath the raised bogs and in the deeper, isolated fault zones. Depending upon the local topography, the water table can vary between a few metres up to 10 m below ground surface. Flow path lengths are short (≤ 30 -300 m). Groundwater flows to the surface water bodies, with local flow directions controlled by local topography. There is no regional flow system.

Groundwater discharges to the streams and rivers crossing the aquifer and to a few springs. Due to the shallow groundwater flow in this aquifer the groundwater and surface waters are closely linked. There are several ecosystems in the GWB dependent on groundwater, including mineralised flushes. Groundwater and surface water interactions require special attention where terrestrial ecosystems are dependent on a sustainable balance between the two.

There are several gravel aquifers or potential gravel aquifers overlying this bedrock GWB: The most extensive of these are the Birr-Rapemills-Rahan (Aghall) Gravels and Birr Gravels that radiate NW and NE-wards out from Birr in the south of the GWB.

Clara Groundwater Body

The GWB is roughly rectangular and orientated NE-SW. Surface water catchment divides define the SW, NW and NE edges of the GWB, but part of the NW edge coincides with the Lower River Shannon. It is bounded on SE by the contact between the low transmissivity rock units of this GWB and the karstified Pure Bedded Limestones of the adjacent Tullamore GWB. Topography ranges from low-lying to hilly.

The GWB is comprised of generally low transmissivity and storativity rocks. Where gravel deposits or potential gravel aquifers overlie the bedrock aquifer, this can contribute to the storage.

The rocks of this GWB confine the high transmissivity sandstone aquifer of the Ferbane GWB, which this GWB encircles.

Flow occurs along fractures, joints and major faults. Flows in the aquifer are typically concentrated in a thin approximately 15 m zone at the top of the rock although deeper groundwater flow in hydraulically isolated fault zones can occur. Within the pure limestones, transmissivity may have been enhanced further by dissolution of calcium carbonate along fracture and bedding planes.

An epikarstic layer of 1-2 m is likely to exist at the top of the Pure Unbedded Limestones. Limited karstification has taken place in the Upper Impure Limestones.

Diffuse recharge occurs across most of the GWB (except for areas overlain by bogs), but particularly where rock outcrops or where subsoils are thin. Where the water table is close to the surface potential recharge may be rejected.

The aquifers within the GWB are generally unconfined. Areas where confined conditions occur include beneath the raised bogs (e.g. Clara Bog) and in the deeper, isolated fault zones. Depending upon the local topography, the water table can vary between a few metres up to 15 m below ground surface. Flow path lengths are short (\leq 30-300 m). Groundwater flows to the surface water bodies and to springs, with local flow directions controlled by local topography. A regional flow system does not exist.

The Dinantian (early) Sandstones, Limestones and Shales rock unit of this GWB confine the partly underlying Ferbane GWB aquifer. Due to the shallow groundwater flow in this aquifer the groundwater and surface waters are closely linked. There are several ecosystems in the GWB dependent on groundwater, including mineralised flushes. Groundwater and surface water interactions require special attention where terrestrial ecosystems are dependent on a sustainable balance between the two.

There are several gravel aquifers or potential gravel aquifers overlying this bedrock GWB: The most extensive of these are the potential Little River Gravel Aquifer in the SW, the Ballycumber-Clara potential Gravel Aquifer in the centre of the GWB, and the potential Horseleap Gravels in the north of the GWB.

Athlone West Groundwater Body

This groundwater body occupies a northeast southwest trending broadly rectangular area west and southwest of Athlone. It is bounded to the east and south by the River Shannon and to the north by contact with the Pure Bedded Limestones of the karstic Fuinshinagh GWB. The western boundary is formed by a groundwater divide and topographic high which coincides with a surface water catchment boundary.

The area is flat and low lying with large areas of bog cover adjacent to the River Shannon.

This groundwater body is composed primarily of low permeability rocks which have localised zones of enhanced permeability. Groundwater flows along fractures joints and major faults. Recharge occurs diffusely through the subsoils. Recharge is limited in areas where the aquifer is confined beneath clayey till and lacustrine clay which underlie the bogs.

In general groundwater is unconfined in this groundwater body, however groundwater can become confined beneath the clayey till and lacustrine clay deposits that underlie the large bogs along the River Shannon. Most groundwater flow occurs in the upper 15 m of the bedrock, comprising a weathered zone of a few metres and a connected fractured zone below this. Deepwater strikes in more isolated faults/fractures can be encountered. Groundwater flow in this body will be of a local nature. Groundwater flow paths will generally be short.

Groundwater will discharge to the streams crossing the body and to the River Shannon. Overall, the flow direction is east and south to the River Shannon.

Groundwater surface water interactions may be an issue in lag zones on the margins of the raised bogs within this groundwater body. Removal of the peat cover and alterations to drainage patterns post harvesting may influence groundwater surface water interactions in these areas.

There may be a limited number of karst features, such as swallow holes and enclosed depressions, within the body. Where present these would act as a focus for point recharge and groundwater surface water interaction, however karstification is quite rare in the limestones found in this groundwater body.

Inny Groundwater Body

Aquifer categories

The main aquifer categories are:

Ll: Locally important aquifer which is moderately productive only in local zones;

Pl: Poor aquifer which is generally unproductive except for local zones.

In the north east of the body a small area of Dinantian Pure Bedded Limestone (Stackallan Member MEst), and small isolated areas of Dinantian Sandstones (Fearnaght Sandstone & Basal Clastics) are classified as Lm: Locally important aquifer which is generally moderately productive

In the south west of the body, on the southern shore of Lough Ree a very small area of Dinantian Pure Bedded Limestone (Visean Limestones (undifferentiated)) is classified as Rkc: Regionally important karstified aquifer dominated by conduit flow

Main aquifer lithologies

The main aquifer lithologies are Dinantian Upper Impure Limestones, Dinantian Lower Impure Limestones, Dinantian Pure Unbedded Limestones, Dinantian (early) Sandstones, Shales and Limestones and in the extreme north of the body an area of Silurian Metasediments and Volcanics.

The groundwater body is bounded on all sides by topographic highs and groundwater divides which coincide with surface water catchment boundaries. Two small groundwater bodies occur within the Inny Groundwater Body, the Ballymanus GWB the Derravarragh GWB.

The River Inny flows through the centre of the body. The terrain is flat and low-lying in the vicinity of the river, gently rising in the northwest, and hilly in the southeast, east and north of the body.

This groundwater body is composed primarily of low permeability rocks, although localised zones of enhanced permeability occur along faults and in the vicinity of fault zones. In general, the Silurian Metasediments in the extreme north of the body have a lower permeability than the Dinantian Limestones in the rest of the body. Groundwater flows along fractures joints and major faults.

Recharge occurs diffusely through the subsoils and via outcrops. It occurs especially in upland areas where the subsoil is thinner and rainfall higher.

Groundwater is generally unconfined within this GWB. Most flow in this aquifer will occur in a zone near the surface of the rock, particularly in the poor (Pl) aquifer. In general, the effective thickness of this aquifer is likely to be about 15m, comprising a weathered zone of a few metres and a connected fracture zone below this. However, deep-water strikes in more isolated faults/fractures can be encountered, though this is less likely in the poor (Pl) aquifer. Groundwater flow in this groundwater body will be of a local nature. Groundwater flow paths will be short in the order of between 30 and 300 m.

Groundwater discharges to the numerous streams and rivers crossing the aquifer. Overall, the flow direction is towards the main channel of the Inny in the centre of the body and towards Lough Ree in the southwest.

Funshinagh Groundwater Body

Aquifer categories

The main aquifer category in this GWB is Rkc: Regionally important karstified aquifer dominated by conduit flow.

A number of small areas occur throughout the body with an aquifer category of: Ll: Locally important aquifer which is moderately productive only in local zones.

The islands in Lough Ree are formed of karstified limestone similar to the rest of the GWB, however they are not considered large enough to merit the classification of regionally important – a classification code to reflect the karstified nature of these islands as well as their limited size is pending.

Main aquifer lithologies

This GWB is composed primarily of Dinantian Pure Bedded Limestones. Some of the Pure Bedded Limestones have been dolomitised, but only a small area is currently mapped as Dinantian Dolomitised Limestones.

This GWB occupies an elongate north south trending area along the west side of Lough Ree and the River Shannon. It is bounded to the west by a groundwater divide and topographic high which coincides with the surface water catchment boundary with the Suck catchment. It is bounded to the east by Lough Ree and the River Shannon. It is bounded to the south by the contact with the lower permeability Dinantian Pure Unbedded Limestones of the Athlone West GWB. The northern boundary is in part formed by the contact with the lower permeability rocks of the Curraghroe GWB and in part by the Hind/Lough Ree Shannon Upstream Roosky surface water catchment boundary. However, the topography is quite subdued at this point and it is possible that this surface water catchment boundary does not coincide with a groundwater divide. There may be some groundwater flow between Carrick on Shannon GWB and the Funshinagh GWB.

The topography of the body is generally flat with some small hills and low ridges. There are low-lying areas in the south of the body, along the west shore of Lough Ree, in the vicinity of the River Hind and along the north eastern limb of the body. Elevations are higher just west of the centre of the body, in the extreme northwest and along a low ridge to the east of Lough Funshinagh.

The GWB is composed primarily of high transmissivity karstified limestone. Groundwater flows through a network of solutionally enlarged fissures and conduits. Karst features such as dolines, swallow holes and turloughs occur within the body.

Small areas of pure unbedded limestones are incorporated with this GWB, but these are isolated and are not considered to significantly alter the flow system.

Groundwater flows along interconnected fractures, joints, faults and bedding planes, many of which have been enlarged by solution. Much of the groundwater flow is concentrated in conduits. Rapid groundwater flow velocities have been recorded through groundwater tracing.

Recharge to this GWB is via point, swallow holes and collapse features, and diffuse via rainfall percolating through the subsoil. The lack of surface drainage in several parts of this GWB indicates that potential recharge readily percolates into the groundwater system. Groundwater in this body generally shows a rapid response to recharge.

The groundwater in this body is generally unconfined. Most of the groundwater flow will be concentrated in the upper epikarstic layer and in a zone of interconnected fissures, enlarged by karstification, generally extending to a depth of 30 m. Deep water strikes in more isolated faults/fractures can be encountered.

In general, in karstic aquifers, the degree of interconnection between fractures zones is high and they support regional scale flow systems. Flow paths can potentially be several kilometres in length. Some areas in this GWB are of extremely vulnerable due to the thin nature of the subsoil, as well as the frequency of karst features. Groundwater storage in karstified bedrock is low and the potential for contaminant attenuation in such aquifers is limited.

Groundwater discharges to the streams and rivers crossing the body and to large high yielding springs, some of which are used for water supply.

There is a high degree of interaction between surface water and groundwater in this GWB. Groundwater supports turloughs, sensitive terrestrial ecosystems, which are highly dependent on groundwater. Overlying gravels provide a permeable pathway for recharge to the karstic aquifer and where saturated may provide an element of storage for the underlying bedrock.

5.6.6 Groundwater – Upper Shannon

Carrick on Shannon Groundwater Body

This body occupies a large area in north County Roscommon south of the Curlew Mountains. It is bounded to the north by the contact with the Dinantian Lower Impure Limestones of the Curlew Mountains GWB. It is bounded to the west and south by topographic highs and groundwater divides that coincide with surface water catchment boundaries. It is bounded to the east, in part by the contact with the Dinantian Sandstones of the Scramoge North GWB and in part by the contact with various low permeability rocks of the Kilglass, Dromod and Mohill GWBs.

The GWB is composed primarily of high transmissivity karstified limestone. Groundwater flows through a network of solutionally enlarged fissures and conduits. A large number of karst features such as dolines, swallow holes and turloughs occur within the body. Small areas of pure unbedded limestones are incorporated within this GWB.

The topography of the body is varied. Low-lying areas (40-50 mAOD) occur in the east of the body, where a large number of lakes are separated by small low hills. Higher ground occurs on the Plains of Boyle (80-110 mAOD) and on the south western boundary of the body (120-140 mAOD). Drumlins are common in the body, generally increasing in number and size to the east of the body. Areas of peat and cut peat are common, becoming more common towards the northwest of the body. There are areas within the body where surface drainage is limited or absent (e.g. south of Boyle) reflecting the karstified nature of the underlying bedrock and the high permeability or absence/thin occurrence of overlying subsoil.

Groundwater flows along interconnected fractures, joints, faults and bedding planes, many of which have been enlarged by solution. Much of the groundwater flow is concentrated in conduits. Rapid groundwater flow velocities have been recorded through groundwater tracing.

Recharge to this GWB is both point, through swallow holes and collapse features, and diffuse via rainfall percolating through the subsoil. The lack of surface drainage in several parts of this GWB indicates that potential recharge readily percolates into the groundwater system. Groundwater in this body generally shows a rapid response to recharge.

The groundwater in this body is generally unconfined. Most groundwater flow will be concentrated in the upper epikarstic layer and in a zone of interconnected fissures, enlarged by karstification, generally extending to a depth of 30 m. Deep water strikes in more isolated faults/fractures can be encountered.

In general, in karstic aquifers, the degree of interconnection between fractures zones is high and they support regional scale flow systems. Flow paths can potentially be several kilometres in length.

Some areas in this GWB are of extreme groundwater vulnerability due to the thin nature of the subsoil, as well as the frequency of karst features. Groundwater storage in karstified bedrock is low and the potential for contaminant attenuation in such aquifers is limited.

Groundwater discharges to the streams and rivers crossing the body and to the large high yielding springs, many of which are used for water supply.

There is a high degree of interaction between surface water and groundwater in this GWB. Groundwater supports many sensitive terrestrial ecosystems, including turloughs, which are highly dependent on groundwater.

Lough Allen Uplands Groundwater Body

This groundwater body is bounded to the east, north and northwest by topographic highs which coincide with the surface water catchment boundary. To the south and southwest the groundwater body boundary is formed by the contact with the Dinantian Pure Bedded Limestones of the Skean Meeglan GWB and, to the northeast, by

contact with the Dinantian Sandstones of the Glenade Dowra GWB. The topography is mountainous, consisting primarily of steep-sloped upland cut by narrow river valleys.

The groundwater body is composed of low permeability rocks although localised zones of enhanced permeability can occur in the vicinity of fault zones. Groundwater flow will be concentrated in fractured and weathered zones and in the vicinity of fault zones.

Recharge will occur diffusely through the subsoils and via outcrops, primarily in the upland areas where the subsoil is thinnest. The high drainage density in the uplands suggests that a high percentage of potential recharge is rejected.

Groundwater within the body is generally unconfined. Most flow will occur near the surface of the rock. The effective thickness of the aquifer is likely to be not more than 15 m, comprising a weathered zone of a few metres and a connected fracture zone below this, although deeper inflows could occur where there has been a higher degree of structural deformation. Due to the low permeability nature of the rocks in this groundwater body, groundwater flow will be of a local nature. Flow path lengths will be relatively short, and in general are between 30 and 300 m. Local flow directions are controlled by local topography.

Overall, groundwater flow within the body will be generally towards the River Shannon and Lough Allen in the centre of the body. In the extreme southwest of the body the general groundwater flow direction will be southwestwards towards the Geevagh/Ballyfarnan valley. Groundwater discharges to the streams crossing the aquifer, and locally to Lough Allen.

Curlew Mountains Groundwater Body

This roughly rectangular northeast-southwest trending groundwater body is bounded to the north, west and east by topographic highs which form the surface water catchment of the Shannon RBD. Part of the northern boundary is formed by the contact with the Pure Bedded Limestones of the Skean Meeglan GWB, while the southern boundary is formed by the contact with the Pure Bedded Limestones of the Carrick on Shannon GWB. The body includes both the upland slopes of the Curlew Mountains and more low-lying areas in the vicinity of Lough Gara and Lough Key.

The groundwater body is composed primarily of low permeability rocks, although localized zones of enhanced permeability do occur in the vicinity of fault zones. Small isolated areas of higher permeability rocks occur within the groundwater body.

Groundwater flow will be concentrated in fractured and weathered zones and in the vicinity of fault zones. Recharge will occur diffusely through the subsoils and via outcrops, primarily in the upland areas where the subsoil is thinnest. The high drainage density in the uplands suggests that a high percentage of potential recharge is rejected.

Groundwater within the body is generally unconfined. Most flow will occur near the surface of the rock. In general, the effective thickness of the aquifer is likely to be not more than 15 m, comprising a weathered zone of a few metres and a connected fracture zone below this. However deeper inflows can occur. Due to the low permeability nature of the rocks in this groundwater body, groundwater flow will be of a local nature. Flow path lengths will be relatively short, and in general are between 30 and 300 m.

Local flow directions are controlled by local topography. Overall, groundwater flow within the body will be in a southerly direction away from the mountains towards the low-lying areas, the rivers Lung and Boyle, and Lough Gara and Lough Key. In the east of the body overall flow direction will be towards the River Shannon.

Groundwater discharges to the streams crossing the aquifer, and locally to Lough Gara and Lough Key.

Glenade Dowra Groundwater Body

Aquifer categories

Lm: Locally important aquifer which is generally moderately productive.

Main aquifer lithologies

Dinantian Sandstones

This groundwater body underlies the valleys of the upper River Shannon and its main tributary, the Owenmore, northeast of Lough Allen. Its boundaries are formed by its contact with the low permeability shales and sandstones of the surrounding Lough Allen Uplands GWB and by topographic highs which form the boundary of the surface water catchment of the Shannon RBD.

The groundwater body is composed of Dinantian Sandstone (Glenade Sandstone Formation) which overlies the Dinantian Mixed Sandstone, Shale and Limestones (Meenymore Formation) of the Lough Allen Uplands GWB. The Dinantian Sandstones are considered to have the potential for relatively high fissure permeability. The dominant sandstone lithology means that fractures where they occur are more likely to remain open. The Dinantian Sandstones are however less permeable than the Karstic Dinantian Pure Bedded Limestone to the north.

Groundwater flow will occur along fractures, joints and major faults. Recharge occurs diffusely through the subsoils and via outcrops. Point recharge can occur through collapse features in the sandstone related to weaknesses in the underlying karstified limestone.

Groundwater within the body is generally unconfined. Most flow in this aquifer will occur in a zone near the surface of the rock. In general, the effective thickness of this aquifer is likely to be about 30m, comprising a weathered zone of a few metres and a connected fracture zone below this. However, deep-water strikes in more isolated faults/fractures can be encountered. Regional groundwater flow is expected to be towards the River Shannon and southwest towards Lough Allen.

On a local scale, groundwater flow will be influenced by local topography and generally flow towards the streams and rivers crossing the aquifer. Groundwater discharges are to the River Shannon and its tributaries and to Lough Allen in the southwest.

5.6.7 Source Protection Zones

A number of public water supplies are located within the masterplan area, with associated public supply inner and outer source protection areas. The following public water supplies (PWS) are shown to be within the masterplan area by the GSI:

- Whitegate PWS adjacent to Lough Derg
- Lorrha PWS, located near Portumna
- Banagher PWS
- Newtowncashel PWS, near Lough Ree
- Rockingham PWS at Boyle

The source protection zones located within the masterplan boundary are presented in Figure 14. Two springs supply the Whitegate PWS while other springs in the area discharge into nearby streams. Two springs also supply the Newtowncashel supply (Slawn and Ballagh). Rockingham Spring supplies water for the Boyle-Ardcan Water Supply Scheme, and production boreholes were drilled in 1990 to increase output. The other public water supplies are groundwater fed, typically from limestone bedrock.

