Winter 2020

National Water Resource Plan – Draft Framework Plan

Strategic Environmental Assessment

Environmental Report

IW/FF/LDB/0115

Tionscadal Éireann
Project Ireland
2040

Data Disclaimer: This document uses best available data at time of writing. Some sources may have been updated in the interim period. As data relating to population forecasts and trends are based on information gathered before the Covid 19 Pandemic, monitoring and feedback will be used to capture any updates. The National Water Resources Plan will also align to relevant updates in the National Planning Framework.

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Non-Technical Summary

See separate Non-Technical Summary document.

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Introduction and Background

1.1 Irish Water's Role

On the 1st of January 2014, through the Water Services Act (No. 1) 2013, Irish Water assumed statutory responsibility for the provision of public water services and management of water and wastewater investment. Irish Water's role is to provide public water and wastewater services throughout the country. They are the custodian with the responsibility to manage the precious water resources and, with Local Authority partners, secure it for future generations. It is their responsibility to ensure that all their customers receive a safe and secure supply of drinking water and have their wastewater collected, appropriately treated and returned to the environment. Irish Water support Ireland's social and economic growth in a sustainable manner through appropriate investment in water services and protect the environment in all their activities.

Irish Water is regulated by:

- The economic regulator, the Commission for Regulation of Utilities (CRU), is charged with protecting the interests of the customer. The CRU also approves appropriate funding to enable the utility to deliver the required services to specified standards in an efficient manner.
- The environmental regulator, the Environmental Protection Agency (EPA), sets standards and enforces compliance with EU and National Regulations for drinking water supply and wastewater discharge to water bodies. The EPA liaises with the Health Services Executive in matters of public health.

1.2 What is the National Water Resources Plan

Effective water services, including the delivery of a sustainable and reliable clean water supply and safe disposal of wastewater, are essential for a modern country. Being able to understand and estimate how much water is required, where it is required, and the variability of requirements over the course of the year or over time, is essential to plan appropriately for the future of the public water supply.

A Water Resources Plan is a strategic plan used to identify deficiencies and need across a water supply and to develop plan level capital and operational solutions to address these issues.

Irish Water's National Water Resources Plan will be the first resources plan for the public water supply in the Republic of Ireland. It will allow Irish Water to integrate Government Policy, Legislation and external factors that have the potential to impact their water supplies into the planning and operation of their existing and future supply asset base.

The objective of the National Water Resource Plan is to manage customer and communities needs while meeting their requirements over the short, medium and long term by ensuring safe, secure, sustainable and reliable water supplies. The National Water Resources Plan will:

- Enable Irish Water to address needs across their water supplies in the most effective way over time, through the regulated investment cycles;
- Ensure that there is a transparent framework to develop the most appropriate projects/programmes to meet statutory obligations in relation to water supply; and
- Provide a framework to track outcomes, allowing interventions to be prioritised to bring the water supply up to the required standards in the shortest possible timeframe.

As a basis for broad public and stakeholder engagement, the National Water Resources Plan (the Plan) will be delivered in two phases. In this first Phase, Irish Water will consult on the methodologies they have developed in the draft Framework Plan in order to identify need and find solutions to

address need across all of their supplies. Irish Water will also assess need across each of the 539 public water supplies nationally, in terms of:

- **Water Quantity** that Irish Water can provide;
- **Water Quality** that Irish Water can provide; and
- Performance of and operational efficiency of Irish Waters **Asset Base**.

Water Resources Plans are reviewed on a cyclical basis to take account of new information, data, policies and laws and are usually updated every 5 years. Irish Water know things will change over the next 25 years so within the Plan they have considered a range of possible futures, some more challenging than others. This approach is called adaptive planning, and means Irish Water are ready and flexible whatever the future holds.

A glossary of technical terms used is included at the end of the document.

1.3 Water Supply in Ireland

Water is currently abstracted from approximately 1,090 individual sources and treated in 749 Water Treatment Plants (WTPs). The size of these WTPs varies significantly across the country, with the largest 72 WTPs producing 73% of the water supplied and the smallest 500 WTPs producing on average 0.2Ml/d or about 6% of the total supply available.

The WTPs feed water into supply areas known as Water Resources Zones (WRZs). Each WRZ is an independent water supply system serving a region, city, town or village and is governed by topography or the extent of the water distribution network in an area. Within a WRZ most customers receive the same Level of Service, measured as a probability of interruption to services (for example one interruption to supply in 50 years). There are 539 WRZs in Ireland. These range in size, serving populations of less than 30 people (small rural areas) up to 1.7 million people (Greater Dublin Area).