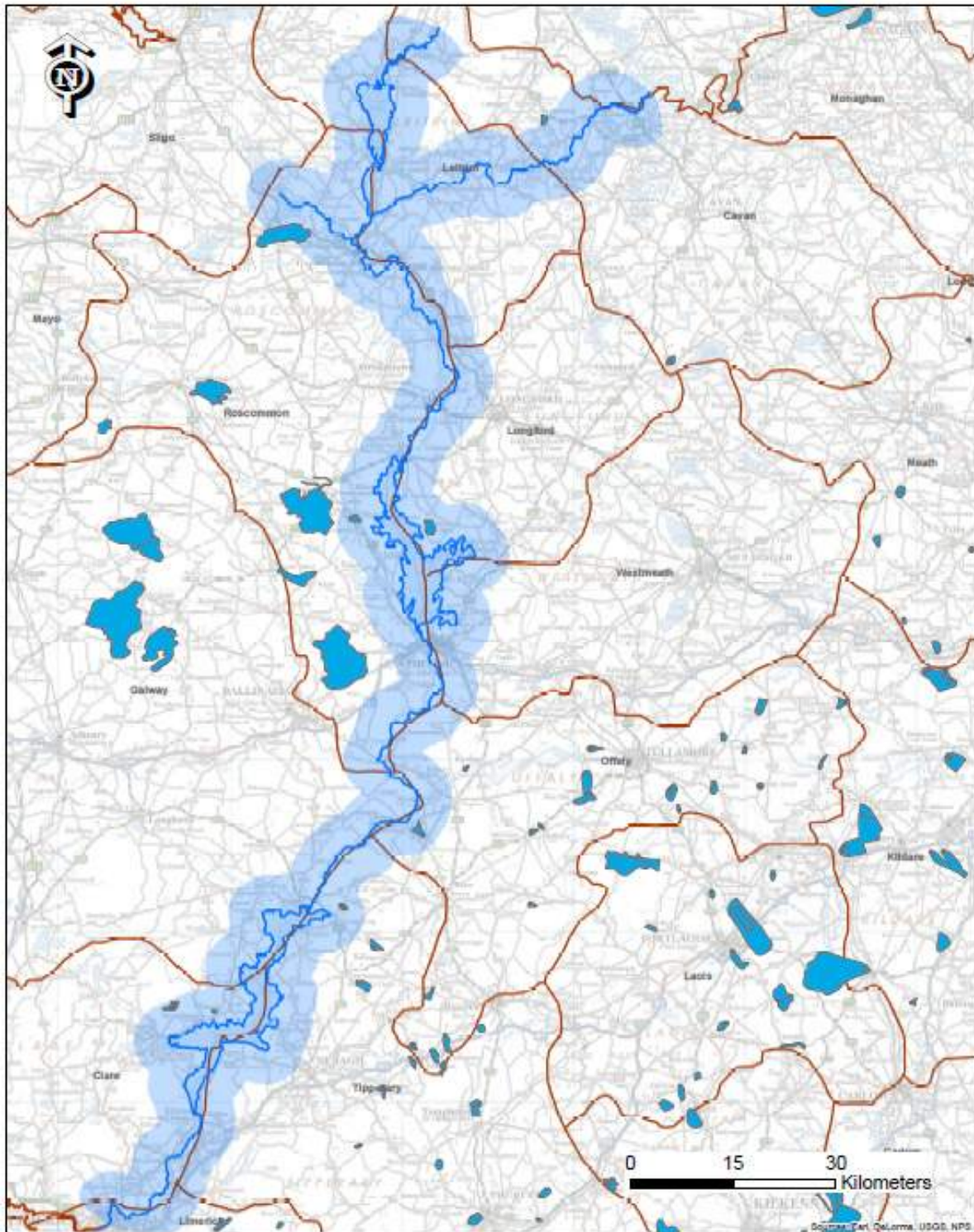


Figure 15 Shannon Masterplan Area - Source Protection Zones

5.6.8 Groundwater Quality - Groundwater Waterbodies at Risk

The following groundwater waterbodies within the masterplan area were categorised as being at risk under the Water Framework Directive, according to the EPA:

- Limerick City East, IE_SH_G_138 Poor Chemical Groundwater Status
- Carrick on Shannon, Code IE_SH_G_048, No details available

5.6.9 Flooding

A number of flooding events have occurred along the Shannon, in particular flooding events are noted by the OPW south of Ballina and in the Portumna area. The middle Shannon catchment i.e. between Lough Allen and Athlone, had record levels in the winter of 1999/2000 and there was extensive flooding of land along the river in this section.

The River Shannon is slow moving and any flood waters stay within the flood plains for long periods. The presence of lakes and the restrictive capacity of the river channel has a marked effect in attenuating run-off resulting in a lag of many days between causal rainfall and resultant run-off.

The Shannon Flood Risk State Agency Co-ordination Working Group was established by the Government in January 2016. It has published and consulted on its Work Programme and it is a solutions-focussed group that added value to the Shannon CFRAM Study by ensuring the best possible level of co-ordination between all statutory bodies involved in flood risk management of the Shannon River Basin. The Group is trialling the lowering of the lake levels on Lough Allen since 2016. It is examining a plan for strategic maintenance, to help reduce further deterioration of the River Shannon, and is also examining the development of viable flood risk reduction measures in the Shannon Callows.

Flood Events

Details on flood events from the last 10 years have been obtained from floodmaps.ie, the OPW database. Many of the reported flood events were the result of extensive flooding on the Shannon which occurred in November and December 2009. The Met Éireann Monthly Weather Summary for November 2009 reported that persistent and often heavy rain and saturated ground conditions led to unprecedented levels of flooding in parts of the West and South. Rainfall totals for November 2009 were the highest on record at most monitoring stations. Rain or showers were recorded on almost every day, with between 22 and 27 wet days observed (days with 1mm or more rainfall), compared with the normal range of 13-20 wet days for the month of November.

Following this flooding, a water levels profile survey was undertaken by OPW staff and the water levels varied from 31.92m OD to 42.44m OD (Malin Head).

Record flooding hit the Shannon river basin in late November 2009. In the Athlone area, the river levels were higher than previously observed since records began a century before. Overall, the area under water nearby doubled, with close to 20,000 hectares flooded.

The Castleconnell, Mountpelier and Castletroy areas of Limerick County were severely affected as a result of the increased levels of water in the Shannon System. This increase in water levels subsequently necessitated the ESB to increase the amount of water discharged at Parteen Weir.

5.6.10 Shannon CFRAM Programme

The CFRAM Programme was the first phase in proactively addressing flood risk in Ireland. In the second cycle of the implementation of the EU 'Floods' Directive, from 2017 – 2021, it is foreseen that there will be a greater level of assessment of rural and dispersed risk, such as for individual homes and farm properties, agricultural risk and access roads to properties.

The OPW has undertaken a catchment-based Flood Risk Assessment and Management (CFRAM) Programme to give a clear and comprehensive picture of flood risk in areas at significant risk and impact of flooding and to set

out how the risk can be managed effectively and sustainably. This is a strategic approach that recognises the need, in line with international best practice, to move to a more sustainable, planned and risk-based approach to dealing with significant flooding risks.

The study is focussing on areas of significant flood risk and impact that were identified through an assessment of areas known to have experienced flooding in the past and areas that may be subject to significant flooding in the future.

The 2018 CFRAM Flood Risk Management Plan for the Shannon Upper & Lower River Basin (UoM 25/26) includes the masterplan area. The purpose of the Plan is to set out the strategy, including a set of proposed measures, for the cost-effective and sustainable, long-term management of flood risk in the River Basin, including the areas where the flood risk has been determined as being potentially significant.

The Plan is for the period of 2018-2021 and sets out the feasible range of flood risk management measures proposed. The preparation of the plan is part of the implementation of Government policy on flood risk management, as set out in the Report of the Flood Policy Review Group (OPW, 20043), and addresses Ireland's obligations under the 2007 EU 'Floods' Directive (EU, 20074).

There is an existing Flood Relief Scheme providing protection to properties in the following communities. Ongoing maintenance will be undertaken of schemes including the following within the masterplan.

All river (Athlone) Flood Relief Scheme

- Limerick City & Environs - Clancy Strand (Limerick) Flood Relief Scheme
- Limerick City & Environs - Harry's Mall (Limerick) Flood Relief Scheme
- Limerick City & Environs - Howley's Quay (Limerick) Flood Relief Scheme

There is a Flood Relief Scheme already in design or construction for the following communities, which will continue to be progressed:

- Limerick - (King's Island) Flood Relief Scheme

For the following areas in the masterplan, it is proposed in the plan that a flood relief scheme is progressed to project-level development and assessment, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation:

- Athlone
- Boyle
- Carrick on Shannon
- Castleconnell

5.6.11 Surface Water Quality - Lake and River Waterbodies at Risk

The EPA has identified those surface water bodies *At Risk* of not meeting their environmental objectives. Following this, detailed assessment were undertaken by the EPA to identify the likely significant pressures preventing the water bodies from achieving the required environmental objectives. The locations of the *At Risk* surface water bodies are presented in Figures 15 and 16.

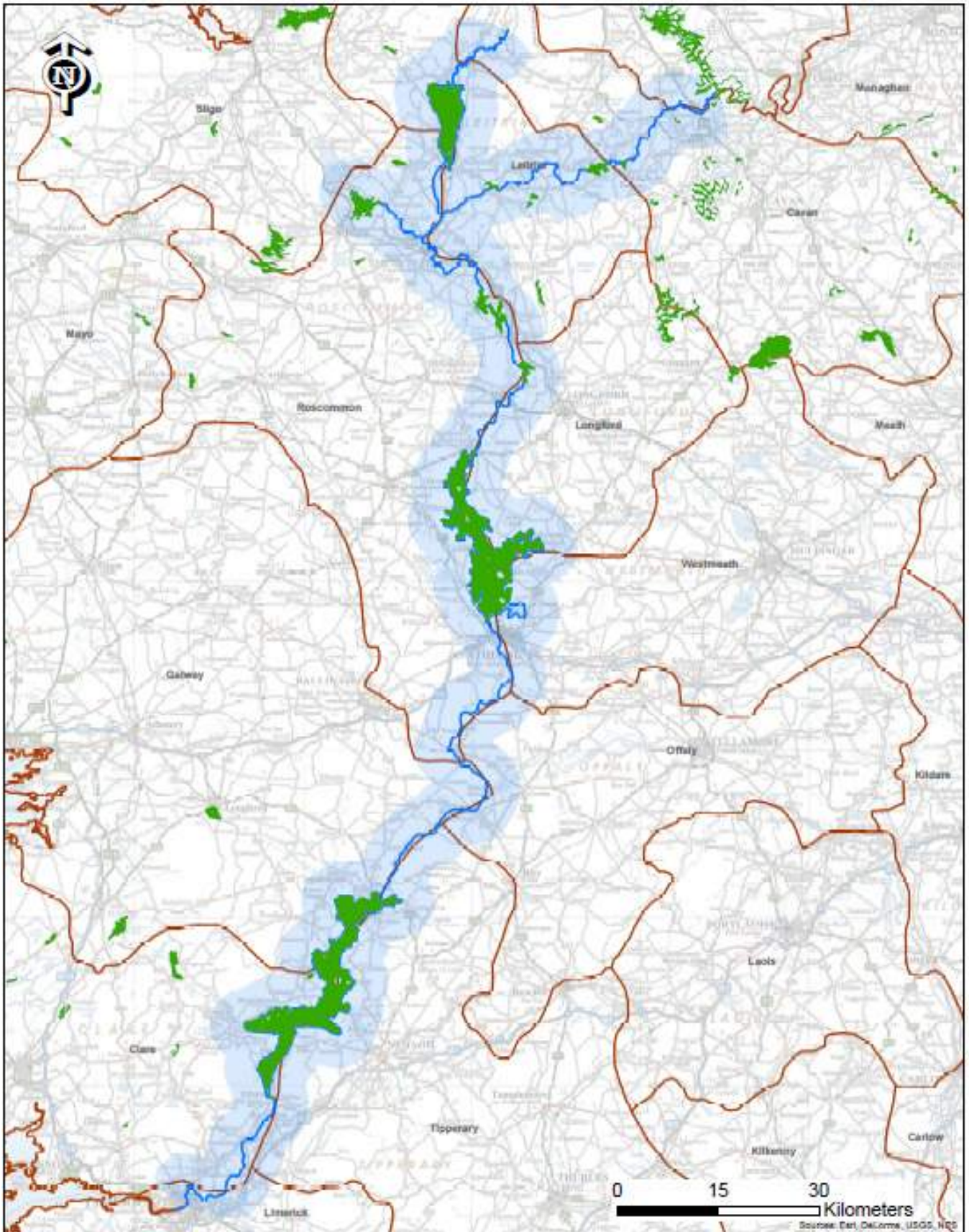


Figure 16 Lake Water Bodies at Risk

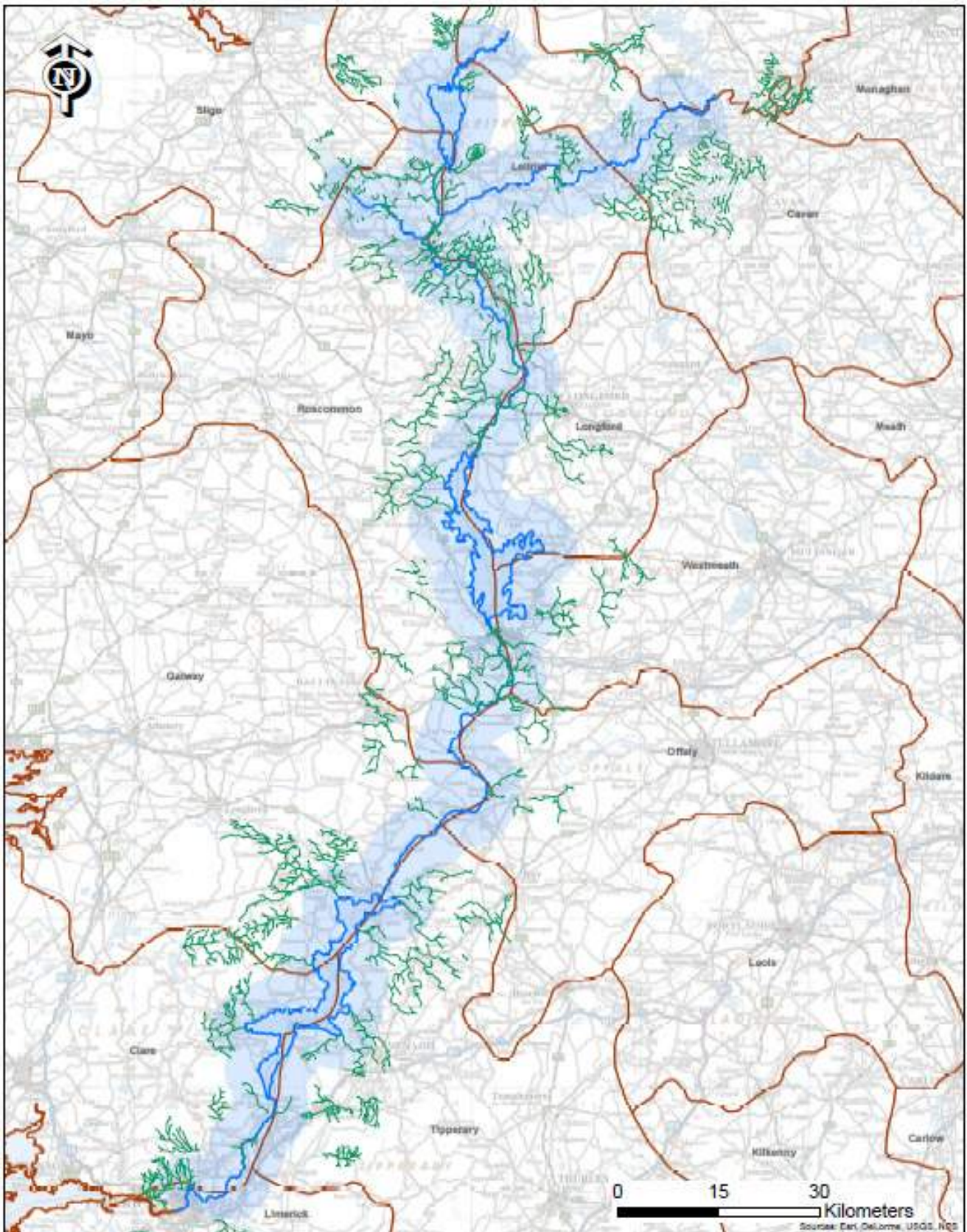


Figure 17 River Water Bodies at Risk

The following lake waterbodies within the masterplan area were categorised as being at risk under the Water Framework Directive, according to the EPA:

- * **Lough Derg TN**
Code IE_SH_25_191a
Poor Biological Status or Potential
Poor Fish Status or Potential

- * **Lough Ree**
Code IE_SH_26_750a
Moderate Ecological Status or Potential
Moderate Macrophyte Status or Potential

The Lough Derg WFD Management Unit Action Plan which was published with the Shannon RBMP in 2009 lists the pressures / risks to Lough Derg as including diffuse nutrient sources from agriculture (71%), unsewered properties (10%) and forestry (8%). 7% of nutrients was noted to come from wastewater treatment plants.

The Lough Ree River Hind WFD Management Unit Action Plan lists the pressures / risks to Lough Ree as including diffuse nutrient sources from agriculture (73%) and unsewered properties (80%). 9% of nutrients was noted to come from wastewater treatment plants.

A number of river waterbodies which discharge to the lakes within the masterplan area are determined by the EPA to be at risk including:

- * **KILCROW_070**
Code IE_SH_25K010700

- * **NENAGH_070**
Code IE_SH_25N010800

- * **SHANNON (Upper)_120**
Code IE_SH_26S021800

- * **HIND_030**
Code IE_SH_26H010500

5.6.12 Bathing Water

For water based recreational activities, particularly those that are immersive, such as swimming, faecal contamination from sewage and animals is a cause of concern for public health as swimming in contaminated waters can result in illness.

The major sources of pollution responsible for faecal bacteria in surface water come from sewage and from farmyards and farmland where animals are housed or put out to pasture. Where bacteriological pollution in surface waters is a problem, there will be an increase in pollution during periods of heavy rains and floods, when the bacteriological pollutants are washed into rivers and seas.

In terms of surface water pollution, potential point sources of sewerage in a catchment are from poorly maintained or over capacity Waste Water Treatment Plants, domestic wastewater treatments systems including septic tanks, miss connections in the sewerage network and storm overflow from combined sewers.

From desk based research carried out, there are no particular water quality standards for Blueways. However, there are a number of comparable quality standards for bacteria in surface water which could be used as the Environmental Quality Standard for a Blueway.

The bathing water standards most relevant to the Shannon Masterplan area are the Blue Flag Water Quality Standard and the Bathing Water Directive.

The EU Bathing Water Directive (2006/7/EC)

The Bathing Water Directive sets quality standards and provides monitoring guidelines for EU bathing sites. It was first issued 40 years ago, in 1976, and revised in 2006. It requires the monitoring of bathing water quality. Member states are required to

- identify national bathing water sites,
- define the length of their bathing season
- establish a monitoring calendar for each bathing water site before the start of the bathing season.
- ensure that the analysis of bathing water quality takes place in accordance with the reference methods specified in the directive.
- make the results of the analysis available to the public.

Water quality Standards under the Bathing Water Directive are set out in Table 10 below for microbiological contamination.

Table 10 Bathing Water Directive Quality Limits for Inland Water

Parameter	Excellent Quality	Good Quality	Sufficient
Intestinal enterococci (cfu/100 ml)	200	400	330
Escherichia coli (cfu/100 ml)	500	1000	900

Besides the monitoring of bacteria concentrations, bathing (Blue Flag) water sites are also regularly inspected for other potential hazards such as cyanobacterial proliferation, chemical spills, marine litter etc. If such events affect bathing water sites and present a threat to human health, information is made available to the public at the bathing water's location (signs and boards), through the media, via bathing water profiles etc.

Bathing Locations

Ballycuggeran is on the south-west of Lough Ree. According to www.beaches.ie it is monitored by Clare County Council and is classified as achieving excellent water quality in 2018 based on the assessment of bacteriological results for the period 2015-2018. Ballycuggeran has achieved an excellent water quality rating for the four consecutive years 2015-2018. Annual water quality ratings are generally calculated using monitoring results over a four year period and are assess against stringent bacterial limits to protect bather health.

Portumna is on the north of the lake. According to www.beaches.ie it is monitored by Galway County Council and is classified as achieving excellent water quality in 2018 based on the assessment of bacteriological results for the period 2015-2018. Bathing place at Portumna has achieved an excellent water quality rating for the four consecutive years 2015-2018. Annual water quality ratings are generally calculated using monitoring results over a four year period and are assess against stringent bacterial limits to protect bather health.

Blueway Water Quality Monitoring

Where considered appropriate, the water quality in the Blueway should be tested against the Environmental Quality Standard for microbiological contamination as set out in the EU Bathing Water Directive for Excellent Quality inland waters.

5.6.13 Transboundary Issues

For the River Basin Management Plan for Ireland 2018-2021, the Eastern, South Eastern, South Western, Western and Shannon River Basin Districts will be merged to form one national River Basin District. In relation to the North Western and Neagh Bann International River Basin Districts a single administrative area will be established in the Republic of Ireland portion of these two IRBDs for the purpose of coordinating their management with authorities in Northern Ireland.

Overall coordination for the implementation of the Water Framework Directive between Northern Ireland and the Republic of Ireland is undertaken, on a bilateral basis of Ministerial level, between the Minister with responsibility for the Environment in the North and the Minister for the DoEHLG in the Republic.

5.6.14 Wastewater

Wastewater is an important element of infrastructure for the Shannon Masterplan. Table 11, following, provides a comprehensive list of the wastewater treatment plants within the Study Area which are to be upgraded, or have already been upgraded².

Table 11 Planned Upgrade to Wastewater Treatment Plants in the Masterplan Area

Planned WWTPs	Status	Completion date	Works
Ballinamore and Leitrim Village Wastewater Treatment Plants Upgrade	Planned	2021	Upgrade works which comprise of: new combined inlet works, new bypass screen, stormwater holding tank
Ballinacorney Wastewater Treatment Plant Upgrade	In progress	2020	Upgrade of capacity and discharge quality in compliance with EU regulations which comprise of: Construction of new inlet works; storm water holding tank; A new secondary biological treatment process and settlement tanks and a new sludge storage facility
Tarmonbarry Wastewater Treatment Plant Upgrade	Planned	2021	Improvement works which include upgrades to the inlet works, storm water management and sludge treatment and storage at the facility.
Galway Wastewater Treatment Plant Upgrade (Ballinasloe)	Planned	2021	Improvements include: Upgrade the inlet works at the plant. Install storm water storage tanks. Install 2 No. pumping stations at the site to upgrade storm water management.
Offaly Wastewater Treatment Plants Upgrade	Planned	2021	Improvement works include upgrades to the storm water management and upgrades to the sludge treatment and storage facilities.

² According to www.water.ie on 7th June 2019

Planned WWTPs	Status	Completion date	Works
Nenagh Water Conservation and Wastewater Network Project	Completed	2017	Upgrades and replacements made to the aging sections of the wastewater network
Offaly Wastewater Treatment Plants Upgrade (Birr)	Planned	2021	installation of below ground storm water holding tanks and storm pumps, inlet works, upgrade the effluent pumping station and existing sludge holding tanks. Upgrade the storm water management and sludge treatment at the Birr plants through the installation of constructed wetland and Sludge Drying Reed Beds.
Limerick City Sewer Surveys	In progress		Survey being undertaken which is examining 22km of sewer pipe to construct a hydraulic model to prioritise the sewers in biggest need of upgrade.

5.7 Air

There are no air quality monitoring stations along the entire length of the Masterplan study area for the island of Ireland. The nearest two EPA air monitoring locations are located in Roscommon and Longford, to the west and east of the Masterplan area, outside the 5km inclusion zone, but within a short distance to each other.

Table 12, following, shows the location of these stations.

Table 12 Air Quality Monitoring Stations

Air Monitoring No	Location	Type
Longford LD1	Dublin Road, Longford Town	Current monitoring site (EPA)
Roscommon Town RN01	Facilities yard, Roscommon County Council Offices, Roscommon Town	Current monitoring site (EPA)

PM₁₀ are very small particles; their main sources are the combustion of solid fuels and road traffic, in particular emissions from diesel engines. Other particulates include dust from roads, industrial emissions and natural substances such as windblown sea salt. PM₁₀ can also be caused by emissions of gaseous precursors (NO_x, SO₂ and NH₃), which are transformed by chemical reaction in the atmosphere.

The European Union has required that certain levels of particulates (PM¹⁰) must be reduced by 2005 and maintained thereafter. Table 13, following, shows these requirements.

Table 13 European Air Quality PM¹⁰ Obligations

Particulates (PM ¹⁰)	Concentration measured as ¹⁰	European Obligation	Date to be achieved (by and maintained after)
	24 hour mean	50 µg/m ³ not to be exceeded more than 35 times a year	1 January 2005
	Annual mean	40 µg/m ³	1 January 2005

In Northern Ireland, combined emissions estimates from the UK's National Atmospheric Emissions Inventory (NAEI) show that in 2016, Particulate Matter (PM¹⁰) for the Residential, Commercial and Public Sector was measured as 3.6 µg for the year. There were no reports of the 24 hour mean being breached.

In Ireland, PM₁₀ was monitored at 18 stations across the country in 2007 (the latest year for such figures); all stations were compliant with the 2005 limit value, which permits no more than 35 exceedances greater than 50 µg/m³ in a calendar year. Although below limit values, levels are above the upper assessment thresholds in all four air quality assessment zones. Average levels of PM₁₀ are higher in small towns than in cities, due to higher use of solid fuel for domestic heating. It is noted that the EPA has stated that the highest levels of PM₁₀ measured were found in Ennis, Waterford and Navan, while the majority of the area west and along the Shannon was found to have the lowest measurements.

Air quality in the vicinity of the Masterplan area is generally considered to be good, due to the low development density and the limited concentrations of industrial operations in the area. There are a number of national and regional roads with run adjacent to, or in close proximity to, the proposed masterplan area. There are potentially notable sources of local anthropogenic pollution.

5.8 Climate

The United Nations Intergovernmental Panel on Climate Change (2007), in its 4th assessment report (AR4) has stated that there is unequivocal evidence of climate change and that much of the global temperature increases *"since the mid-20th Century is very likely to the observed increase in anthropogenic greenhouse gas concentrations."*

Climate change may have substantial impacts on coastal and riparian development with increases in flood risk and sea level change. In Ireland, wetter winters are anticipated in addition to these changes, which may result in further anticipation of climate change effects. The impacts of climate change may have serious consequences along coastal and large tidal river settlements and may have impacts on natural and artificial waterbodies.

Other effects of climate change include

- Increases in frequency and intensity of rainfall
- Increases in peak river flows
- Increased frequency of storms
- erosion

Future development must therefore be adaptable and resilient to climatic changes, and projects arising from the proposed Masterplan must be developed to ensure future drainage and flood risk are taken into account.

Sectoral Impacts of Climate Change must also be considered, particularly with respect to biodiversity due to increasing temperatures which will impact upon the geographical range and phenology (the timing of life cycle events) of native species. Projected shifts in climate, temperature and precipitation may also result in the increased occurrence of invasive species and competitive pressures on Ireland's native species.

Critical infrastructure such as water, energy, communications, transport and emergency services are also at risk from a range of projected changes, including sea-level rise, increasing temperatures, changing rainfall patterns and extreme weather events. In relation to water management the projected changes are expected to impact on water management and will exacerbate existing pressures in terms of water supply, quality and flooding. (Source: *Climate Ireland*).

Within the study area, the annual average air temperatures (measured at Clones, Co. Monaghan, Mullingar, Co. Westmeath and Shannon Airport, Co. Clare) from 1978-2010³ were 9.8°C, with an average of 3.47 hours of sunshine per day. Mean annual rainfall over this period was 959.77mm. Rainfall patterns are typical of what might be expected in terms of wind patterns and topography in the area. Table 14, following, provides the averages of sun, wind and rain for the three weather stations used for this study.

Table 14 Weather Averages 1978-2010

Weather Station	Average Temperature	Average Daily Hours of Sunshine	Average Monthly Wind Speed (m/s)	Average Rainfall per year
Clones*	9.4°C	3.3 hours	4.01 m/s	960.4mm
Mullingar (central)**	9.3°C	3.6 hours	3.91m/s	941.3mm
Shannon Airport***	10.7°C	3.5 hours	4.68m/s	977.6mm
Overall Average	9.8°C	3.47 hours	4.2 m/s	959.77mm

*Figures taken from Met Eireann Historical Data 1978-2007 – northernmost long-term weather station in proximity to River Shannon
**Figures taken from Met Eireann Historical Data 1979-2008 – centremost long-term weather station in proximity to River Shannon
***Figures taken from Met Eireann Historical data 1981-2010 – Southernmost long-term weather station in proximity to River Shannon

5.9 Material Assets

The study area of the Shannon Masterplan encompasses road corridors within mostly rural areas with low density of development. These corridors link a variety of settlements, from village to city across the counties of Fermanagh (Northern Ireland), Cavan, Leitrim, Roscommon, Longford, Westmeath, Offaly, Galway, Tipperary, Clare and Limerick. The implementation of the Masterplan has the potential to impact upon these material assets.

There are 36 significant roads which intersect with the Masterplan area, including the M6, M7, N3, N87, N4, N5, N63, N6, N56, N7, N20, N69 and N18. In Northern Ireland, the Masterplan area intersects with the A509 and the Ballyconnell Road. The Masterplan area encompasses 8 rail stations and crosses 4 rail lines that are located within 1km of the 5km inclusion zone. The Masterplan area also crosses 14 power line routes, including 11 no.110kV, 2 no. 220kV, and 1 no. 400kV.

Development of the Shannon Masterplan has the potential to increase the intensity of usage in relation to material assets such as roads, walkways and cycleways and other recreational infrastructures. The intensification of use may result in the need for capacity improvements and investment in new material assets should avoid areas at risk of flooding and should focus primarily on improvements that relate to more sustainable forms of transport.

³ Met Eireann “30 year averages”

5.9.1 Fisheries and Aquaculture

The River Basin Management Plan for Ireland 2018 – 2021 highlights key measures aimed at moving towards meeting the environmental objectives of the Water Framework Directive. The key measures are in line with the pressures identified through the characterisation process and include:

- To work to address significant pressures arising from hydromorphology, the EPA and Inland Fisheries Ireland will improve assessment methods and knowledge in relation to the physical condition of rivers lakes and marine coastal waters to inform and support future management measures. The Office of Public Works (OPW) will incorporate mitigation measures when undertaking channel maintenance over 2,000 kilometres per year.
- In addition, the feasibility of implementing measures to improve fish connectivity in the Lower Shannon catchment will be assessed

It is also worth noting that areas of shellfish aquaculture are located further downstream of the masterplan area, in the Shannon Estuary. These areas are governed by the provisions of the **European Union Shellfish Waters Directive** which is designed to protect the aquatic habitat of bivalve and gastropod molluscs, including oysters, mussels, cockles, scallops and clams. The directive has a number of different strands:

- It requires all member states, including Ireland, to designate waters that need protection in order to support shellfish life and growth.
- It sets physical, chemical and microbiological requirements that designated shellfish waters must either comply with or try to improve.
- It allows for the establishment of pollution reduction programmes for the designated waters.

5.10 Cultural, Archaeological and Architectural Heritage

There is the potential for both direct and indirect impacts on archaeological and architectural features and their settings as a result of siting of new tourism facilities and supporting infrastructures. The key issues associated with the development of the masterplan and cultural heritage relates to:

- Impacts on archaeological features and setting;
- Potential impacts for unknown archaeological features during construction of new infrastructure and/or land cover changes; and
- Potential impacts for underwater archaeological features during construction of new infrastructure and/or upgrades.

5.10.1 Archaeological and Architectural Heritage

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

- 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 Arts, Heritage and the Gaeltacht;
- 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, Planning and Local Government [previously the Minister for Environment, Heritage 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.

At present there are no UNESCO sites within the masterplan area, however the following which have been submitted on the Tentative List are located wholly or partially within the study area. They include

- the Monastic City of Clonmacnoise and its Cultural Landscape
- the Early Medieval Monastic Sites (Clonmacnoise, Durrow, Glendalough, Kells and Monasterboice),
- the Royal Sites of Ireland (Dún Ailinne, Hill of Uisneach, Rathcroghan Complex and Tara Complex).

There are 22 monuments within the 5km inclusion zone from Aghalane to Ballyconnell along the Shannon -Erne canal located within Northern Ireland. There are 4,885 national monuments located within the 5 km inclusion zone from Aghalane through the Shannon Erne Waterway, from the source of the Shannon at the Shannon Pot, through Lough Allen southwards to Sarsfield Lock in Limerick. There are 320 National Monuments either in State ownership or State care throughout the Masterplan area.

The Shannon Masterplan area seeks to combine existing walking, hiking and cycling trails, existing greenways, river-walks and the navigable waterways within the region. There are also proposed trails, greenways, and river-walks, separate to the Masterplan which are also within the Masterplan area. As a result of the Shannon Masterplan, there may be additional activity trails, and walkways throughout the Masterplan region.

Any construction activity has the potential for direct negative impacts on heritage features, especially in areas known for rich heritage such as watercourses, hilltops and historic transportation corridors. There is potential during the course of development to uncover new heritage features. There is also potential to enhance existing heritage sites through incorporation in detailed design which may be a step towards the overall preservation and restoration of cultural heritage sites.

5.10.2 Industrial Heritage

There are a number of sites such as buildings and structures listed for their Industrial heritage importance within the National Industrial Engineering Heritage (NIEH) maintained by the Engineering Department of Trinity College. There are a number of water-related engineering features listed, for example: the engineering complexes of the adjacent Grand and Royal Canals, water mills, bridges and weirs, lighthouses and breakwaters.

5.11 Landscape and Visual Amenity

In 2002, Ireland ratified the European Landscape Convention which promotes the protection, management and planning of landscapes. The National Landscape Strategy for Ireland 2015-2025 was published “to ensure compliance with the European Landscape Convention and establish principles for protecting and enhancing the landscape while positively managing its change.”

Article 1a of the European Landscape Convention defines landscape as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors”.

This definition has been included in the Planning and Development (Amendment) Act 2000 as amended, along with the requirement that objectives relating to landscape shall be included in development plans. Owing to this, County Development Plans typically contain objectives/policies to conserve scenic viewpoints, scenic routes, areas of high amenity or similar. However, the types of landscape designations and levels of protection vary considerably from county to county.

Similarly, this applies to Landscape Character Assessments (LCAs), which are available for most counties, but are uncoordinated and provide different levels of detail. The National Landscape Strategy contains an objective for the development of a National Landscape Character Assessment, which is awaiting implementation. The

absence of a National Landscape Character Assessment, which will impede the consistent assessment of potential impacts.

The key issues associated with the development of the Shannon Masterplan and landscape relate to:

- impacts on designated landscapes, e.g. due to the visibility of potential new tourism developments or alterations to existing sites;
- impacts on landscape character, e.g. due to land use changes or due to increased visitor numbers, resulting in changes to how a landscape is experienced;

The Shannon Masterplan study area comprises a variety of numerous landscapes which include lakelands, river valets, raised bogs, drumlins, rolling farmlands and others. Many of these landscapes, such as the Shannon Callows, the Upper Lough Erne region and the Lough Ree region are recognised as being distinctive due to their intrinsic character, natural and manmade beauty.

There are also a number of designated landscape areas that are found within the Shannon Masterplan Study area, including Tourism Conservation Zones, Areas of Village Character, Local Landscape Policy Areas. Many of the landscape classifications are designated due to their landscape value, wildlife value and landscape heritage value. These classifications may seek to limit or prevent development that diminishes the quality of the local landscape or may be intrusive.

Other landscape designations may include High Landscape Areas, such as the Erne-Shannon Canal Corridor, and Scenic Viewing points which may be found throughout the study area. These designations may recognise the significant value of local landscape and will also seek to minimise visually intrusive developments upon landscapes of scenic beauty.

The Shannon Masterplan Study Area may also hold additional landscape features, including Areas of Secondary Amenity and areas of Scenic Quality. These features may be highly sensitive to any new development. Extensive development in these areas should be avoided if possible so as to minimise intrusion into the scenic qualities of the area.

Landscape Character

The Shannon Masterplan boundary encloses the Shannon Navigation and Shannon Erne Waterway, as well as a 5km buffer on both sides of the waterway. The Masterplan boundary therefore crosses the boundaries of eleven counties i.e. Cavan, Leitrim, Sligo, Roscommon, Longford, Westmeath, Offaly, Galway, Tipperary, Clare and Limerick, respectively, as well as a County Fermanagh in Northern Ireland.

As mentioned above the LCAs provided for each of these counties vary with regard to the detail provided and were not coordinated with the relevant neighbouring counties. Considering these inconsistencies, as well as the large area covered by the Shannon Masterplan it was decided that for the purpose of landscape the masterplan area is sub-divided into 9 general landscape units (LU), as listed below. These subdivisions are based on any high level descriptions made in the available LCAs (e.g. uplands, boglands, lakelands, etc.), as well as distinct changes of the river morphology, such as when the Shannon widens to form one of the lakes along the course of the river. They take account of landform (i.e. topography) and land cover (e.g. grassland, boglands etc.). The extent of each of the landscape units is illustrated in Figures 17, 18, 19 and 20.

- **LU1 –Shannon Headwaters Uplands.** Description: small winding river, set in narrow undulating farmed river valley, adjoined by steeply sloping mountainsides.
- **LU2 – Lough Allen.** Description: large lake, surrounded by a narrow band of farmed undulating land, adjoined by steeply sloping mountainsides.
- **LU3 – Drumshanbo to Roosky and Lough Key Lakelands.** Description: series of small to medium sized lakes along the course of the River Shannon, as well as in the wider area, surrounded by gently undulating farmed land.

- **LU4 – Shannon-Erne Lakelands.** Description: series of mostly small lakes along the Shannon-Erne Waterway, surrounded by gently undulating farmed land.
- **LU5 – Roosky to Lanesborough Shannon Boglands.** Description: gently winding large river, surrounded by extensive flat boglands, as well as farmland.
- **LU6 – Lough Ree.** Description: large lake surrounded by flat (north) to gently undulating (south) farmland, as well as some boglands.
- **LU7 – Athlone to Portumna Shannon Callows.** Description: gently winding large river, set in extensive farmed floodplains, adjoined by numerous boglands.
- **LU8 – Lough Derg.** Description: large lake surrounded by flat (north) to gently undulating (central) to sloping farmland, as well as some boglands (north).
- **LU9 – Killaloe/Ballina to Limerick Shannon Farmland.** Description: gently winding large river, as well as the Headrace Canal, set in very gently undulating farmland.

Protected Views and Scenic Routes

While each of the twelve counties provides slightly different landscape designations, it was found that most of them have designated a type of protected view and/or scenic route.

A total of 33 protected views and 34 scenic routes were found to be located within the masterplan area, which should be considered in an assessment of the potential impacts of the proposed Shannon Masterplan. Their location is indicated on Figures 12, 13, 14 and 15.

Existing Environmental Pressures / Problems: Landscape

- lack of consistent landscape character assessments and landscape designations throughout the masterplan area, resulting in different importance placed on the protection of landscape in different areas;
- the potential for poor design and siting of proposed development, having impact on existing views and landscape setting;
- changes to existing land uses resulting in impacts on landscape character.