Ireland has a dispersed population and water supplies were historically developed in response to need in the immediate vicinity. As a result, some supplies were developed using surface or groundwater sources with limitations in terms of quantity available and/or variable raw water quality. Also, due to long term under investment in water services many of Irish Water water supply assets (WTPs, water mains etc.) are in need of upgrades or additional infrastructure is required.

As a result, there are a number of key issues that impact the quality, sustainability and reliability of Irish Water existing water supplies.

- **Single Source Supplies**: Many WRZs rely on a single source of supply, meaning they are more vulnerable to interruptions to supply;
- **Inappropriate Water Sources**: Current supplies often come from small local rivers. Irish Water must ensure that their abstractions will not adversely impact the environment so that Ireland complies with its obligations under the Water Framework Directive;
- **Treatment Capacity**: Rapid growth in some areas has meant that some of Irish Water WTPs are undersized and treat water in quantities that exceed the original design capacity of these facilities;
- **Water Quality**: Although 98.6% of samples passed quality tests in 2019, some of Irish Water water treatment facilities and distribution systems do not function as effective barriers to reduce risk and may not consistently provide safe drinking water at Customer's taps. The legacy of under-investment has exacerbated the problems with Ireland's deteriorating and poor quality water services infrastructure.
- **Network Performance:** The performance of Irish Water distribution networks does not meet European norms and leakage and distribution losses are unacceptably high. Key issues include:

- The average age of the water mains infrastructure in Ireland is estimated at between 65 to 85 years. This compares to an EU average of 36 years (source: European Benchmarking Cooperation 2013).
- Some of the cast iron mains in our cities and towns are often heavily corroded and vary in age from 50 to 160 years, giving rise to high leakage, rust discolouration and high risk of failure causing supply disruption.
- Other pipe materials such as uPVC and Asbestos Cement laid between the 1960s and 1980s can also be problematic with high burst frequency.

- **Constrained Funding:** Due to long term underinvestment in water services many of Irish Water assets are failing and are in need of significant capital investment. Coupled with stricter EU standards, treated water quality and protection of the environment are driving the need to increase as opposed to reduce expenditure.

1.4 Progress to date

Irish Water has made positive progress in improving water quality for their customers by developing policies and strategies for water supply. They have progressed projects and programmes to deliver the requirements of these policies. Irish Water's Investment periods, (known as Revenue Control periods) set out how much Irish Water can spend on projects and programmes for that period.

The first Capital Investment Plan covered the period 2014-2016. The second investment plan covered 2017 to 2019. Irish Water is currently at early implementation stages of the new investment plan for 2020-2024.

Between January 2014 and December 2019 Irish Water invested €3.9 billion in public water and wastewater infrastructure, with a further projected spend of circa €5bn by 2024. Irish Water has invested in a range of water projects and programmes that will support and enable proper planning and sustainable development at a national, regional and local level. The objective of this approach has been to deliver a balanced portfolio of investment across the three themes of Quality, Conservation and Future Proofing.

1.4.1 Water Quality

Irish Water aims to lift Boil Water Notices (BWN) through targeted investment and they have successfully achieved this for 79,507 people since 2014. Nearly 16,000 of these were on long term boil water notices. Through investment in water assets and infrastructure, Irish Water has removed 174 public water schemes from the EPA's remedial action list. Over the same period (2014-2019) an additional 86 schemes have been added, leaving 52 schemes with remedial works remaining.

Since the start of 2014, 72 WTPs have been rationalised by Irish Water by laying a water main connection to a neighbouring treatment plant. Irish Water is also delivering a range of national programmes to address high risk water supplies. Through Irish Water National Disinfection Programme, they have upgraded a total of 255 WTPs and under their National Lead Programme they have replaced a total of 32,641 lead services, representing a significant investment in protecting public health.

1.4.2 Water Conservation

Water conservation is a key focus for Irish Water. Irish Water's National Leakage Reduction Programme is reducing leaks across Ireland by fixing or replacing old, damaged pipes and removing lead service pipes from the network. Through this programme they have achieved total gross leakage savings of 154.2 Ml/d on the private side and 233.2 Ml/d on the public side of the water distribution network for the 2014-2019 period.