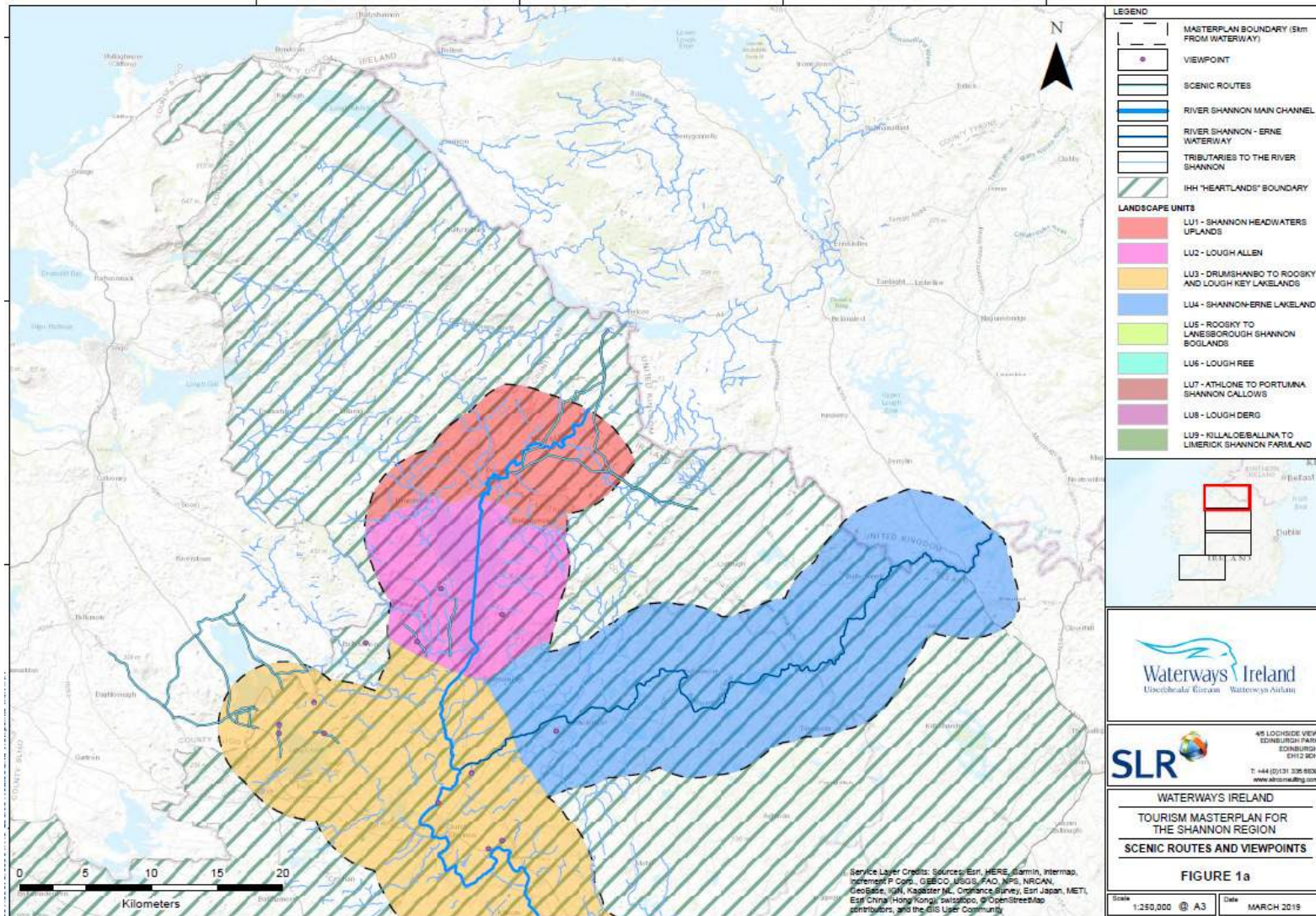


Figure 18 Landscape Character, Scenic Routes and Viewpoints (1a)

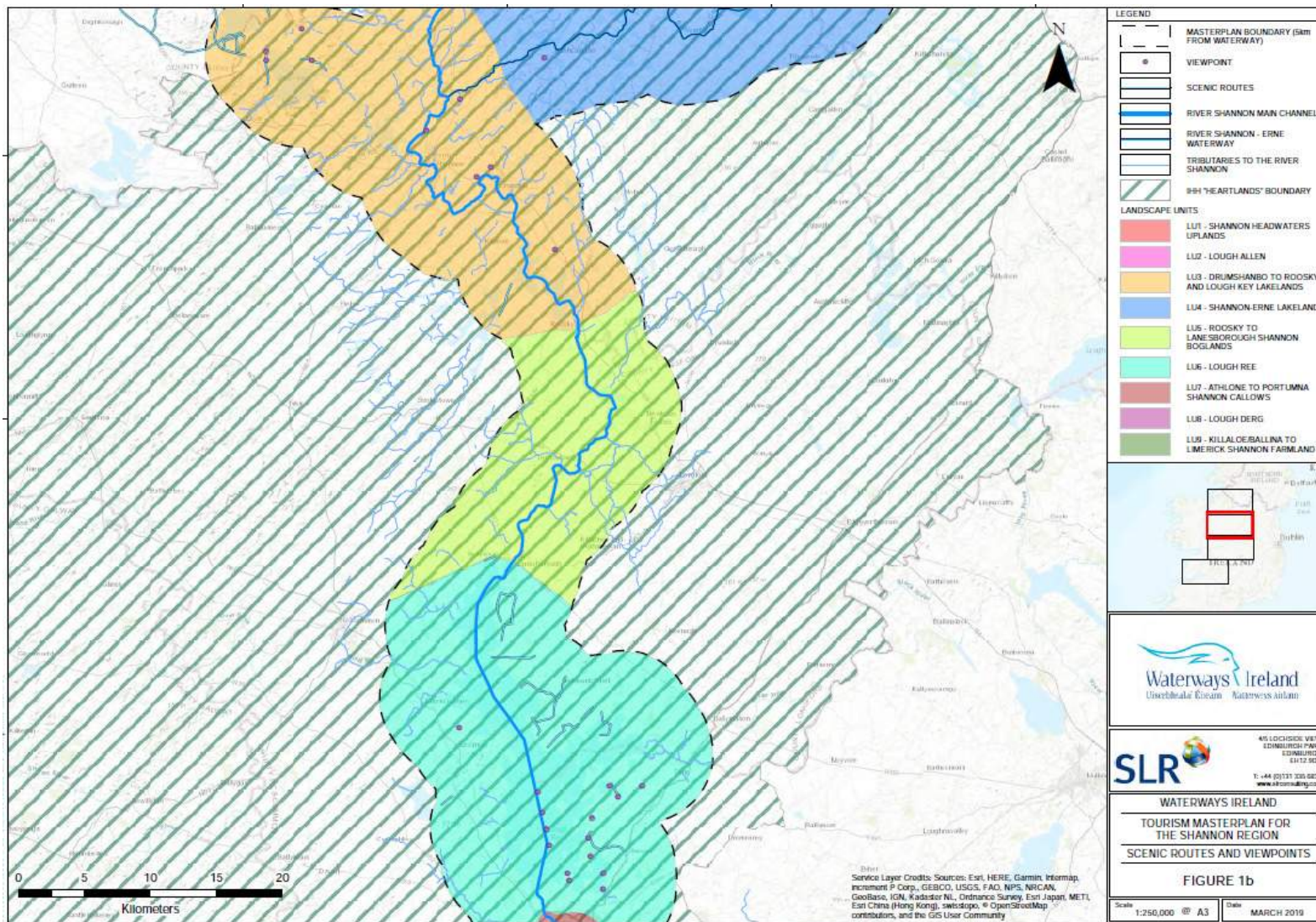


Figure 19 Landscape Character, Scenic Routes and Viewpoints (1b)

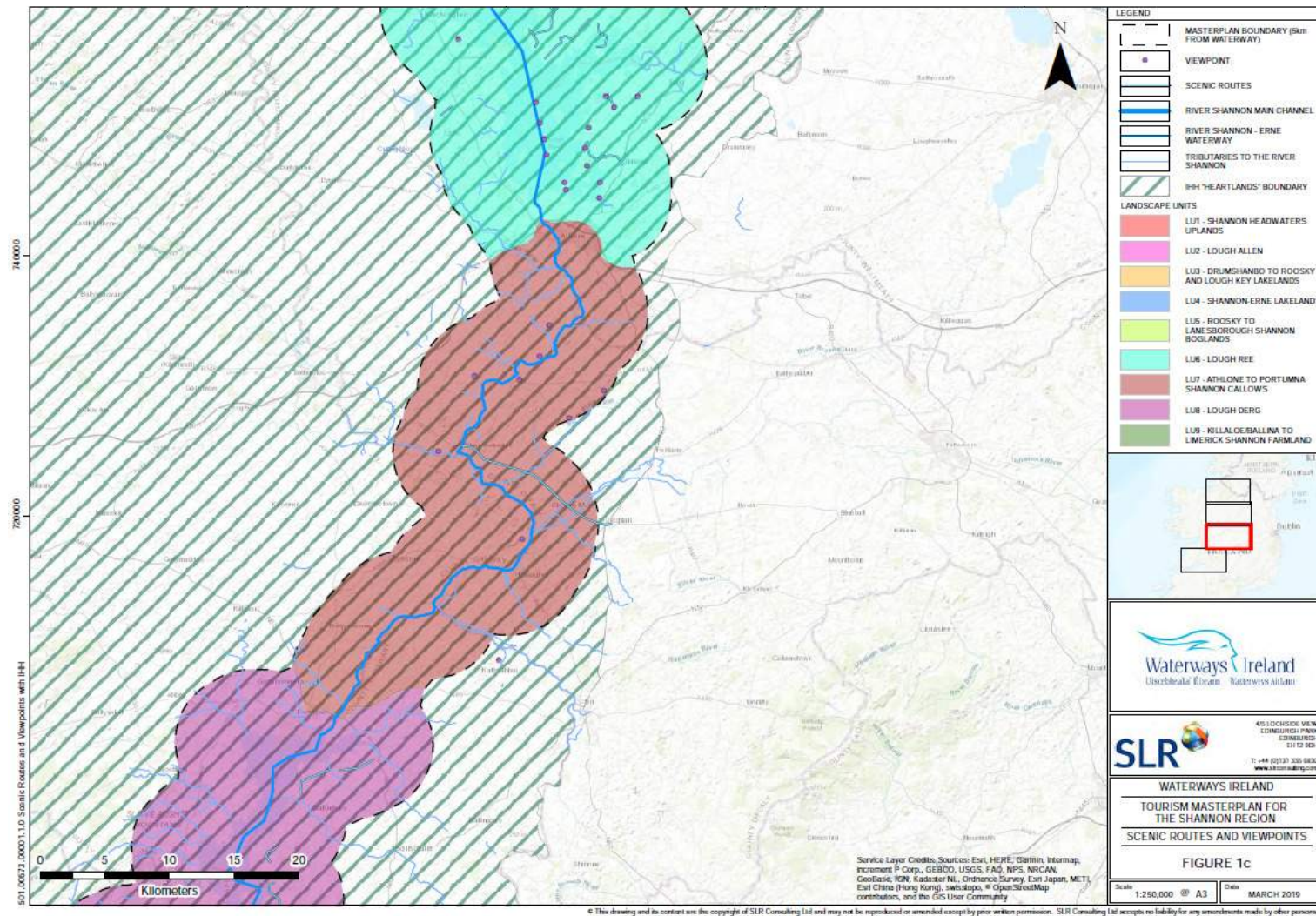


Figure 20 Landscape Character, Scenic Routes and Viewpoints (1c)

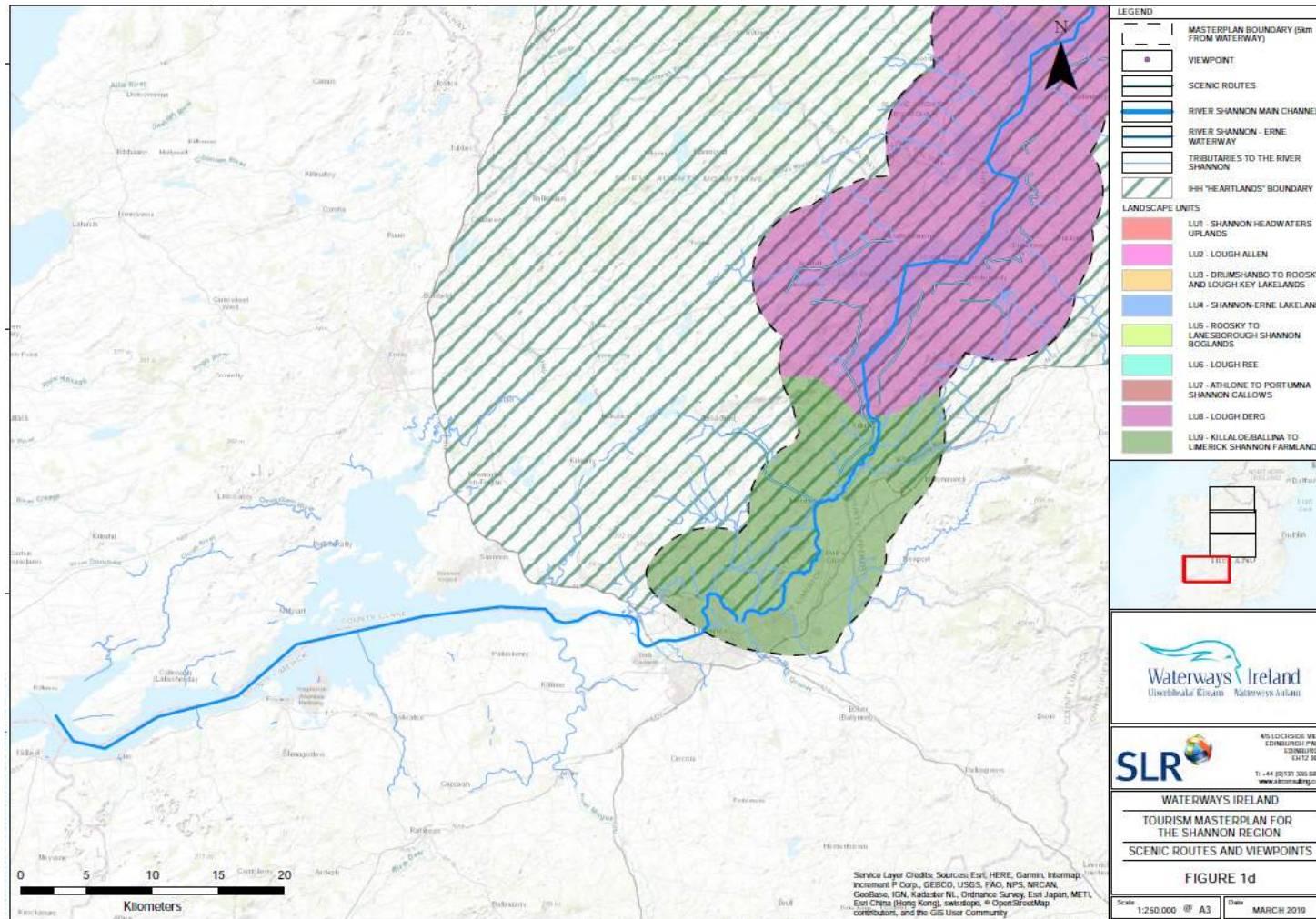


Figure 21 Landscape Character, Scenic Routes and Viewpoints (1d)

6.0 Assessment Framework

6.1.1 SEA Objectives for Shannon Masterplan

The proposed Shannon Masterplan has been assessed against the SEA Objectives in order to examine the significant likely environmental impacts of the Masterplan.

This assessment is strategic and is designed to report likely impacts at the regional level to reflect the scale at which the Masterplan Area is being prepared.

The SEA Objectives, including their indicators can be found in Table 15, following.

Table 15: SEA Objectives for Shannon Masterplan

Ref	Environmental Objective	Indicator
1 BIO	Conserve and enhance habitats and species, with priority protection afforded to sites and species designated under the Habitats Directive.	Loss of habitats and species
2 BIO	Prevent the spread of invasive species	Occurrence of invasive species
3 HEA	Improve health and wellbeing by improving opportunities safe and sustainable transport	Public transport availability Numbers participating in walking and cycling activities
4 WAT	Protect and improve the quality of surface and ground water bodies	WFD water status of surface and groundwaters
5 WAT	Protect water levels	WFD water status of surface and groundwaters
6 WAT	Minimise development in areas of flood risk, where flood risk compatible development is proposed ensure that flood risk does not increase elsewhere.	Interaction with flood extents
7 CLI	To adapt and mitigate the effects of climate change	No of zero carbon tourism developments in the masterplan area Number of people using walking, cycling and public transport as a means of transport
8 HER	To protect the integrity and authenticity of cultural heritage	Status and of cultural heritage features
9 LAN	To protect landscape character, minimise the loss of historic landscape features such as mature trees and hedgerows and scenic views	Number of developments subject to Landscape and Visual impact assessment
10 SOIL	To protect soil resources and minimise the loss of the high quality agricultural land	Area of agricultural land lost Area of cut away bog remediated

7.0 Description, Evaluation and Selection of the Alternative Plan Scenarios

One of the critical roles of the SEA is to facilitate an evaluation of the likely environmental consequences of a range of alternative scenarios for the future development of the plan area. In preparing this tourism masterplan, the following three alternatives were considered, each focusing on a different spatial approach to the development of visitor experiences and associated tourism services and infrastructure:

- Alternative 1: Consolidation and Improvement to existing Tourism Infrastructure and Visitor Experiences;
- Alternative 2: Develop major new visitor attractions on or alongside the water/river; or
- Alternative 3: Do nothing.

7.1 Evaluation of Alternative Scenarios

This section summarises the evaluation of the Alternative Scenarios.

7.1.1 Alternative 1: Consolidation and Improvement to existing Tourism Infrastructure, Visitor Attractions and Experiences

Traditionally the River Shannon been a popular destination for both overseas and domestic visitors. The height of its popularity coincided with the emergence of the all island boat hire industry which acted as the cornerstone of both the Shannon and Erne's tourism product from the 1990s. Cruising has since declined in popularity, leaving behind a variety of under-used hotels, jetties, harbours and boats. A key issue of the masterplan is the need to address the fall off in visitor numbers and to revitalise the visitor infrastructure, services and towns that depend on the tourism industry as a basis for their economy.

Environmental Impacts

The central environmental benefit of this alternative is associated with its focus on the re use and regeneration of existing tourism facilities and infrastructure. Whilst in some cases increased visitor numbers will mean that upgrades to existing infrastructure may be required, it is generally considered that the environmental impacts on air and water will be addressed using specific infrastructural upgrades and therefore minimised in this scenario. Indeed, the socio-economic benefits are likely to be greatest under Alternative 1 as the benefits will accrue in areas where the existing population is highest within the Shannon region.

7.1.2 Alternative 2: Develop major new Visitor Attractions on or alongside the Water/River

The River Shannon and Shannon Erne Waterway extend over a vast geographical and predominantly rural area encompassing a variety of undeveloped nature areas including several sites of biodiversity importance. It is interspersed with a number of settlements, which with the exception of Limerick and Athlone, are predominantly small to medium sized in nature.

This low level of urbanisation means that corresponding visitor infrastructure in terms of attractions, accommodation and associated activity is also low. Generally speaking, the study area lacks attractions of scale, where the most popular visitor attractions of Clonmacnoise and Lough Key Forest Park enjoy visitors in the region of 170,000 - 200,000 per annum. The development of new attractions of scale will be required to invigorate the visitor offer and experience, and to encourage visitors to dwell longer. Several locations for new attractions were identified and considered during the preparation of the Masterplan; however, these would require the development of green field sites.

Environmental Impacts

The environmental impacts associated with developing wholly new visitor attractions within the Masterplan area are dependent on the nature, scale and location of the development and are potentially wide ranging.

7.1.3 Alternative 3: Do Nothing

The 'do nothing' scenario was considered prior to the commissioning of the Masterplan. With the emergence of *Ireland's Hidden Heartlands* as a national tourist brand, a requirement for a planned and coordinated approach was established. Without a Masterplan in place, a number of potential disbenefits and environmental impacts would accrue.

Environmental impacts

The 'do nothing' and business-as-usual approach was not considered appropriate on the basis that it would result in poor value for money in terms of any future investment, as well as a potentially greater scale of environmental impacts associated with unplanned and uncoordinated development of a potentially significant scale.

Without a masterplanning / plan led approach, the opportunity to test and consult on the strategy in accordance with the requirements of the Strategic Environmental Assessment Directive would also be missed.

7.2 Selection of Preferred Alternative

The preferred alternative which emerged from the evaluation process was Alternative 1, which is the consolidation of and improvement to existing tourism infrastructure, visitor attractions and experiences within the Masterplan area, as this has the fewest potentially negative impacts on the SEA objectives set out in Section 6.

This scenario contributes towards the protection of the environment and conforms to high level planning objectives around the prioritisation of development around existing infrastructure.

By applying appropriate mitigation measures - including those which have been integrated into the Plan - potential adverse environmental effects which could arise as a result of implementing this scenario are likely to be avoided, reduced or offset.

Section 8 of the Environmental Report evaluates the individual strategic aims and objectives which have been prepared to realise the selected scenario.

8.0 Assessment of Plan Effects Likely Significant Effects on the Environment

8.1 Do Nothing / Evolution of the Environment in the Absence of the Masterplan

In the absence of the Shannon Masterplan, the different areas of the Masterplan study area would be much unchanged from the present circumstances. Natural increases in visitor numbers, both foreign and domestic, will continue to utilise the Upper, Mid and Lower Shannon areas.

Fragmentation of existing recreational infrastructure may become united in some fashion through the provision of other plans, programmes and strategies, but the provision of additional recreational infrastructure may be fragmentary in development. Wastewater treatment facilities may not be increased to support additional tourist usage of the Shannon region. Bio-security provision and water quality monitoring may also be fragmentary.

In the absence of a masterplan, the Shannon and the numerous walkways and existing recreational infrastructure would remain in their current state, without additional investment and maintenance. Much existing recreational infrastructure including walkways, trails, blueways, cycleways and boating along the Shannon and other navigable areas will continue as it currently does.

8.1.1 Biodiversity, Flora and Fauna

The biodiversity, flora and fauna within the Masterplan study area will likely remain in its current state. Agricultural development will continue to impact through continued degradation of local water quality. The semi natural and natural areas within the Masterplan area will eventually become impacted by human development, or it will go through the natural succession process with evolving alterations of flora and fauna to continue over time until a dominant and stable condition is achieved. In its current state, it is likely that there will be a loss of local biodiversity, flora and fauna due to a continued cumulation of impacts from agriculture and other rural development. There is unlikely to be a change in the designated/protected areas within the study area.

8.1.2 Population and Human Health

The influence of national policy such as *Ireland 2040* along with social and increased employability factors are impacting net migration between the rural and urban areas. In rural areas within the study area, most employment opportunities centre around agriculture and agriculture related activities, with occasional manufacturing and tourism jobs. Due to this lack of employable diversity, it is likely that younger generations will continue to migrate towards urban areas. According to CSO data, the migration of the younger generations to urban areas is on the increase. However, more people are choosing to move to rural locations for a number of reasons. It is considered therefore, that natural population levels in the study area will remain stable in the future.

In relation to tourism, it is likely, in the absence of a Masterplan, that the tourism industry will remain underdeveloped in many areas where there are not currently other strategies in the proposal stage.

Human health, in terms of life expectancy and general wellbeing will likely remain unchanged in the near future, but may increase due to factors which are outside the scope of the proposed Masterplan.

8.1.3 Geology, Soil and Land Use

In the absence of a Masterplan, it is unlikely that there will be significant changes to the geology, soil or land use in the study area. There may be areas of small improvements of soil and land in agricultural areas. There may also be the loss of more natural land to agriculture and agricultural land due to the expanding urban areas. These however would not be likely due to the absence of the Masterplan.

8.1.4 Water

In the absence of a Shannon Tourism Masterplan, the water quality in the study area may see little change but would be monitored and protected under the Water Framework Directive (WFD) and other European and National water protections. The water status objectives for the waterbodies in the study area are to be restored; however, many waterbodies such as Upper Lough Erne are located in cross-border and in relatively remote locations, which add additional jurisdictional issues and may lower the prioritisation of restoring the waterbodies in favour of other more populated waterbodies.

Future flooding within the Masterplan Study area may remain prevalent, despite the aims of the EU Flood Directive to reduce and manage floods that pose a threat to human health. The masterplan study area is partially cross border in nature, in an area with low population and a low development density. In areas further south along the Study Area, populations and development density are much higher and will therefore be the priority of the EU Flood Directive for the protection of human health, infrastructure and property.

In the absence of a Masterplan, the supply of water for business and household consumption would rely on the existing infrastructure and supply in the study area. There would be slight increases in demand pressure as the population increases naturally within the study area.

8.1.5 Air

In the current timeframe, the air quality along the length of the Masterplan study area is considered to be of good quality. In more densely developed areas such as Athlone and Limerick, there are low levels of pollutants like nitrogen dioxide and other particulates. Whilst these reflect positively upon the air quality of the area, increasing levels of road traffic (particularly along busy roads such as the M6, M7, N3, N87, N4, N5, N63, N6, N56, N7, N20, N69 and N18), as well as the absence of local sustainable transport resources, are likely to contribute towards enhanced levels of traffic related pollutants into the atmosphere. In the absence of the Masterplan there would be less opportunity for local sustainable transport to replace air pollutant emitting automotive transport along some of these corridors within the Masterplan study area.

8.1.6 Climate

Climate change has been predicted to occur in the future. Climate change is particularly important when examining future development and what mitigation measures may be employed to offset more extreme conditions into the future. Some of the impacts of climate change include:

- sea level rise as a result of human made greenhouse gas emissions (GHG);
- changes in rainfall patterns;
- changes in temperatures and more temperature extremes;
- an increase in extreme weather;
- an increase in the frequency of droughts.

In the absence of the Masterplan, the above listed changes are both likely and predicted to occur; however, there would be limited opportunities to develop and utilise local sustainable transport options to reduce GHG emissions from visitor generated automotive transport within the study area.

8.1.7 Material Assets

The absence of the Masterplan would result in an unlikelihood of any significant changes to the current material assets within the study area. There would also be an unlikelihood for infrastructural improvements in the future, unless there are future plans, masterplans or strategies which provide the opportunity for them. Planned infrastructural and service related changes in the future would evolve independently from the absence of this Masterplan. Planned energy and transport developments and upgrades would also independently evolve in the absence of the Masterplan.

While the River Shannon and other waterways currently within the Masterplan area are existing assets, there would be no wider secondary development in the area as a result of the Masterplan. The absence of a Masterplan would play no role in the numbers of visitors to the existing assets of the Study area. The most significant impact in the absence of a Masterplan, however, would be the uncontrolled growth of visitors and their associated impacts on the existing assets and infrastructure within the Masterplan boundary. If uncontrolled, there is a likelihood of a deteriorating water quality due to the continued increase of the assets and infrastructure, including septic tanks, pump-out facilities, lack of infrastructure and other issues.

8.1.8 Cultural, Archaeological and Architectural Heritage

In the absence of the Masterplan, heritage features within and adjacent to the Masterplan study area would continue to degrade from un-managed use of hiking trails leading through cultural heritage features and waterfront features. Some heritage features may be lost to nature or in the development process of other developments not associated with the Masterplan. Without the development of the Shannon Masterplan, there is potential that heritage features in the area may remain inaccessible, not preserved, undiscovered and potentially not restored.

8.1.9 Landscape and Visual Impact

In the absence of the Masterplan, the value of the landscape within the study area is unlikely to change in any significant manner. The landscape itself however may be subject to some development, particularly around the urban settlements of Athlone, Limerick and smaller towns and villages alongside the Shannon. However, there are large swathes of the Masterplan Study Area which are predominantly rural in nature.

8.2 Masterplan Appraisal

This section presents an evaluation of the likely significant effects of the Draft Tourism Masterplan (Table 16).

Table 16 Evaluation of the Likely Significant Effects of the Draft Tourism Masterplan

Masterplan Objectives	SEA Objective										Comments (Including reference to secondary, cumulative, synergistic, short, medium, long-term, permanent, temporary, positive and negative effects and scale (local / regional / national))
	✓✓ - Significant beneficial effect ✓ - beneficial effect O – neutral * - Adverse effect / uncertain ** Significant adverse effect										
	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
Thematic and Experiential Framework for the Shannon											
Thematic Interpretation The Shannon Themes and Inspirers should be embedded in all Shannon interpretative materials and used by all providers to shape the next generation of experiences on the Shannon. The thematic framework should be used in all future promotional and communications strategies. See Strategic Initiative 1 below for recommendations	✓	O	O	O	O	O	O	O	O	O	Depending on the content of the interpretation there is potential for positive as well as negative impact on a range of receptors. Recommendation: Interpretation text should be developed to reflect environmental sensitivities and specific issues around wildlife disturbance including noise and dropping of litter.
Shannon Discovery Zones											
Discovery Zone 1: Upper Shannon Lough Allen and Shannon Erne Waterway - Priority Projects											
DZ1.1 Development of a Destination & Visitor	x	x	x/✓	x/o	o	o	x/o	x/o	x/o	x/o	There are a number of SAC designations in the vicinity of the Shannon pot and increasing visitor

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<p>Management Plan for the Shannon Pot:</p> <ul style="list-style-type: none"> As per Cavan Co. Council's development proposals for Cavan Burren Park. Enhance green linkages to the Cavan Burren and international Marble Arch-Cuilcagh Mountains UNESCO Geopark. 											<p>numbers at the site has the potential to contribute indirectly to impacts on these sites. The site is located in a predominantly rural area with limited access to services. Measures to minimise the need for significant additional infrastructure should be identified and implemented. Measures to limit traffic generation should also be considered.</p> <p>Recommendation: Site specific proposals should be supported by appropriate ecological surveys and relevant environmental assessment.</p>
<p>DZ1.2 Develop waterside recreational infrastructure, building linkages and filling 'gaps' where feasible:</p> <ul style="list-style-type: none"> Carrick-to-Leitrim Boardwalk; linking alongside the water to Acres Lake and Lough Allen; Strengthen links from the Shannon-Erne 	x	x	✓	x/o	o	o	o	o	x/o	x/o	<p>The development of boardwalks, blueways and trails generally involve the introduction of small scale infrastructure such as signage as well as trail surfacing. New trails and associated infrastructure has the potential to impact on vegetation and increase soil compaction due to the change in surfaces and the increase in use. The impact will depend on</p>

Masterplan Objectives	SEA Objective										Comments (Including reference to secondary, cumulative, synergistic, short, medium, long-term, permanent, temporary, positive and negative effects and scale (local / regional / national))
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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
Waterway - Lough Allen - Lough Key, through development and promotion of both blueways and waterside trails.											the sensitivity of the selected route. Recommendation: Route selection must be the subject of detailed evaluation centred on the ecological feasibility of proposals.
DZ1.3 Lough Key Greenway Proposed greenway links from Boyle to Lough Key; with ultimate links to Carrick-on-Shannon (see DZ1.5 below).	x	x	✓	x/o	o	o	o	o	x/o	x/o	The development of boardwalks, blueways and trails generally involve the introduction of small scale infrastructure such as signage as well as trail surfacing. New trails and associated infrastructure has the potential to impact on vegetation and increase soil compaction due to the change in surface and the increase in use. The impact will depend on the sensitivity of the selected route. Recommendation: Route selection must be the subject of detailed evaluation centred of the ecological feasibility.
DZ1.4 Delivery of long distance, themed journeys to meander slowly into and within the zone:	x	x	✓	x/o	o	o	o	x	x	x/o	As this objective includes reference to three long distance trails., it is difficult to be specific

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<ul style="list-style-type: none"> Enhancement of the Beara Breifne Way; Support emerging spiritual Pilgrim Way along the Shannon-Shannon Erne Waterway, with onwards links to Lough Erne; Revitalise the Humbert Trail that meanders into Leitrim, with links to the Wild Atlantic Way. 											<p>about the potential for significant environment effects. Generally, it can be concluded that a focus on existing trails has the potential to minimise significant environmental effects. The specifics of the pilgrim way proposals are not yet available and require further work to establish the route and transport options and associated environmental feasibility. The Pilgrim way is in essence a heritage trail and so the interpretation and redevelopment of heritage assets has the potential to impact significantly on the historic environment.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> Add the following wording 'Subject to the environmental assessment and establishing the preferred route, support emerging spiritual Pilgrim Way along the

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
											<p>Shannon-Shannon Erne Waterway, with onwards links to Lough Erne.</p> <ul style="list-style-type: none"> The environmental assessment referred to above must include a detailed assessment of the potential for impacts on the historic environment.
<p>DZ1.5 Enhancement of the Lough Key Forest Park experience –</p> <ul style="list-style-type: none"> Support proposals to enhance the family-friendly Lough Key adventure experiences. Enhance blue-green linkages to and from Boyle under provisions of Boyle 2040 strategic plan. Consider long term green/blueway linkages from Lough Key to the Shannon via Knockvicar. 	x	x	✓	x/o	o	o	o	o	x/o	x/o	<p>Lough Key forest park is an existing visitor attraction. Enhancing linkages between the park and Boyle would increase activity in the town with supporting benefits for local enterprise and employment.</p> <p>The development of green and blueway linkages involves the introduction of small scale infrastructure such as signage as well as new trail surfacing or the resurfacing of existing trails. New trails have the potential to impact on vegetation and increase soil compaction. The impact can</p>

Masterplan Objectives	SEA Objective										Comments (Including reference to secondary, cumulative, synergistic, short, medium, long-term, permanent, temporary, positive and negative effects and scale (local / regional / national))
	✓✓ - Significant beneficial effect ✓ - beneficial effect O – neutral * - Adverse effect / uncertain ** Significant adverse effect										
	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
											depend on the sensitivity of the selected route. Recommendation: Route selection must be the subject of detailed evaluation of the ecological and technical feasibility of a number of financially viable route option.
Discovery Zone 2: Mid-Shannon											
Lough Ree, peatlands & Shannon Callows											
DZ2.1 Development of a Visitor Management Plan for Clonmacnoise (Oct. 2019) to: <ul style="list-style-type: none"> Consider reconfiguration of access points and facilities to enhance the visitor experience; Develop on-water linkages with service hubs upstream and downstream, inclusive of Athlone, Shannonbridge, Shannon Harbour and Banagher. 	x	x	o	x/o	o	o	o	x/o	x/o	o	There are a number of internationally designated sites including Middle Shannon Callows SPA directly adjacent to Clonmacnoise. The site is also on the tentative list for World Heritage Site Designation and sensitive to development from a heritage perspective. Significant numbers of visitors already visit the site and there is the potential to improve management of the site for the benefit of water quality, preservation of the historic

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<ul style="list-style-type: none"> Enhanced off-road links from Athlone to Clonmacnoise and Shannonbridge/ Shannon Harbour with links to Lough Boora Discovery Park via Grand Canal to allow immersive experiences. 											<p>environment and traffic generation.</p> <p>Recommendation: The Development of a Visitor Management Plan should implement the principles of sustainable access and design.</p>
<p>DZ2.2 Enhanced interpretation and access to Rindoon Medieval Walled Town</p> <ul style="list-style-type: none"> Consider options for an enhanced Visitor Experience based at Lecarrow / Portrunny, to include access to Rindoon Walled Town and peninsula; and Consider options for visitor access to the Lough Ree Islands (subject to landowner agreements) from Lecarrow or Portrunny harbours and/or Lanesborough- 	x	x	✓	x/o	o	o	o	x/o	x/o	o	<p>Rindoon Medieval Walled Town is significant heritage asset and largely undeveloped with restricted access. It is also located adjacent to internationally designated sites such as Lough Ree SPA / Lough Ree SAC. Prior to its promotion as a visitor attraction, a plan should be developed to establish the constraints and carrying capacity of the site together with ongoing environmental management requirements.</p> <p>Recommendation: The objective should be amended to include the requirement for the preparation of a Visitor experience development and Management</p>

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
Ballyleague/ Hodson Bay harbours.											Plan supported by the relevant management plan.
DZ2.3 Wet'n'Wild Peatlands of Mid Shannon <ul style="list-style-type: none"> Develop integrated Discovery Zone focused on peatlands' environmental heritage and industrial histories; recreational opportunities such as walking, hiking, cycling, guided tours or bog trains; Outdoor educational classroom/ summer schools to demonstrate climate change in action; Range of family fun 'bog snorkelling' or mud-slinging; and Creative 'slow' initiatives such as bog carving and sculpture, photography & 'art in the open'. 	x	x	✓	x/o	o	o	o	x/o	x/o	o	This objective is focused on visitor experience development in environmentally sensitive locations. It is unclear from this objective where visitor infrastructure and services will be provided. The number of visitors and the location of services and infrastructure has the potential for significant environmental effects. Recommendation: A detailed sustainable visitor management plan is required prior to the implementation of this objective. The reuse of existing infrastructure and services should be prioritised.

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<p>DZ2.4 Expanding the Lough Ree Experience</p> <ul style="list-style-type: none"> Continue to develop Athlone’s waterfront amenities to build a critical mass of attractions and activities, linking the Glasson-Coosan-Wineport-Killinure-Hodson Bay activity-food nexus; Completion of the National Cycleway and the new bridge that will deliver ‘slow tourism’ into the core of Athlone town and DZ2; Development of the planned cycleway south from Athlone to Clonmacnoise, linking the National Cycleway to the monastic complex; consider cycle links south to Shannonbridge; Completion of the Athlone-Mullingar- 	x	x	✓	x/o	o	o	x	x/o	x/o	o	<p>The Lough Ree area already benefits from significant visitor numbers and exiting visitor infrastructure. Further enhancement is likely to increase the number of sightseeing trips generated in the surrounding area. Given the high level of existing visitor numbers, there is the potential to improving environmental performance particularly around the provision of sustainable transport.</p> <p>Recommendation: A feasibility study should be considered for a more sustainable approach to transport within the Lough Ree area.</p>

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<p>Royal Canal circuit to deliver 'active in nature' experiences across the peatlands, directing visitors via Ballymahon-Clondara, thence to Portlick - Athlone.</p> <ul style="list-style-type: none"> Develop an enhanced range of cruise options, boating and guided tours from Athlone waterfront linked to onshore attractions (islands, monastic sites, activity centres, bike tours) and hinterland. 											
<p>DZ2.5 Improvement of the Visitor Centre at the Corlea Iron Age Trackway</p> <ul style="list-style-type: none"> Prepare an improvement plan for the centre which would explore the expansion of its story and experience to include the Iron Age in Ireland'. 	x	x	✓	x/o	o	o	o	x/o	x/o	o	Corlea Iron Age Trackway is an existing tourism attraction within the masterplan area. It is however located in a predominantly rural location so sustainable transport and access options are limited. It is also likely to be constrained in terms of water supply and wastewater.

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
											Recommendation: As part of the proposed 'improvement plan' further consideration should be given to the constraints in relation to existing infrastructure. The Plan should implement the principles of sustainable access and design.
DZ2.6 Surf in the Turf – Surf Wave Centre <ul style="list-style-type: none"> Prepare a Feasibility Study to explore the potential of developing Ireland's first artificial Surf Wave Centre on a cutaway bog powered by renewable energy. 	x	x	o	x	x	o	x	x/o	x	o	This objective has the potential to result in a range of environmental effects. However, the extent of these impacts depend on the location and scale of the centre. This objective does not identify a location for the proposed wave centre so at development plan stage, a number of potential site options should be evaluated. If the potential renewable energy sources are to include ground source heat pump, solar and/ or wind, then site option evaluation should also consider the planning and environmental acceptable of this supporting infrastructure. Recommendation: As party of the feasibility study, a number of

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	✓✓ - Significant beneficial effect ✓ - beneficial effect O – neutral * - Adverse effect / uncertain ** Significant adverse effect											
	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI		
												potential site options should be evaluated on planning and environmental grounds. Key issues for consideration include <ul style="list-style-type: none"> Sustainable transport and Access Impact on Water supply Landscape and visual impact Wastewater treatment infrastructure Potential impact on internationally designated sites.
Discovery Zone 3: Lower Shannon Lough Derg & Lower Shannon												
DZ3.1 Ardnacrusha – Feasibility Study for redevelopment of Visitor Centre and Visitor management- (subject to ESB approvals & collaboration) <ul style="list-style-type: none"> Provision of reconfigured visitor facilities, to accommodate larger groups. Assessment of transport options by land and water to and from site. 	x/o	x/o	✓	x/o	o	o	x/o	x/o	x/o	o	Ardnacrusha is an existing tourism attraction. As it continues to function as a hydroelectric power station, the capacity of the visitor centre is constrained There is potential for the site to be configured to increase capacity. There is the potential for the impact on heritage assets, water quality and designated sites. Recommendation: As part of the Feasibility Study further consideration should be given to	

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<ul style="list-style-type: none"> Options to consider on-water and beside-water development links with service hubs upstream and downstream, inclusive of Limerick, O'Brien's Bridge, Killaloe/ Ballina, Lough Derg. 											<p>potential impact on heritage assets, sustainable transport and access, water quality and designated sites.</p> <p>Proposals should implement the principles of sustainable access and design.</p>
<p>DZ3.2 Develop enhanced Castlelough & Portroe Lookout; Active Amenity Zone & Slow Travel Interchange</p> <ul style="list-style-type: none"> Enhance the amenity zone at Castlelough Bay & Woods with safe swimming/ boating/ canoeing access; linking to iconic Portroe Lookout; facilities to enhance visitor experience. <p>Enhanced links to Castlelough Woods onwards to Ballina/ Killaloe (south) and Garrykennedy / Dromineer</p>	x/o	x/o	✓	x/o	o	o	o	x/o	x/o	o	<p>Castlelough & Portroe is an existing visitor destination offering a range of activities. By enhancing, there is the potential for impacts on water quality, designated sites as well as landscape and visual amenity.</p> <p>Recommendation: As part of the approach consideration should be given to potential impacts on heritage assets, sustainable transport and access, water quality and designated sites.</p>

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
(north) along Lough Derg Way and/ or by boat along the lake.											
<p>DZ3.3 Feasibility Study for Development of ‘Shannon Greenway’</p> <ul style="list-style-type: none"> Linking Limerick, via Clonlara, Ardnacrusha, O’Brien’s Bridge, Killaloe/Ballina, Tuamgraney and Scariff* Utilise public lands (canals, forests, amenity zones) where possible. <p>*Consider future links to Mountshannon, with direct links to Iniscealtra Visitor experience.</p>	x	x	✓	x/o	o	o	o	x	x	x/o	<p>This objective introduced broad parameter for the completion of a Feasibility Study for Development of ‘Shannon Greenway’.</p> <p>No specific routes have been proposed and detailed appraisal in relation to route selection is required.</p> <p>Recommendations:</p> <p>As part of the feasibility stage, priority should be given to the re use and enhancement of existing trails. Environmental effects including visual impact could be reduced further by minimising the development of additional infrastructure and ensuring trail surfacing is permeable and does not impact on designated sites.</p>
DZ3.4 Implementation of the Iniscealtra Visitor Management Plan	x/o	x/o	✓	x/o	o	o	o	x/o	x/o	x/o	The Inis Cealtra Visitor Management and. Sustainable Tourism Development Plan was

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<ul style="list-style-type: none"> It is strongly recommended that the recommendations of the VMP for Iniscealtra (Holy Island) be expedited as soon as possible. Critically the development of a Visitor Centre at Mountshannon, with guided access to the island, will provide a springboard for a unique visitor experience in the East Clare corridor adjacent to the Shannon, from Killaloe, to Tuamgraney (St. Cronan's), Scariff and Mountshannon, and northwards towards Portumna. Development of potential cross-Shannon visitor boating links from other villages around Lough Derg to Iniscealtra Visitor Centre and island experience. 											<p>completed in July 2017 and was subject of SEA and AA.</p> <p>Avoidance of sensitive areas is the preferred option for mitigation measures in this plan in addition to a range of measures identified in a dedicated section on environmental management.</p> <p>Recommendation: n/a</p>