1.4.3 Future Proofing

Between 2014 and 2019 Irish Water has delivered key outcomes to support growth including constructing of 11 new WTPs and upgrading of 36 WTPs. They have also laid a total of 1,906km of new and rehabilitated water main. Major national strategic infrastructure water projects have also been progressed during this time, including the Vartry Water Supply Scheme (Co Dublin and Wicklow) and Lough Guitane WTP (Co Kerry). These projects are of vital importance and critical to meeting Ireland's growing water needs.

Despite this progress, Irish Water will have further challenges to address. Therefore, it is essential that Irish Water put in place a National Water Resources Plan in order to keep making progress in a strategic prioritised way for the next 25 years. This Plan will then help Irish Water inform the capital investment plans for each future investment cycle.

1.5 Future Challenges

Ireland has a temperate climate with relatively high annual average rainfall, so while it is easy to assume that there is plenty of water available for supply, this is not always the case. Rainfall is

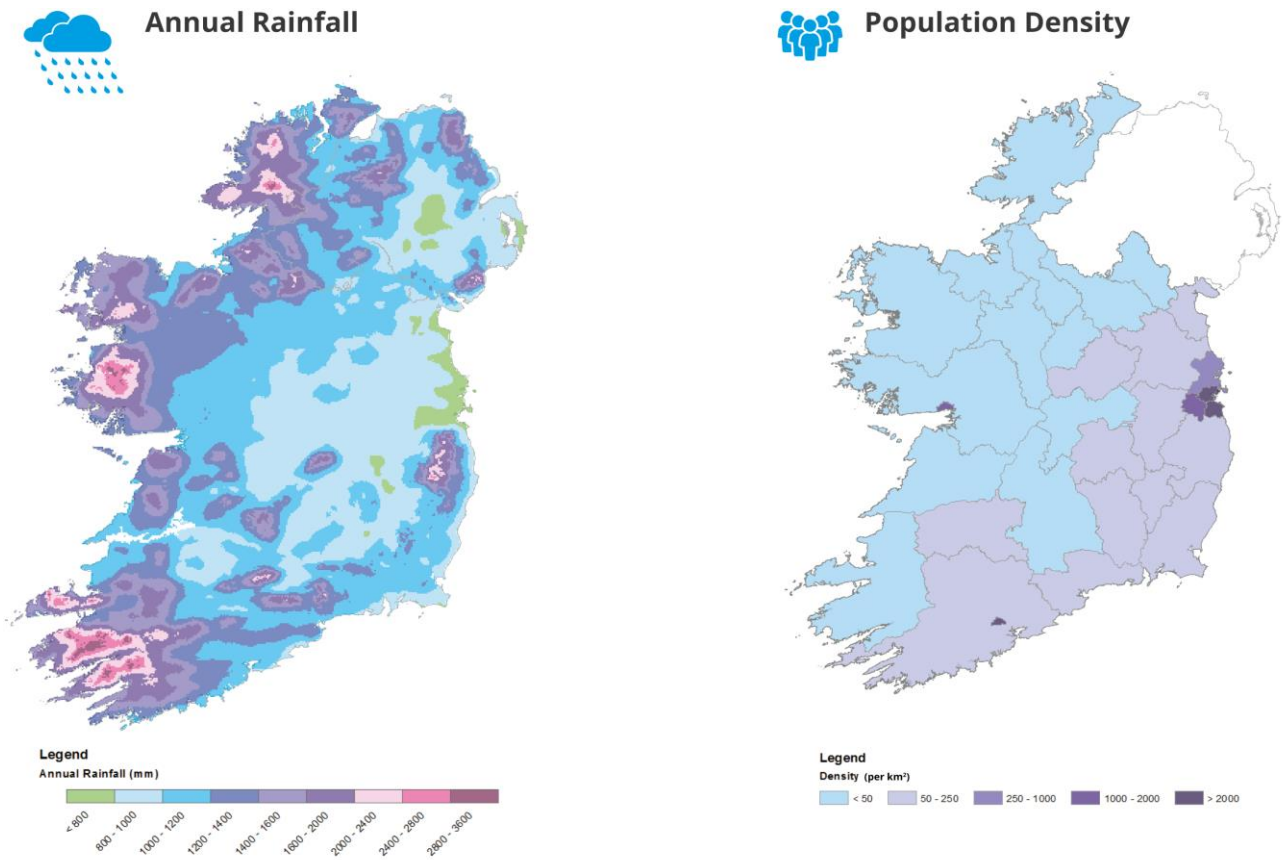


Figure 1.1 – Rainfall in Ireland compared to population density

unevenly distributed across the country, with more falling in the west than the east. Figure 1.1 shows that the areas with lowest rainfall have the greatest population density, meaning resources in the most populated areas can become stressed.