Masterplan Objectives	SEA Objective										Comments (Including reference to secondary, cumulative, synergistic, short, medium, long-term, permanent, temporary, positive and negative effects and scale (local / regional / national))
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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<p>DZ3.5: Portumna Attractions - Integrated Tourism Development Plan</p> <p>Prepare an integrated tourism development plan incorporating Portumna Castle, Forest Park, Harbour, Friary and Portumna Town, to ensure that the visitor experience and yield is greater than the sum of the parts.</p>	x/o	x/o	✓	x/o	o	o	x/o	x/o	x/o	o	<p>Portumna's on the water location and several visitor attractions mean that it is well positioned within the overall strategy of the Shannon Masterplan. The further development of Portumna has the potential to result in a number of impacts relating to water quality, heritage assets as well as visual impacts on sensitive landscapes.</p> <p>Recommendation: It is likely that the proposed integrated tourism development plan will require further environmental assessment and the detail of these project level proposals will be considered at this stage.</p>
<p>DZ3.6 Link to Lough Derg Destination Development Plan (LDDDP) proposals</p> <p>All Lower Shannon experience development initiatives around Lough Derg should be aligned to the Destination Strategy and VEDP currently in progress.</p>	x/o	x/o	✓	x/o	o	o	x/o	x/o	x/o	o	<p>Lough Derg is the location of several visitor attractions meaning that it is well positioned within the overall strategy of the Shannon Masterplan. The further development of Lough Derg has the potential to result in a number of impacts relating to water quality, heritage assets as well as</p>

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
Support proposals for a network of camping/ RV sites, in suitable locations around Lough Derg. Development of Dromineer Sailing Training Hub, as centre of excellence for sail training and national and international sailing events, through enhanced experience development. Creation of linked boating experiences; support enterprises and clubs to deliver linked visitor experiences at destinations around the lake; build on stories such as Brian Ború; Iniscealtra and the pilgrim experience; and trade on the Mighty Shannon; that leverage existing strengths.											visual impacts on sensitive landscapes. Recommendation: It is likely that the proposed integrated tourism development plan will require further environmental assessment and the environmental implications of these proposals will be considered at this stage.
Shannon: Strategic Initiatives											
Strategic Initiative 1: Communicating a Clear & Consistent Message											
Strategic Initiative 1: Communicating a Clear & Consistent Message	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	Clear messaging around high environmental standards, has the potential to minimise environmental impacts and

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
											improve environmental performance. Recommendation: Areas with particular environmental sensitives should be highlighted to ensure that that the visitor is aware of these sensitives.
SI1.1 Vision for the Shannon aligned with Ireland's Hidden Heartlands : Develop consistent communications and interpretation to reflect the shared vision, aligned with that of Ireland's Hidden Heartlands (IHH). All local authorities and statutory authorities to embrace and reflect this shared vision across all print and digital media platforms.	o	o	o	o	o	o	o	o	o	o	No impacts anticipated. Recommendation: n/a
SI1.2 Develop distinctive visual representation for Shannon: Design a series of distinctive cascading logos to reflect the embedded, inter-linked nature of the IHH, Shannon and three Discovery Zones.	o	o	o	o	o	o	o	o	o	o	No impacts anticipated. Recommendation: n/a

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI		
SI1.3 Shannon Integrated Interpretation Strategy and Design Guide : Develop Guide for co-ordinated landscape-scale interpretation for the Shannon, including interventions for interpretation for all stages of the visitor journey. Prepare detailed guidelines on appropriateness and use of a range of interpretation media and methods	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	Clear messaging around high environmental standards, has the potential to minimise environmental impacts and improve environmental performance. Recommendation: The design guide could be extended to encourage high environmental standards with respect to all development proposals.
SI1.4 Interpretation Planning: All new experience and interpretation developments should include an Interpretation Plan aligned to the Shannon Integrated Interpretation Strategy.	o	o	o	o	o	o	o	o	o	o	o	No impacts anticipated. Recommendation: n/a
SI1.5 Shannon Visitor Experience and Interpretation Toolkit: Develop toolkit with linked training and supports for local providers and local guides should be developed to support shared standards of high-quality	o	o	o	o	o	o	o	o	o	o	o	No impacts anticipated. Recommendation: n/a

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
interpretation across the Shannon region.											
SI1.6 Environmental Code of Conduct: Develop a Code of Conduct to highlight and encourage positive behaviours that reflect care for the Shannon environment for local people and visitors. This should be accompanied by research and monitoring of visitor behaviours, beliefs and motivations.	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	Clear messaging around high environmental standards, has the potential to minimise environmental impacts and improve environmental performance. Recommendation: Areas with particular environmental sensitives should be highlighted to ensure that that the visitor is aware of these sensitives. The code of conduct should apply to tourism enterprise and services.
SI1.7 Marketing Requirements: Integrated Marketing Strategy and allied resourcing, closely aligned with the themes and experiences proposed in the Masterplan. Align with promotion and marketing of Ireland's Hidden Heartlands as part of an integrated thematic communications strategy for the region.	o	o	o	o	o	o	o	o	o	o	No impacts anticipated. Recommendation: n/a

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Strategic Initiative 2: Enhancing the On-Water Visitor Experience											
SI2.1 Cruising/ Day-Boating/ Passenger Cruising: Carry out techno-economic feasibility study to examine viable rejuvenation & greening options for the cruise hire fleet; increase on-water access options through day-boat /passenger cruising	x/o	x/o	✓	x/o	o	o	x/o	x/o	x/o	o	Increased boating activity on the water is likely to result in an increase in disturbance for wild bird and deterioration in water quality. Recommendation: Update / upgrade fleet to high environmental standards. Ensure boats are fully cleaned when travelling from one waterbody to another. Examine the carrying capacity of the waterway in terms of additional boats. Establish a re-use or waste reduction strategy with regard to end of life cruisers.
SI2.2 Development of an additional Cruise Hire Hub(s) to 'spread' the options for on-water experiences. Options to be assessed for technical, commercial and environmental feasibility including Tarmonbarry / Clondara, Killaloe, Athlone on Shannon and Ballinamore on Shannon-Erne Waterway.	x/o	x/o	✓	x/o	o	o	x/o	x/o	x/o	o	The development of an additional Cruise Hire Hub(s) will result in an increase in cruising activity in the vicinity of the proposed hub (s). For the selected hub it is also likely to require the development of additional moorings. Recommendation: Ensure the approach is supported by an environmental feasibility study.

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<p>SI2.3 Marina Development: Technical Assessment of Marina capacity to establish requirements for additional jetty space; consider options of Carrick-on-Shannon; Hodson Bay; Connaught Harbour; and new Marina in Parteen/Clarisford. Consider enhanced jetty capacity up-and down-stream of Clonmacnoise at Athlone and Shannonbridge.</p> <p>Review shore-based Service Block provision; assess potential use of smart technologies to enhance delivery and monitoring of usage patterns.</p>	x/o	x/o	✓	x/o	o	o	x/o	x/o	x/o	o	<p>The development of additional marina capacity will result in an increase in cruising activity in the vicinity of the selected locations. Increased boating activity has the potential to impact on water quality and the spread of invasive species. An increase in activity is also likely to increase disturbance in relation bird species.</p> <p>Recommendation: Ensure that the technical assessment is supported by an environmental feasibility study.</p>
<p>SI2.4 Water-Based Activities & Adventure: provide timely visitor information on range of 'soft adventure' activities (swimming, rowing, sailing, kayaking, waterskiing etc), where to go and amenities within each of the Discovery Zones. Develop improved networking and promotion of family-friendly</p>	o	o	o	o	o	o	o	o	o	o	<p>No impacts anticipated.</p> <p>Recommendation: n/a</p>

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activity zones (in association with the 'Shannon 100' network).											
SI2.5 Angling: Identify angling hubs in association with WWI/ IFI and FI, linked to the Shannon Towns and Villages strategy (SI3). Develop family-friendly angling experiences, linked to activities in nature.	x/o	x/o	✓	o	o	o	x/o	x/o	x/o	o	The identification of angling hubs has the potential to impact on biosecurity levels and more directly on fish species as a result of overfishing. Recommendation: Angling hubs should be identified in tandem with appropriately environmental management standards.
SI2.6 Blueways: The accreditation of the existing trails should be carried out with a view to supporting the promotion and optimisation of the existing and newly developed Blueway network over the medium term.	o	o	o	o	o	o	o	o	o	o	No impacts anticipated. Recommendation: n/a
SI2.7 Tranquillity Zones: Pilot selected sites on the Shannon as tranquillity zones in the short term, with a view to extending along Shannon water bodies over the lifetime of the Masterplan. If successful, protocols will require to be developed.	x/o	x/o	✓	o	o	o	x/o	x/o	x/o	o	The identification of tranquillity zones has the potential to increase boating activity in areas along the water. This has the potential to increase noise and disturbance to animal and bird species.

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												Recommendation: A maximum number of tranquillity zones should be designated at any one time.
SI2.8 Small Scale Accommodation Options: Define appropriate locations using a criteria-based approach, linked to Shannon Towns and Villages. Consider options for e.g. floating pods; glamping; & camp-sites; serviced parking and amenities for recreational vehicles.	x/o	x/o	✓	o	o	o	x/o	x/o	x/o	o		The identification of appropriate locations for small scale accommodation has implications for infrastructure and services, particularly wastewater and water supply. Recommendation: Appropriate locations should be defined within the county development plans.
Strategic Initiative 3: Enhancing the Waterside Visitor Experience												
SI3.1 Reimagining Harbour Facilities through Sustained Investment Programme A programme of investment in harbour infrastructure will be developed to include the upgrade of some harbours, the opening of new destinations and the possible restoration of some waterways. Enhancements of waterfront public realm, amenities and provision of	x/o	x/o	✓	x/o	o	o	x/o	x/o	x/o	o		The development and redevelopment of harbour facilities will result in relatively significant new development which has the potential to impact on water quality as well as soils and landscape assuming greenfield areas are required for expansion. However, projects of this scale and nature will be the subject of standalone project level environmental assessment.

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onshore services, charging, pump out and power facilities; use smart technologies. Use existing public infrastructure to stimulate enterprises and community activity. Enhanced BBQ, picnic and playground amenities at harboursides on public lands.; Create walk/cycle recreational linkages to settlements, attractions and things to see and do. Provision of serviced camping/ pod/ RV parking at harboursides. Sustained investment in the harbour infrastructure to facilitate growth in tourism.												Best practice environmental design should be considered for sub threshold development such as BBQ facilities, picnic and playground amenities as well as RV parking. Recommendation: Projects of this nature are likely to require projects of this scale and nature will be the subject of standalone project level environmental assessment.
SI3.2 Nature-Viewing in Forests & Hinterlands Identify potential for enhanced family-friendly outdoor recreational amenities and nature viewing experiences in the Forest Parks that punctuate the Shannon Corridor. Strengthen and promote access to nature along the Beara Breifne Way, Famine Way and emerging Pilgrim Way, to provide	x/o	x/o	✓	x/o	o	o	x/o	x/o	x/o	o	'Nature viewing' has the potential to disturb species if participants are unaware of the sensitivities for relevant bird and/ or animal species. Further clarity is required around what is proposed here and whether this can be met by additional guiding or whether additional physical infrastructure is required. Recommendation: Minimums distance between	

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opportunities for visitors to enjoy spectacular scenery while engaging with nature in the Shannon / Shannon Erne Waterway hinterlands.												participants and sensitive locations should be considered Hides maybe required depending on the location.
SI3.3 Revitalisation of Lesser Used Waterways There is an opportunity to identify and consider measures to increase visitors and activity on waterways such as the Shannon Erne Waterway (SEW), the River Suck, the Boyle Canal and the Limerick Navigation, as well as the Royal and Grand Canals. This can be achieved by refocussing promotional efforts as well as revitalising their potential for waterside, on-water and blueway experiences.	x/o	x/o	✓	x/o	o	o	x/o	x/o	x/o	o	The revitalisation of lesser Used waterways is generally beneficial in that it will support the re use of existing infrastructure. However, as with most waterway development it is likely to increase visitor activity and has the potential to impact on water quality, both directly and indirectly. It also increases the likelihood of biosecurity issues. Further clarity around what is proposed here would aid this assessment. Recommendation: Provide further clarity on what is proposed as a result of 'revitalising their potential for waterside, on-water and blueway experiences' is required.	

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SI3.4 Reimagining Historic Buildings & Canal Structures Define appropriate locations and opportunities for refurbishment of historic Shannon buildings, using a criteria-based approach, linked to Destination Hub Towns and Villages strategies.	x/o	x/o	✓	x/o	o	o	✓	✓	x/o	✓	The reimagining of historic buildings & canal structures will have a beneficial effect on historic buildings by bringing them back into use. However, poorly thought out and ill consider design with respect to redevelopment proposals has the potential to negatively impact the historic environment in terms of the integrity of protected structures and national monuments where relevant. However, it is expected that relevant policy as set in ministerial guideline would be implemented as part of the statutory consent process. Recommendation: n/a
Strategic Initiative 4: Shannon Towns and Villages											
SI4.1 Shannon Hubs <ul style="list-style-type: none"> Enhance their existing role as hub towns within the Discovery Zones; Expand visitor infrastructure aligned with carrying capacity of 	x/o	x/o	✓	✓		x/o	x/o	✓	✓	✓	By Focusing investment on Shannon Hubs, the emphasis is on development where infrastructure capacity exists. Generally, this will benefit water quality. It will also support the re use of empty buildings in towns

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<p>residential population;</p> <ul style="list-style-type: none"> Improve urban layout & public realm for better integration with the Shannon and SEW; Provide a wider range of on-the-water and links to beside-water activities; and Anchor and enhance access linkages with key attractions and proposed projects within the towns' hinterlands in the relevant Discovery Zone. Where not already in place, Shannon-themed visitor experience development plans (VEDPs) should be prepared for these hubs. 											<p>and villages across the Shannon and ensure better access to employment. Localised impacts with respect to designated sites should be addressed at project level.</p> <p>Recommendation: Liaise and consult with Irish Water to ensure that appropriate infrastructure is in place prior to significant new development being funded. Subsequent plan and project level environmental assessment maybe required.</p>
<p>SI4.2 Shannon Towns Each smaller town has the potential to develop and explore tourism opportunities provided</p>	x/o	x/o	✓	✓		x/o	x/o	✓	✓	✓	<p>By Focusing investment in Shannon Towns, the emphasis is on development where infrastructure capacity exists.</p>

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<p>by their physical proximity to the Shannon. While the Masterplan has identified some development opportunities in relation to each of these settlements, further analysis is required.</p> <p>Where not already in place, Shannon-themed Visitor Experience Development Plans (VEDPs) should be prepared for the Hubs.</p>											<p>Generally, speaking, this will have benefits for water quality. It will also support the re use of empty buildings in towns and villages across the Shannon ensuring better access to the increase in employment. Localised impacts with respect to designated sites must be addressed at project level.</p> <p>Recommendation: Liaise and consult with Irish Water to ensure that appropriate infrastructure is in place prior to significant new development being funded. Subsequent plan and project level environmental assessment maybe required.</p>
<p>SI4.3 Shannon Villages</p> <ul style="list-style-type: none"> Improve interface between waterway and public realm; wayfinding, playground, BBQ facilities Assess provision of walks along rivers and lakes, within a short distance from mooring or jetty 	x/o	x/o	✓	✓		x/o	x/o	✓	✓	✓	<p>By Focusing investment in Shannon Village, the emphasis should be is on development where infrastructure capacity exists. If appropriate infrastructure is in place, this objective is likely to have benefits for water quality. It will also support the re use of empty buildings and improvements to</p>

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<ul style="list-style-type: none"> Provide information on ‘what’s on’ in the local area – branded Shannon map board at the jetty/ harbour showing nature, activities, landmarks or points of interest. Capitalise on the strengths of food and drink offer in the locality; Facilitate increased availability of berthage for visiting boats Facilitate opportunities to access on-water recreation and boating on a short term basis Accommodate signature points of interest, including a Shannon Sculpture Trail, with linked greenways, cycle trails. 											<p>public realm. Localised impacts with respect to designated sites must be addressed at project level.</p> <p>Recommendation: Liaise and consult with Irish Water to ensure that appropriate infrastructure is in place prior to significant new developments being funded. Subsequent plan and project level environmental assessment maybe required.</p>
<p>S13.4 Shannon Festivals and Events</p> <p>Develop an integrated calendar of .Shannon-themed festivals, centred on water, culture, arts, foods, music and activities that</p>	x/o	x/o	✓	✓	o	x/o	x/o	✓	✓	✓	<p>Festivals and events will increase visitor numbers within the masterplan area which will benefit local businesses and employment. The intensification of activity has the potential to</p>

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allow visitors to experience the full range of Shannon's unique culture and heritage. Working with the Shannon 100 enterprise and community networks (SI7), to provide support to professionalise, enhance and grow a series of internationally attractive festivals delivering highest quality experiences to visitors.											increase disturbance but this will depend on the type of activity e.g. boating, walking, fishing. Recommendation: A consistent approach to managing the impacts of popular activities along the Shannon should be developed. A consistent approach to reducing water and energy use should be developed. A zero waste approach to festival materials should be considered. Proposals could be captured by way of an environmental management plan.
Strategic Initiative 5: Protecting & Enhancing the Shannon Environment											
SI5.1 Adopting an Ecotourism Approach <ul style="list-style-type: none"> Establishing an ecotourism toolkit for tourism businesses and code of practice will be essential to becoming a sustainable tourism destination. 	✓/o	✓/o	✓	✓	✓	x/o	x/o	✓	✓	✓	This objective focuses on ecotourism and slow tourism helps to minimise the impact of tourism development in relation to car based travel and use of water resources. Recommendation: n/a

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	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<ul style="list-style-type: none"> Develop 'slow tourism' opportunities, allowing visitors to enjoy activities and nature at a slower pace, building appreciation of Shannon's hidden places. 											
<p>SI5.2 Destination Development and Rewilding Plan to develop access to Shannon Peatlands as well as rewilding, regeneration and recreational proposals</p>	x/o	x/o	✓	✓	o	x/o	x/o	✓	✓	✓	<p>A rewilding plan for the Shannon Peatlands should ensure that rewilding and regeneration proposals are compatible.</p> <p>Recommendation: Ensure that potential conflicts around access and ecologically sensitive sites are resolved.</p>
<p>SI5.3 UNESCO Biosphere for Lough Ree & Environs</p> <p>Explore the potential for a UNESCO Biosphere Designation for Lough Ree and its environs, through consultations and partnership, for delivery of a zonal biosphere that will enhance the environmental status and create opportunities for low impact, nature-based tourism experiences.</p>	✓/o	✓/o	✓	✓	o	✓/o	x/o	✓	✓	✓	<p>This objective focuses on eco-tourism and slow tourism which helps to minimise the impact of tourism development in relation to car based travel and use of water resources.</p> <p>Recommendation: Ensure that possible conflicts around access and ecologically sensitive sites are resolved.</p>

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<p>SI5.4 Biosecurity Measures</p> <p>Establish Biosecurity Standards to be used by all craft on the Shannon.</p> <p>Establish Biosecurity Facilities at Designated Entry points, with spot inspections by licensed navigation staff.</p>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<p>This objective focuses on the provision of biosecurity measures which will minimise the spread of invasive species.</p> <p>Recommendation: n/a</p>
<p>SI5.5 Monitoring & Evaluation</p> <p>Monitor the impacts of the various sustainability measures over the timeframe of the Masterplan.</p> <p>Modify strategies to enhance the Shannon environment, where feasible.</p>	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	✓/o	<p>Monitoring and evaluation is consistent with best practice approach to plan making as it allows objectives to be reviewed and revised subject to the outcomes of the plan.</p> <p>Recommendation: Incorporate environmental monitoring measures as identified in this environmental report.</p>
Strategic Initiative 6: Improving Connectivity											
<p>SI6.1 Encouraging Sustainable & Slow Travel Implement multi-model slow and sustainable travel options throughout Shannon/ Shannon Erne Waterway over the lifetime of</p>	x/o	x/o	✓	x/o	o	o	✓/o	x/o	✓	✓	<p>This objective focuses on slow and sustainable travel options to minimise the impact of tourism development in relation to car based travel and CO2 emissions. Specific environmental effects are</p>

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the masterplan. Establish inter-agency monitoring programme of traffic flows. Encourage On-Water slow travel links within & between Discovery Zones.											dependent on the detail of the proposed links. Recommendation: Further environmental assessment may be required depending on the sensitivity of on-water slow travel routes
Sl6.2 Priority Walking and Cycling Trails Network Assess the technical and environmental feasibility of developing the priority walking and cycling trails identified in the Masterplan. Provide accessible and safe links from Shannon into hinterlands, with access to peatways and natural environments. Develop 'trails of scale' that will direct visitors into the heart of the Shannon, with immersive experience of nature and longer dwell.	x/o	x/o	✓	x/o	o	o	✓/o	x/o	✓	✓	This objective focuses on slow and sustainable travel options to minimise the impact of tourism development in relation to car-based travel. Specific environmental effects are dependent on the detail of the proposed routes. Development of trails of scale has the potential for significant environmental effect as this implies a requirement for a substantial amount of additional infrastructure. Recommendation: Proposals for trails of scale require further consideration under statutory provisions for environmental assessment at project level.