In addition, Ireland also face key challenges over the coming years, which have the potential to exacerbate the current problems with their water supplies:

- **A growing population:** The country's population is expected to increase by 21% or 1.2 million people over the next 25 years, this will impact on demand for water. Further information is provided on this in Chapter 6.2 of this report;
- **Changes in land use and emerging contaminants:** Increasing pressure on the quality of water in the natural environment before it is treated, due to changes in land use, emerging contaminants and higher quality/supply standards required under the recast Drinking Water Directive[1];
- **A changing climate:** Changing weather patterns reducing available supplies and increasing the frequency of droughts and other extreme weather events that can result in interruptions to supply. Further information is provided on this in Chapter 6.8 of this report; and
- **An Environment in Need:** Irish Water currently abstract water from rivers and groundwater aquifers for the purpose of water supply. Irish Water need to make sure they leave enough water in the environment to protect the health of rivers and wildlife. Forthcoming Abstraction Legislation, required to ensure that Ireland can meet its obligations under the Water Framework Directive, may reduce the amount of water Irish Water is able to abstract from some of their sources in the future.

If Irish Water can address these challenges as part of their Plan, they will ensure that future infrastructure development is proportionate to identified need and is sustainable, reliable and resilient.

1.6 Water Resource Planning

Water Resource Plans are standard practice for other utility companies that are involved in drinking water supply. However Irish Water needs to develop a plan that is specific to the public water supply in Ireland, accounting for:

- Ireland's dispersed low-density population;
- The historical development of the existing water supply system; and
- The baseline condition of existing infrastructural assets and the associated risks in terms of safety and security of existing supplies.

Irish Water must also ensure that the NWRP aligns with government policies such as: Project Ireland 2040, the second cycle of the River Basin Management Plan (RBMP) and the Climate Change Adaptation Policy.

The NWRP covers the entire state, which is a larger geographic area than most water resource plans would consider. Whilst the content of the NWRP is consistent with a 'typical' Water Resource Plan from another jurisdiction, owing to the size of the area it is required to cover, the NWRP is broken into two delivery phases.

Phase 1: National Water Resources Plan – Framework Plan

Phase 1 of the draft Framework Plan will include*:*

[1] Drinking Water Directive (98/83/EC), Provisional Agreement of Recast Directive 18th December 2019

- A description of the methodology Irish Water propose to use for Water Resources Planning:
    - How Irish Water assess quantity need through the Supply Demand Balance;
    - How Irish Water assess quality and reliability need through the Barrier Assessment;
    - How Irish Water address Sustainability by ensuring that all new options for water supply must be based on conservative approaches to protecting water sources;
    - Irish Water Options Assessment Process; and
    - Irish Water Preferred Approach Development Process.
- An assessment of Need across Irish Water asset base in terms of Quality, Quantity, Reliability and Sustainability for all of their supplies nationally.

This Framework Plan is subject to Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA).

Phase 2: comprises of four Regional Water Resources Plans (Regional Plans)

In order to manage the delivery of Phase 2, the public water supply will be divided into the four regional groupings shown in Figure 1.2.

The draft Regional Plans will be referred to as follows:

- Regional Water Resources Plan: North West (Group Area 1)
- Regional Water Resources Plan: South West (Group Area 2)
- Regional Water Resources Plan: South East (Group Area 3)
- Regional Water Resources Plan: Eastern and Midlands (Group Area 4)

These groupings reflect Irish Water's operational regions and their water supply boundaries, with modifications to account for river catchments, as delineated by the EPA in the RBMP.

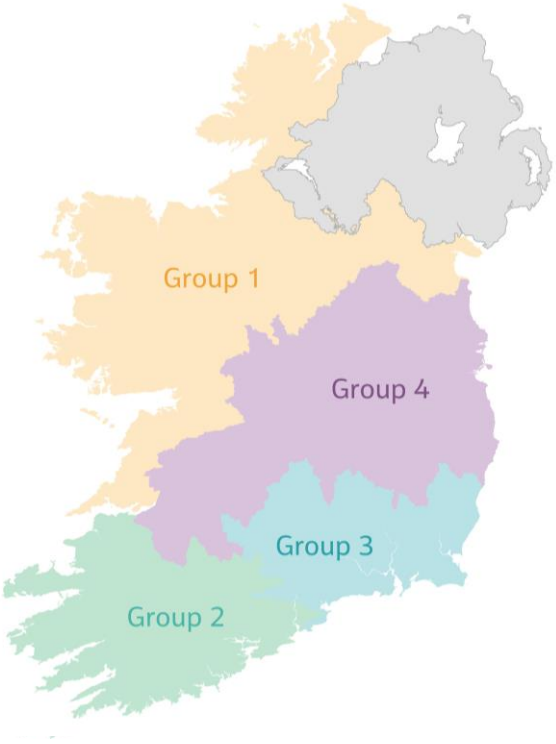


Figure 1.2 – Regional Group Areas for roll-out of Phase 2 of the NWRP

The Regional Plans will apply the Options Assessment Methodology to the national water supply and develop a programme of preferred short, medium and long term solutions and/or groups of solutions to address identified needs for each area of the supply network. The Regional Plans will each be subject to a separate SEA and AA process.

Figure 1.3 summarises the component parts of the National Water Resources Plan and how these interact.

Figure 1.3 – Key elements of the NWRP and the phased consultation

In the current phase Irish Water is presenting the draft Framework Plan for consultation alongside this SEA Environmental Report[2] and the Natural Impact Statement (NIS). A case study of the application of the proposed Options Assessment Methodology is provided as an illustrative example (see Case Study – Study Area 5) along with an environmental review to demonstrate how the SEA and AA process will be applied in the Regional Plans (see Case Study – Study Area 5: Environmental Review).

[2] This SEA Environmental Report is not an SEA Environmental Assessment on the case study.

Table 1.1 – National Water Resources Plan Phases

NWRP Phases	NWRP Reports	Content	SEA Reports
Phase 1 - Framework Plan	NWRP – draft Framework Plan	Need Identification including SDB Calculations NWRP Objectives Generic Options Types Options Assessment Methodology	SEA Environmental Report (of the Framework Plan)
	Case Study - Study Area	Test of the Options Assessment Methodology. Study Area 5 provided as an example with draft Framework Plan to demonstrate the methodology. The outcomes are not part of draft Framework Plan consultation.	Sample Case Study - Study Area 5 Environmental Review
	NWRP – final Framework Plan	Finalise and Adopt NWRP Framework Plan	SEA Statement
Phase 2 Regional Water Resources Plans (Regional Plans)*	Draft RWRPs (draft Regional Plans)	Application of Options Assessment Methodology and Identification of the Preferred Approach for the following regions: North West (GA1) South West (GA2) South East (GA3) East Midlands (GA4)	SEA Scoping Report SEA Environmental Reports for the Regional Plans
	Final RWRPs (final Regional Plans)	Finalise and Adopt RWRP Regional Plans	SEA Statement

*subject to adaption of NWRP Framework Plan

1.7 Strategic Environmental Assessment

1.7.1 This Report

This is the SEA Environmental Report which has been prepared to document the environmental assessment of the draft Framework Plan. This report has been prepared having regard to the SEA Directive (2001/42/EC) and its provisions that are transposed into Irish law by European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. No. 435 of 2004 as amended in 2011). This draft SEA Environmental Report will be published alongside the draft Framework Plan.

The SEA process including legislative requirements and influence on the draft Framework Plan development are described in more detail in the sections below.

1.7.2 Legislative requirement

Council Directive 2001/42/EC of the European Parliament and of the Council of 27th June 2001 on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive) established the statutory requirement for SEA as part of the development of certain plans and programmes. The Directive is applicable to the draft Framework Plan and the Regional Plans of the NWRP.

The transposing Irish Regulations are the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. No. 435 of 2004) as amended by the European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011 (S.I. No. 200 of 2011).

In accordance with the overall objective of the SEA Directive as set out in Article 1, an SEA is required to:

"Provide for a high level of protection to the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development…."

According to Article 2 of the Directive, "plans and programmes" means plans and programmes, including those co-financed by the European Community, as well as any modifications to them:

- which are subject to preparation and/or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government; and
- which are required by legislative, regulatory or administrative provisions.

Under Article 3(2), an environmental assessment:

"…shall be carried out for all plans and programmes, (a) which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consent of projects listed in Annexes I and II to Directive 85/337/EEC34."

1.7.3 The Strategic Environmental Assessment process

The purpose of SEA is to enable plan-making authorities such as Irish Water to incorporate environmental considerations into decision-making at an early stage and in an integrated way throughout the plan-making process. The SEA process is undertaken in four stages. The progress for each stage of the SEA process is summarised in Table 1.2.