Masterplan Objectives	SEA Objective										Comments (Including reference to secondary, cumulative, synergistic, short, medium, long-term, permanent, temporary, positive and negative effects and scale (local / regional / national))
	✓✓ - Significant beneficial effect ✓ - beneficial effect O – neutral * - Adverse effect / uncertain ** Significant adverse effect										
	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
S16.3 Enhancement of Public Transport Links Identify, with the NTA and LCTU, if existing Bus Eireann Regional and local link services can be enhanced during peak visitor period. Provide easily accessible and timely information on Shannon transport options.	✓/o	✓/o	✓	o	o	o	✓/o	o	o	o	This objective focuses on the provision of public transport links minimise impacts in relation to visitor movement, traffic and transport. Recommendation: n/a
S16.4 Improving Local Link Routes Consider enhanced Local Link routes during peak visitor season Establish the feasibility of developing new Local Link services in collaboration with the NTA and LTCUs.	✓/o	✓/o	✓	o	o	o	✓/o	o	o	o	This objective focuses on the provision of public transport links minimise impacts in relation to visitor movement, traffic and transport. Recommendation: n/a
S16.5 Development of a Shannon Discovery Bus Route Consider the feasibility of a Shannon Region Discovery Bus Route by 2025, once visitor numbers, attractions and accommodation have shown a measurable increase.	✓/o	✓/o	✓	o	o	o	✓/o	o	o	o	This objective focuses on the provision of public transport links minimise impacts in relation to visitor movement, traffic and transport. Recommendation: n/a

Masterplan Objectives	SEA Objective										Comments (Including reference to secondary, cumulative, synergistic, short, medium, long-term, permanent, temporary, positive and negative effects and scale (local / regional / national))
	✓✓ - Significant beneficial effect ✓ - beneficial effect O – neutral * - Adverse effect / uncertain ** Significant adverse effect										
	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
Strategic Initiative 7: Building Enterprise & Community Networks											
SI7.1 Create Tourism Network in each of 3 Discovery Zones: Establish a commercially driver Tourism Network in each Discovery Zone, comprising key tourism and development interests that reach into the wider Ireland's Hidden Heartland, with private sector Chairperson, in partnership with Local Authorities, FI and WI, to provide strategic direction and support to the enterprise and community networks. Each network will be supported by a development and training programme.	o	o	o	o	o	o	o	o	o	o	This objective focuses on the development of enterprise & community networks with limited potential for significant environmental effects. Recommendation: n/a
SI7.2 Shannon 100 Enterprise Networking Convene the Shannon 100 network – invite enterprises to enter a structured Shannon-wide programme aimed at building and delivering world-class thematic experiences.	o	o	o	o	o	o	o	o	o	o	This objective focuses on the development of enterprise & community networks with limited potential for significant environmental effects. Recommendation: n/a

Masterplan Objectives	SEA Objective										Comments (Including reference to secondary, cumulative, synergistic, short, medium, long-term, permanent, temporary, positive and negative effects and scale (local / regional / national))	
	✓✓ - Significant beneficial effect ✓ - beneficial effect O – neutral * - Adverse effect / uncertain ** Significant adverse effect											
	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI		
Design a bespoke, development programme, delivered by an accredited training body. Shannon 100 to develop a sustainability ethos and code of practice across the region. Shannon 100 to define a series of collaborative Shannon Experiences Inter-linked enterprise networks within each Discovery Zone will support the overall delivery of the Masterplan, including existing networks and marketing initiatives.												
SI7.3 Shannon Community Networking Establish Shannon Community Network to assist in building and delivery of Shannon experiences, working with existing networks where possible. Align community groups and landowners with thematic Trails developments (working with existing rural development programmes and initiatives).	o	o	o	o	o	o	o	o	o	o	o	This objective focuses on the development of enterprise & community networks with limited potential for significant environmental effects. Recommendation: n/a

Masterplan Objectives	SEA Objective										Comments (Including reference to secondary, cumulative, synergistic, short, medium, long-term, permanent, temporary, positive and negative effects and scale (local / regional / national))
	✓✓ - Significant beneficial effect ✓ - beneficial effect O – neutral * - Adverse effect / uncertain ** Significant adverse effect										
	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
Provide capacity building & mentoring (with RDP/ LEADER) for Community Network to collaborate with Shannon 100 Enterprise developments. Inter-linked community networks within each Discovery Zone will support the overall delivery of the Shannon Tourism Masterplan.											
Implementation of the Tourism Masterplan											
<p>7.1 Guiding Principles</p> <p>To ensure the successful implementation of the Tourism Masterplan for the Shannon, a series of Guiding Principles have been established to guide the implementation of the Action Plan (Section 7.4 below).</p> <ul style="list-style-type: none"> - All project proposals for the Shannon Tourism Masterplan must be seen in the context of Ireland's Hidden Heartlands, the overarching strategic tourism proposition for the Irish midlands. 											<p>It is unclear how the provisions under 'guiding principles' will be implemented or demonstrated.</p> <p>Recommendations:</p> <p>All future projects should be required to demonstrate consideration of the potential need for project level environmental assessment.</p> <p>Adequate infrastructure is should be in place prior to providing support to major new development.</p>

Masterplan Objectives	SEA Objective										Comments (Including reference to secondary, cumulative, synergistic, short, medium, long-term, permanent, temporary, positive and negative effects and scale (local / regional / national))
	✓✓ - Significant beneficial effect ✓ - beneficial effect O – neutral * - Adverse effect / uncertain ** Significant adverse effect										
	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<ul style="list-style-type: none"> - The principles of responsible tourism, including consultation with local stakeholders and landowners, will be embedded in all strategic initiatives and actions, creating better places to live, work and visit. - All projects will be ‘on-message’ with the Shannon Thematic & Experiential Framework and aligned to the broader objectives of the Masterplan. - The Strategic Initiatives and related project proposals for the Discovery Zones will focus on differentiating the Shannon and set it apart from its competitors. - All projects will aim to add value to the Shannon as a unique destination and provide a demonstrable link to either attracting greater visitor numbers and revenues; extending visitor dwell time (length of stay); 											<p>‘Guiding Principles’ should be incorporated by way of an environmental management section of the plan.</p>

Masterplan Objectives	SEA Objective										Comments (Including reference to secondary, cumulative, synergistic, short, medium, long-term, permanent, temporary, positive and negative effects and scale (local / regional / national))
	✓✓ - Significant beneficial effect ✓ - beneficial effect O – neutral ✖ - Adverse effect / uncertain ✖✖ Significant adverse effect										
	1 BIO	2 BIO	3 HEA	4 WAT	5 WAT	6 WAT	7 CLI	8 HER	9 LAN	10 SOI	
<p>extending the tourism season; or, developing a new or niche market.</p> <p>- Commerciality will be a key consideration for many project proposals and the implementing partners will work to support innovative and sustainable projects that align with the aims of the Shannon Masterplan</p>											

8.3 Habitats Regulation Assessment

The Natura Impact Report which should be read alongside this Environmental Report concluded that:

“The integrity of the 42 Natura 2000 sites is likely to be affected by increased human activity and the development and operation of associated supporting infrastructure and services within the core area of the Shannon Tourism Masterplan. Habitat loss and degradation could result from increased use of footpaths and water ways within Natura 2000 sites. Disturbance and resultant displacement of species such as birds and otter could occur due to proposed recreational activities and development in close proximity to the river and other key habitats. Water pollution could impact aquatic species such as lamprey (sea, river and brook) and salmon. These effects could result in population reduction through mortality or reduction in the distribution of habitat. Increased movement of people and transport of a wide area of countryside potentially in and out of number of Natura 2000 site also has high potential to spread non-native invasive species. The effects described could undermine the conservation objectives for the features of interest affected which would adversely affect the Natura 2000 sites”.

Mitigation measures set out in Section 9.4 below are proposed to avoid, reduce or remedy the potential adverse effects on the integrity of the sites in question. In identifying appropriate mitigation measures it is acknowledged that the Masterplan by its nature is a high-level strategic document and thus, the mitigation measures proposed will also be relatively **strategic and cross cutting** in nature.

8.4 Cumulative Effects

Cumulative effects result from impacts on the environment as a result of incremental developments and can result from individually minor, but collectively significant, actions taking place over a period of time. Broadly speaking cumulative effects can occur from interaction from other policies and projects.

Cumulative environmental benefits are anticipated from the combined actions and the overall strategy which emphasises coordinated spatial planning, the development of projects in existing settlements. This approach should bring positive cumulative impacts for population and human health as well as air quality and climate as a result of facilitating increased sustainable transport access.

However, it is acknowledged that even with a high level of consolidation in settlement there will remain a need for further greenfield development with continued gradual loss of open space and encroachment on wild areas. As such there is potential for cumulative negative impacts on receptors such as biodiversity, water, soils, cultural heritage and landscape, particularly as a result of construction activities such as site clearance and construction related emissions including emissions air and water. There is also a need for the phasing of future development to ensure that infrastructure services are in place in advance of, or rolled out in tandem with, the development of both brownfield and greenfield lands.

The anticipated cumulative impacts associated with the masterplan are as follows:

Population and Human Health: Cumulative impacts to PHH will be primarily related to the increase in employment opportunities. The cumulative benefits for PHH can be achieved where there is appropriate phasing of future development in settlements to ensure that infrastructure services are in place in advance of, or rolled out in tandem with, increasing visitor activity as identified in the strategy.

Increased growth may place additional demand on existing water and wastewater services, utilities and transport services which may be at or over capacity currently. Significant negative cumulative impacts would occur if the phasing of services and infrastructure does not align with growth. In such a situation there would be a risk from deterioration of water quality as a result of insufficient wastewater treatment, water rationing as a result of inadequate potable water supplies; deterioration in air quality from emissions to air from transport and associated climate and flood related impacts.

Biodiversity Flora and Fauna: Cumulative impact in this regard is often a gradual erosion of open and wild spaces and squeezing of buffer areas particularly along rivers and coasts and deterioration of ecological condition e.g. water or air quality. Cumulative impacts will arise from increased human activity leading to increased disturbance of animal and bird species and their habitat.

Soils: Potential for cumulative impacts as a result of additional and incremental development particularly where this occurs on greenfield sites.

Water: Due to the projected visitor numbers, there may be negative impacts due to additional demand on water supply and wastewater services which are at or are approaching capacity in some areas or have limited or no treatment. Water and wastewater services must be delivered on a phased basis to match projected demand.

The re-development of harbours and waterways could have negative cumulative impacts in terms of the resultant increase in boating, which will increase the number of sources of pollution e.g. emissions to air, wastewater and litter.

Air Quality and Climatic Factors: The EPA has reported that between 1990 and 2015, the transport sector showed the greatest overall increase in GHG emissions per sector (at 130.3%). Increase in transport requirements is likely to have negative cumulative impacts on air quality and climate.

Material Assets: Infrastructure and services needed to support visitor growth in the region will have to be developed in both a local and a strategic manner to ensure that environmental protection and enhancement policies are adhered to and cumulative impacts on the natural environment are reduced.

There are overall long-term positive cumulative effects due to improved public transport connectivity, access to alternative modes, and public transport. The encouragement of walking and cycling as alternative modes are also positive for population and human health and climatic factors.

Cultural Heritage and Landscape: The objectives proposed in the Draft Masterplan could have a cumulative negative impact on both cultural heritage and landscape as a result of land use change, new infrastructure, alteration of historic or cultural landscape. Sensitive siting and consideration of the wider environment prior to siting new infrastructure will greatly reduce this potential cumulative impact.

Interaction from Policies and Proposals in Other Related Plans

There are a number of key national policies which have the potential to result in cumulative impact (both positive and negative) on the receiving environment. The most noteworthy of these are policies relating to land use planning and the built environment, transport, services (e.g. water and wastewater), climate and maritime spatial planning. Critical to this, is the supporting role of statutory lower level plans such as County Development Plans and Local Area Plans, so that issues can be evaluated from both the local and strategic regional perspectives.

9.0 Mitigation and Monitoring Measures

Mitigation measures have been recommended where potential negative impacts from development in the Shannon Masterplan area on environmental topic areas have been identified. These mitigation measures have been proposed with the aim of preventing, reducing and offsetting any significant adverse effects on the environment as a result of the implementation of the Shannon Tourism Masterplan.

In developing the mitigation measures set out below, it is acknowledged that the implementation of the Shannon Masterplan shall be consistent with the policies and objectives set out within the statutory planning framework. This statutory planning context provides the framework under which any new proposals associated with the masterplan will be assessed. Implementation will also have to comply with the all relevant legislation, policies, plans and programmes, particularly with respect to the provisions of the EIA and Habitats Directive.

9.1 Mitigation Measures incorporated into the Draft Masterplan

Mitigation involves avoiding and /or reducing significant negative effects of the Masterplan. Where an environmental assessment identifies significant adverse effects, consideration is given in the first instance to preventing such impacts i.e. avoidance. Where this is not possible, reducing the magnitude or extent, probability and/or severity of effects is proposed.

Strategic Environmental Assessment is an iterative process and should be fully integrated into each stage of masterplan preparation. This section outlines the general mitigation measures currently integrated into the Draft Masterplan that will prevent, reduce, and offset as much as possible any significant adverse effects on the environment resulting from the implementation of the masterplan.

In addition to avoiding certain approaches such as dispersal of tourism development in greenfield locations, the following mitigation measures are currently incorporated into the draft tourism masterplan:

- Develop and identify ecotourism standards across the study area that support the implementation of mitigation measures proposed in this environmental report
- Objective SI1.6 that highlights the requirement for an Environmental Code of Conduct.
- The inclusion of Strategic Initiative 5: Protecting & Enhancing the Shannon Environment which includes SI5.1 Adopting an Ecotourism Approach and SI5.4 Biosecurity Measures in particular
- SI3.4 Reimagining Historic Buildings & Canal Structures, which aims to preserve and enhance existing cultural heritage and embodied energy within older buildings.
- Strategic Initiative 4: Shannon Towns and Villages which supports consolidation of development in existing settlements where the required water and wastewater infrastructure is already in place.

9.2 Further Mitigation Measures Recommended at Adoption of the Masterplan

The following additional mitigation measures are recommended:

- All projects should consider the need for project level environmental assessment. This will have implications for Part 8 arrangements and the consent process for 'small scale' development.
- All smaller scale plans such as Visitor Experience Development Plans should consider the need for plan level environmental assessment
- Addressing climate change will be a considerable challenge for all sectors in the coming decade. As a result, it is suggested that all major tourism development incorporates a zero-carbon approach.
- In areas of potential flood risk, a flood risk assessment will be necessary. Vulnerable uses may not be appropriate in areas of high risk.

- Site specific flood risk assessments will identify the constraints for consideration at the detailed design stage. Further consideration of the potential impact of climate change on all potential sources of flooding will also be provided.

The following specific text amendments are suggested for inclusion into the final version of the Tourism Masterplan:

- All future Destination & Visitor Management Plans should be supported by appropriate ecological surveys and environmental assessment.
- It is advisable that route selection with respect to greenways, blueways and trails should include appropriate ecological feasibility of proposals and environmental assessments.
- Add the following wording to DZ1.4: 'Subject to the environmental assessment and establishing the preferred route', support emerging spiritual Pilgrim Way along the Shannon-Shannon Erne Waterway, with onwards links to Lough Erne. The environmental assessment referred to above should include a detailed assessment of the potential for impacts on the historic environment.
- In relation to DZ2.1, the Development of a Visitor Management Plan for Clonmacnoise should carry out plan level environmental assessment and implement the principles of sustainable access and design.
- In relation to DZ2.2, the objective should be amended to include the requirement for the preparation of a Visitor Experience Development and Management Plan supported by the relevant environmental assessment.
- In relation to DZ2.3 Wet'n'Wild Peatlands of Mid Shannon, this objective should be amended to require 'a detailed sustainable visitor management plan prior to the implementation of this objective and the reuse of existing infrastructure and services which should be prioritised.'
- Regarding DZ2.4 Expanding the Lough Ree Experience, text should be amended to include the **recommendation** for a feasibility study to investigate a more sustainable approach to transport within the Lough Ree area.
- In relation to DZ2.5 Improvement of the Visitor Centre at the Corlea Iron Age Trackway, text should be included to state that as part of the proposed 'improvement plan' further consideration should be given to the constraints in relation to existing infrastructure. The Plan should implement the principles of sustainable access and design.
- In relation to DZ2.6 Surf in the Turf – Surf Wave Centre: 'As part of the feasibility study, a number of potential site options should be evaluated on planning and environmental grounds. Key issues for consideration include
 - Sustainable transport and access
 - Impact on water supply
 - Landscape and visual impact
 - Wastewater treatment infrastructure
 - Potential impact on internationally designated sites.
- In relation to DZ3.1 Ardnacrusha, text should be amended to state that 'As part of the Feasibility Study further consideration should be given to potential impact on heritage assets, sustainable transport and access, water quality and designated sites. Proposals should also implement the principles of sustainable access and design.'
- In relation to DZ3.2 Develop enhanced Castlelough & Portroe Lookout, the text should be amended to ensure that 'as part of the approach consideration should be given to potential impacts on heritage assets, landscape and visual amenity, sustainable transport and access, water quality and designated sites.'
- In relation to DZ3.3 Feasibility Study for Development of 'Shannon Greenway' priority should be given to the re use and enhancement of existing trails. Environmental effects including visual impact could be reduced further by minimising the development of additional infrastructure and ensuring trail surfacing is permeable and does not impact on designated sites.

- Proposals relating to Enhancing the cruise hire fleet should ensure that the upgrade is carried out to high environmental standards and that a re-use or waste reduction strategy with regard to end of life cruisers is adopted.
- Under SI2.2, it is recommended that the Development of additional Cruise Hire Hubs should be supported by an environmental feasibility study
- Under SI2.3 Marina Development the technical assessment must be supported by an environmental feasibility study.
- Under SI2.5 Angling, hubs should be identified in tandem with appropriately environmental management standards.
- Under SI2.7 Tranquillity Zones, a maximum number of tranquillity zones should be designated at any one time.
- For SI2.8 Small Scale Accommodation Options, appropriate locations should be defined within the county development plans.
- Further clarity is required in relation to likely projects or proposals resulting from SI3.3 Revitalisation of Lesser Used Waterways
- To protect water quality, it is important to ensure that adequate infrastructure is in place prior to major new development in towns and village,
- Under SI3.4 Shannon Festivals and Events, the approach may benefit from an environmental management plan to manage activities, resource use and waste.
- As part of SI5.2 Destination Development and Rewilding Plan and SI5.3 UNESCO Biosphere for Lough Ree & Environs it will be important to ensure that potential conflicts around access and ecologically sensitive sites are resolved.
- Under 7.1 guiding principles, text should be amended to state that all future projects should be required to demonstrate consideration of the potential need for project level environmental assessment as well as adequate infrastructure being in place prior to providing support to major new development.
- Consideration should be given to incorporating 'Guiding Principles' into the plan by way of an environmental management section of the masterplan.

9.3 Mitigation by SEA Topic

In the assessment of key environmental considerations, the Shannon Masterplan was assessed as a single unit, with the opportunities and challenges highlighted within each SEA topic area. A discussion of the key conclusions follows. Table 17, following, provides a full summary of key environmental considerations for the Masterplan.

Table 17: Summary of Key Environmental Considerations

SEA Topic Areas	Opportunities / challenges	Potential Effects / Impacts	Proposed Mitigation
Population and Human Health	<p>Opportunities</p> <ul style="list-style-type: none"> Improving recreational infrastructure along the River Shannon; Ensuring tourism potential is linked to economic opportunities in nearby settlements; Improved health and well-being by encouraging physical activity; Better integration of visitor services with existing infrastructure; Strengthening of communities; Inclusion of sustainable transport; and Promotion of natural asset-based economic growth. <p>Challenges</p> <ul style="list-style-type: none"> Increased infrastructural requirements for water and wastewater treatment to service visitor growth; Increase in demand for transport services and associated infrastructure i.e. car parking; and Increasing car dependency and associated emissions to air with associated health impacts. 	<ul style="list-style-type: none"> Deterioration of water quality Increase in air emissions. Increase in development that creates unsustainable transport patterns. 	<ul style="list-style-type: none"> Develop and identify ecotourism standards across the study area that support the implementation of mitigation measures proposed in this environmental report Provide adequate facilities to manage wastewater.
Biodiversity – See also Section 9.4 below.	<p>Opportunities</p> <ul style="list-style-type: none"> More coherent protection and enhancement of biodiversity on a regional scale; and Consideration of the economic potential of biodiversity, flora and fauna to contribute to economic wellbeing of communities. <p>Challenges</p> <ul style="list-style-type: none"> Potential for interactions with population and human health e.g. access to outdoors and disturbance to wildlife; Balancing tourism growth with protecting wild places and protected areas; Realising amenity-based tourism without causing recreational pressures on sites of biodiversity importance; Potential for effects on protected areas; Potential for habitat loss and fragmentation; Potential introduction / spread of alien species and invasive species; 	<ul style="list-style-type: none"> Disturbance of wildlife Deterioration of water quality Habitat loss / fragmentation Species loss Introduction / spread of invasive aquatic and terrestrial species Indirect effects on habitats and species due to increase in air emissions. These would include loss or damage to habitats and loss of species. 	<ul style="list-style-type: none"> Restriction of activities in areas that are considered sensitive to disturbance. Recognised seasonal constraints with respect to development and experience development activities. Identify areas where seasonal constraints on activities apply Provision of adequate facilities to manage wastewater;

SEA Topic Areas	Opportunities / challenges	Potential Effects / Impacts	Proposed Mitigation
	<ul style="list-style-type: none"> • Potential for disturbance of wildlife particularly birds listed as features of SPA sites; • Deterioration in water quality • Deposition of pollutants on vegetation and to water. 		<ul style="list-style-type: none"> • Implement and enforce appropriate biosecurity measures; • Encourage and support walking, cycling and public transport use to minimise emissions to air; • Focus infrastructure and development in amenity areas outside high value biodiversity zones. • Consider use of Integrated Constructed Wetlands (ICW) where space allows to reduce need to treat and discharge to the receiving environment. • A minimum requirement of AA screening for all projects funded or promoted under the Tourism Masterplan in full compliance with the habitats regulations. • Projects that are located in close proximity to internationally designated site will require screening for appropriate assessment. • Minor Development that may be assumed as having exempted development status may require screening for appropriate

SEA Topic Areas	Opportunities / challenges	Potential Effects / Impacts	Proposed Mitigation
			assessment and may requirement planning permission.
Soil	<p>Opportunities</p> <ul style="list-style-type: none"> • Encourage sustainable soil management; • Protect soils including prime agricultural land; • Protect soils with high carbon content e.g. peatlands; • Protect lands with ecosystem services e.g. peatlands, wetlands, hedgerows, grasslands; • Utilisation of existing brownfield sites; and • Support the long-term strategy for the transition from peat extraction towards a natural asset-based rural economy. <p>Challenges</p> <ul style="list-style-type: none"> • Identify appropriate locations for tourism development i.e. in existing settlements or brownfield sites. • Avoid the loss of prime agricultural land for development • Erosion of soils; • Soil compaction; • Spread of invasive species; • Soil pollution; • Effects on geomorphology (i.e. landforms and river channels); and • Sealing of soils; and • Increase in extent of built up areas/urbanisation/impermeable surfaces. 	<ul style="list-style-type: none"> • Introduction / spread of invasive aquatic and terrestrial species • Contaminated run-off from hard surfaces causing sedimentation / pollution of receiving water. • Habitat and / or species loss 	<ul style="list-style-type: none"> • Implement and enforce good biosecurity measures. • Use permeable or semi-permeable surfaces where possible. • Siting of new infrastructure and facilities in town centre locations, focusing on the reuse of existing buildings and the redevelopment of brownfield land to minimise the impact on soil.
Water	<p>Opportunities</p> <ul style="list-style-type: none"> • Improve water quality by influencing the location and type of development within all catchments, but particularly those with water quality issues; • Improve water quality by identifying and addressing impacts on the water environment; and • Improve water infrastructure networks and ensure development is matched with current and future infrastructure capacity. • Ensuring new development does not increase current risk; • Reduce flooding by ensuring new development is not located in areas of high flood risk; 	<ul style="list-style-type: none"> • Potential adverse effects of new development on the capacity of existing waste water treatment facilities 	<ul style="list-style-type: none"> • Facilitating growth and development without compromising achievement of WFD objectives; • Ensure adequate drinking water and wastewater treatment is available to accommodate planned growth and development; • Prevent the introduction and/ or spread of invasive species;

SEA Topic Areas	Opportunities / challenges	Potential Effects / Impacts	Proposed Mitigation
	<ul style="list-style-type: none"> Potential to further develop permeable lands and sustainable drainage systems in urban areas; and Support the fishing industry and encourage other value-added activities. <p>Challenges</p> <ul style="list-style-type: none"> Facilitating growth and development without compromising achievement of WFD objectives; Ensure adequate drinking water and wastewater treatment is available to accommodate planned growth and development; Protect water dependant ecosystems from pollution; Prevent the introduction and/ or spread of invasive species; Morphological impacts on water bodies from additional boating infrastructure; Preparing for and taking account of coastal hazards such as erosion and impacts from climate change such as sea level rises, increased flooding events and extreme weather events; and Impacts on water bodies from construction of new wastewater treatment facilities and infrastructure. 		<ul style="list-style-type: none"> Avoid morphological impacts on water bodies from additional boating infrastructure.
Air Quality	<p>Opportunities</p> <ul style="list-style-type: none"> Reduce transport related emissions and increase energy efficiency across all transport modes; and Encourage modal shift amongst visitors. <p>Challenges</p> <ul style="list-style-type: none"> Visitors are largely car dependant; Increase in emissions to air due to increase in boat activity and traffic to the site; Increasing NOx and particulate matter (PM10 and PM2.5) emissions as a result of road transport and increased transport on water; Modal shift away from road transport; and Reduce transport demand. 	<ul style="list-style-type: none"> Increase in emissions to air stemming from Indirect effects on habitats and species due to increase in air emissions. These would include loss or damage to habitats and loss of species. 	<ul style="list-style-type: none"> Encourage and support walking, cycling and public transport to reduce emissions to air Focus infrastructure and amenity areas outside high value biodiversity zones. Encourage new and refurbished electric powered boats.
Climate Change	<p>Opportunities</p> <ul style="list-style-type: none"> Integrate pathways to carbon neutrality across masterplan proposals; Increase efficiency and reduce energy demand in new build; 	<ul style="list-style-type: none"> Increased energy demand, particularly from carbon intensive 	<ul style="list-style-type: none"> Ensure that mayor new development incorporates a zero carbon approach

SEA Topic Areas	Opportunities / challenges	Potential Effects / Impacts	Proposed Mitigation
	<ul style="list-style-type: none"> • Consider opportunities for renewable energy in new build; • Encourage modal shift; and • Reduce transport related emissions. <p>Challenges</p> <ul style="list-style-type: none"> • Car dependency within the visitor economy; • Climate adaptation and mitigation; • Increased risk of extreme weather events; and • Flood risk. 	<p>development and car based travel.</p>	<ul style="list-style-type: none"> • Encourage new and refurbished boats that are electric powered • In areas of potential flood risk, a flood risk assessment will be necessary. Vulnerable uses may not be appropriate in areas of high risk. • Site specific flood risk assessments will identify the constraints for consideration at the detailed design stage. Further consideration of the potential impact of climate change on all potential sources of flooding will also be provided.
Cultural Heritage	<p>Opportunities</p> <ul style="list-style-type: none"> • Support national level policies at regional level to protect and enhance the region's varied archaeological and architectural heritage assets; • Integration of cultural heritage into the design of future developments; • Promotion of the cultural heritage resource as a source of economic benefit for communities e.g. tourism; • Promotion of the Shannon region's unique cultural wealth and assets; and • Cultural contribution to wider social and economic goals e.g. a heritage based approach to renewal and tourism. <p>Challenges</p> <ul style="list-style-type: none"> • To preserve and protect the cultural heritage including architecture, archaeology and cultural heritage; • Impacts on archaeological features and setting; and • Impacts for underwater archaeological features during construction of new infrastructure and/ or upgrades. 	<ul style="list-style-type: none"> • Developments or redevelopment that does not consider the role, value and opportunity provided by cultural heritage. 	<ul style="list-style-type: none"> • The reuse of protected structures will be encouraged • Inclusive access to visitor attractions will be of benefit to the local economy and health and wellbeing. • Where development involves a protected structure or national monument professional design input and conservation expertise will be required to avoid impacts on the historic fabric of the building.

SEA Topic Areas	Opportunities / challenges	Potential Effects / Impacts	Proposed Mitigation
Material Assets	<p>Opportunities</p> <ul style="list-style-type: none"> Plan to be aligned with required transport, water, energy infrastructure; Balance competing requirements for land use and natural resources; and Investment in supporting infrastructure e.g. water infrastructure. <p>Challenges</p> <ul style="list-style-type: none"> Scale or pace of development not in keeping with level of service provision/ adequate capacity e.g. serviced land, water supply and drainage, road/ port/ airport capacity; Provision of infrastructure which is adaptable to the impacts of climate change; Increased in waste generated; and Increased demands on water supply. 	<ul style="list-style-type: none"> Inadequate infrastructure to facilitate new development. 	<ul style="list-style-type: none"> Ensure the proposal meets defined local/market need and avoids displacement of existing facilities. Develop and implement a strategy to avoid the use of single use plastics during festivals and cultural events. Projects to incorporate soft engineering features to minimise the use of impermeable surfaces, minimise energy use, and demand for water resources as well as wastewater treatment.
Landscape	<p>Opportunities</p> <ul style="list-style-type: none"> Support policies to protect landscapes; To integrate landscape considerations into the design of future developments; To develop requirements for design statements for villages, towns, and key service centres along the Shannon Navigation; and Develop a coordinated approach to identify scenic routes and associated key attractions coupled with infrastructure provision for the creation of safe, segregated pathways. <p>Challenges</p> <ul style="list-style-type: none"> Impacts on landscape character; No national landscape character assessment; and The lack of coherent landscape designations and LCAs will provide a challenge in the preparation of the Environmental Report and SEA assessment, but potential impacts on all existing such designations should be considered. 	<ul style="list-style-type: none"> Poor site selection in relation to new projects Inappropriate site design, height and massing of new development 	<ul style="list-style-type: none"> Site selection to be informed by landscape character and sensitivity. The preparation of design statements be sought for all major new projects

9.4 Habitats Regulations Assessment

9.4.1 Natura Impact Report - Proposed Mitigation

Natura Impact Report which should be read alongside this Environmental Report concluded that:

‘The integrity of the 42 Natura 2000 sites is likely to be affected by increased human activity and the development and operation of associated supporting infrastructure and services within the core area of the Shannon Tourism Masterplan. Habitat loss and degradation could result from increased use of footpaths and water ways within Natura 2000 sites. Disturbance and resultant displacement of species such as birds and otter could occur due to proposed recreational activities and development in close proximity to the river and other key habitats. Water pollution could impact aquatic species such as lamprey (sea, river and brook) and salmon. These effects could result in population reduction through mortality or reduction in the distribution of habitat. Increased movement of people and transport of a wide area of countryside potentially in and out of number of Natura 2000 site also has high potential to spread non-native invasive species. The effects described could undermine the conservation objectives for the features of interest affected which would adversely affect the Natura 2000 sites’.

The following mitigation measures are proposed to avoid, reduce or remedy the adverse effects on the integrity of the sites in question. In identifying appropriate mitigation measures it is acknowledged that **the Masterplan by its nature is a high-level strategic document** and by default the mitigation measures proposed will also be relatively **strategic and cross cutting** in nature. Mitigation has been incorporated into the Masterplan itself where practical.

Biosecurity Measures Strategy for the Shannon

Formal biosecurity standards for the inland waterways, to prevent the inadvertent disruption of the Shannon’s natural ecosystems are required across the masterplan area. Draft standards have been included in the masterplan, which focus on communications, freshwater security measures for small boats and standards for leisure and industrial craft entering the system.

The introduction of Biosecurity Facilities at Designated Entry Points should be considered along the Shannon to reduce the risk of further introduction or spread of invasive species. These should include:

- anti-fouling stations for routine boat cleansing procedures;
- cleansing / power washing stations for incoming / outgoing craft;
- well placed and well serviced pumping stations to prevent unlicensed bilge discharge; and
- spot inspections by licensed navigation staff.

Visitor Behaviour

The master plan puts emphasis on high standards of environmental sustainability including a co-ordinated approach to persuasive communication to positively influence visitor behaviour. This is expected to include a Shannon Code of Conduct, based on the national Leave No Trace guidelines, encouraging positive behaviours and care for the Shannon Environment should be developed for local people and visitors.

General Environmental Mitigation

The mitigation measures proposed can be broadly summarised as follows:

- Wastewater, surface water drainage and drinking water infrastructure must be in place prior to development.
- Contractors appointed to undertake any construction works will be expected to provide site specific method statements detailing measures taken to protect the environment during all phases of works.
- Measures to protect the environment will be incorporated into projects or plans to avoid adverse effects to the integrity of Natura 2000 sites. These will include, but will not limited to, measures such as those set out in:

- Guidelines on Protection of Fisheries During Construction Works In and Adjacent to Waters (IFI, 2016)' and
- Environmental Good Practice on Site Guide (CIRIA, 2015)
- Restrictions on access to sensitive sites within Natura 2000s sites including to: particularly sensitive terrestrial and aquatic habitats that could be damaged by the proposed recreational activities, key bird nesting habitat during the breeding season, key bird foraging habitat (all times of year), where dogs can be let off the lead, how close to the water's edge footpaths and camping areas are allowed to be sited.
- Regardless of planning reequipments and environmental impact assessment and associated species and habitat protection plans should be produced for each objective/ project arising from the Tourism Master Plan with potential for impacts on Natura 2000 sites. These should all also undergo an objective/ project specific AA screening process.

Waterways Ireland will be responsible for ensuring that the mitigation measures proposed are implemented fully and that the measures are implemented for the lifetime of the Tourism Masterplan.

It must also be noted that the appropriate assessment at plan level does not exempt projects or plans arising from the plan from the assessment requirements of Article 6(3) at a later stage, when much more details of potential impacts and effects are known. In other words, projects or plans that result from the Masterplan are also required to undergo Article 6 assessment before they can proceed or be permitted. Waterways Ireland and / or the relevant planning authority will be responsible for ensuring that projects or plans that result from the Masterplan are also required to undergo Article 6 assessment before they can be permitted or proceed.

9.5 Monitoring

The SEA Directive requires the monitoring of a Plan upon the implementation of the Plan to identify any unforeseen significant adverse environmental effects and to take the appropriate remedial action. The following monitoring framework outlined in Table 18 overleaf is proposed.

Table 18 Proposed Monitoring Framework: Tourism Masterplan for the Shannon

Ref	Environmental Objective	Indicator	Topic	International, European, National policy documents / strategies / guidelines
1 BIO	Conserve and enhance habitats and species, with priority protection afforded to sites and species designated under the Habitats Directive.	Loss of habitats and species	Biodiversity	EU Habitats Directive (92/43/EEC) EU Birds Directive (79/409/EEC) UN Convention on Biological Diversity Actions for Biodiversity 2011- 2016, Ireland’s National Biodiversity Plan (2011) National Wildlife Act 1976-2000
2 BIO	Prevent the spread of invasive species	Occurrence of invasive species	Biodiversity	EU Habitats Directive (92/43/EEC) EU Birds Directive (79/409/EEC) UN Convention on Biological Diversity Actions for Biodiversity 2011- 2016, Ireland’s National Biodiversity Plan (2011) National Wildlife Act 1976-2000
3 HEA	Improve health and wellbeing by improving opportunities safe and sustainable transport	Public transport availability Numbers participating in walking and cycling activities	Population and Human Health	Ireland 2040 – The National Planning Framework (2018) People, Place and Policy Growing Tourism to 2025 Directive 2002/49/EC of 25 June 2002 relating to the assessment and management of environmental noise Directive 96/62/EC – Air Quality Framework Directive Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC)
4 WAT	Protect and improve the quality of surface and ground water bodies	WFD water status of surface and groundwaters	Water	European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997 as amended by S.I. No. 233 of 1998 and S.I. 378 of 2005); European Communities Environmental Objectives (Surface Water) Regulations, 2009 (S.I. No. 272 of 2009); European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), and;

Ref	Environmental Objective	Indicator	Topic	International, European, National policy documents / strategies / guidelines
				European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010). EU Water Framework Directive (2000/0/EC) Bathing Water Quality Regulations (SI No. 79 of 2008) European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI No. 272 of 2009)
5 WAT	Protect water levels	WFD water status of surface and groundwaters	Water	European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997 as amended by S.I. No. 233 of 1998 and S.I. 378 of 2005); European Communities Environmental Objectives (Surface Water) Regulations, 2009 (S.I. No. 272 of 2009); European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), and; European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010). EU Water Framework Directive (2000/0/EC) Bathing Water Quality Regulations (SI No. 79 of 2008) European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI No. 272 of 2009)
6 WAT	Minimise development in areas of flood risk, where flood risk compatible development is proposed ensure that flood risk does not increase elsewhere.	Interaction with flood extents	Water	European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997 as amended by S.I. No. 233 of 1998 and S.I. 378 of 2005);

Ref	Environmental Objective	Indicator	Topic	International, European, National policy documents / strategies / guidelines
				<p>European Communities Environmental Objectives (Surface Water) Regulations, 2009 (S.I. No. 272 of 2009);</p> <p>European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), and;</p> <p>European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010).</p> <p>EU Water Framework Directive (2000/0/EC)</p> <p>Bathing Water Quality Regulations (SI No. 79 of 2008)</p> <p>European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI No. 272 of 2009)</p> <p>EU Directive on the assessment and management of flood risks [2007/60/EC],</p> <p>The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009)</p> <p>National Adaptation Framework, Planning for a Climate Resilient Ireland, 2018</p>
7 CLI	To adapt and mitigate the effects of climate change	<p>No of zero carbon tourism developments in the masterplan area</p> <p>Number of people using walking, cycling and public transport as a means of transport</p>	Climate	<p>EU Directive on the assessment and management of flood risks [2007/60/EC],</p> <p>The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009)</p> <p>National Adaptation Framework, Planning for a Climate Resilient Ireland, 2018</p> <p>A 2030 Framework for Climate and Energy Policies [COM (2013) 169]</p> <p>EU 2020 Climate and Energy Package 2013-2020</p> <p>National Planning Framework 2040</p> <p>National Mitigation Plan 2017</p> <p>Climate Act 2015</p>

Ref	Environmental Objective	Indicator	Topic	International, European, National policy documents / strategies / guidelines
8 HER	To protect the integrity and authenticity of cultural heritage	Status and of cultural heritage features	cultural heritage	National Monuments Act, 2004 Planning and Development Act, 2000 S.I. 229/2005 - National Monuments Act 1930 (Section 14B) Regulations 2005 Government Policy on Architecture 2009 – 2015
9 LAN	To protect landscape character, minimise the loss of historic landscape features such as mature trees and hedgerows and scenic views	Number of developments subject to Landscape and Visual impact assessment	Landscape	The European Convention on Landscape, 2000 A National Landscape Strategy for Ireland Strategy Issues paper for consultation (2011)
10 SOIL	To protect soil resources and minimise the loss of the high quality agricultural land	Area of agricultural land lost Area of cut away bog remediated	Soil, Geology	A Resource Opportunity, Waste Management Policy in Ireland. Department of the Environment, Community and Local Government July 2012

APPENDIX 01

Summary of Scoping Consultation Responses

Table 19 Summary of Scoping Consultation Responses

	Respondee	Concerns	Detail	Recommendations
1	Northern Ireland Environment Agency	Environmental Report	DAERA Please ensure that a clear statement indicating the opinion and reasons whether the implementation of the plan, in combinations with identified mitigation measures will have a significant effect on N.I	Check EPA SEA Resources on the EPA website;
		Figure 3	Page 6, figure 3 - appears that the boundary of the study area is close to Reily and Gole Woods Nature Reserve. The following information therefore should be included in Table 3: <i>Strategic Planning Policy Statement for Northern Ireland, Regional Development Strategy 2035 Northern Ireland Landscape Character Assessments;</i> <i>Wildlife and Natural Environment Act (Northern Ireland) 2011;</i> <i>Environment (Northern Ireland) Order 2002 (as amended);</i> <i>Conservation (Natural Habitats, etc) Regulations (Northern Ireland) 1995 as amended;</i> <i>Nature Conservation and Amenity Lands (NI) Order 1985 as amended</i> <i>Wildlife (NI) order 1985</i>	the environmental sensitivity mapping tool http://airo.maynoothuniversity.ie/mapping-resources/airo-research-maps/environmental-research-projects/environmental-sensitivity .
		LCA	There are Landscape Character Assessments available for NI.	Have regard to the EPA SEA Search and reporting tool;

	Respondee	Concerns	Detail	Recommendations
		Appropriate Assessment		Have regard to State of the Environment Report - Irelands Environment 2016
		Historic Environment	Historic Environment Decision is disappointed that the historic environment does not appear as a significant consideration in the body of the document.	

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