The first 2 stages – Stage 1 Screening (deciding whether SEA is required or not) and Stage 2 Scoping (establishing the spatial and temporal scope and assessment framework) – have been completed for the draft Framework Plan. The outputs of each of these stages – the SEA Screening Statement and the SEA Scoping Report – are available on the Irish Water website (https://www.water.ie/nwrp). Irish Water is currently at Stage 3 of the SEA process for the draft Framework Plan (Identification, Prediction, Evaluation and Mitigation of Potential Effects).

[3] Replaced by 2011/92/EU as amended by 2014/52/EU
[4] Bold added for emphasis

Table 1.2 – Stages of SEA

Stage	Purpose and requirements	Progress to date / current status
Stage 1: Screening	Prior to starting the SEA process, a plan or programme undergoes "screening" to determine whether it requires an SEA.	SEA Screening Statement – Irish Water (as the responsible authority) determined that SEA was required for the NWRP when screening was carried out in August 2017.
Stage 2: Scoping	Consideration of the context and objectives of the SEA provides information on baseline data, identifies relevant environmental issues and trends, and defines the parameters of the scope of the SEA for the purpose of consultation.	SEA Scoping Report – The SEA Scoping Report set the geographical and temporal scope of the draft Framework Plan and SEA, the baseline environment and a proposed framework of SEA objectives to inform the Stage 3 assessment. Formal statutory consultation was carried out between November 2017 and January 2018.
Stage 3: Identification, Prediction, Evaluation and Mitigation of Potential Effects	Within the context and parameters identified at the scoping stage. Identification and evaluation of likely significant effects of the draft Framework Plan is carried out, including consideration of alternatives and determination of measures to mitigate and monitor potential residual effects.	Environmental Report (SEA of the Framework Plan) – this report. Consultation will take place alongside the draft Framework Plan consultation. **Current Stage in the SEA Process**
Stage 4: Consultation, Revision and Post-Adoption	Consultation with statutory consultees and the public. This may require changes to the draft Framework Plan and Environmental Report in light of responses. Implementation of the monitoring programme.	Stage 4: Consultation, Revision and Post-Adoption

1.7.4 Purpose of the SEA Environmental Report

The objective of the SEA process is to ensure that environmental objectives and sustainability principles are integrated into the preparation of the draft Framework Plan of the NWRP as well as providing an overall assessment of the draft Framework Plan's proposals. The approach to the SEA has aimed to:

- Contribute to the development of a preferred plan taking account of the full range of environmental protection and enhancement policy and regulatory requirements so that the plan provides a framework for meeting supply requirements while minimising environmental impacts;
- Embed principles governing sustainable abstraction, so the objectives of the RBMP and Irish Water's biodiversity obligations can be achieved; and
- Provide weight to the need to consider long term environmental resilience in water resource planning.

The draft Framework Plan characterises the issues to be addressed and the types of solutions to be applied through the Regional Plans. The draft Framework Plan therefore covers the analysis of the existing data and develops the Supply Demand Balance (SDB). Recommendations are made for additional data collection and high level objectives and types of solutions are identified. The draft Framework Plan also outlines an options assessment methodology which will be applied through the Regional Plans.

The focus of this SEA Environmental Report is therefore to 1) assess the high level framework approach proposed in the draft Framework Plan of the NWRP and 2) consider how the SEA environmental protection, enhancement and sustainability objectives can be incorporated into the options assessment methodology for the Regional Plans development. The Regional Plans proposals will then be subject to separate SEA process.

This SEA Environmental Report is the output of the start of Stage 3 of the four-stage SEA process (as detailed in Table 1.2) for the draft Framework Plan and aims to:

- Identify and evaluate likely significant effects of the draft Framework Plan and identify potential mitigation measures;
- Consider alternatives to the approach for the draft Framework Plan of the NWRP;
- Identify potential interactions with other plans and programmes, including the potential for cumulative effects;
- Provide the methodology for integrating SEA and AA requirements throughout the development of the Regional Plans; and
- Provide implementation recommendations for the Regional Plans and a draft monitoring plan which will be developed further in the Regional Plan SEAs.

1.7.5 Appropriate Assessment

In addition to compliance with the SEA Directive, the preparation and implementation of the NWRP must meet the provisions of the Habitats Directive (92/43/EEC). The Habitats Directive has been transposed into Irish law by the Planning and Development Act, 2000 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). The Habitats Directive requires that if a plan, policy or programme is likely to have a significant effect on one or more European sites (that is, a Special Area of Conservation (SAC) or Special Protection Area (SPA), also referred to as “Natura 2000” Network), either alone or in combination with other schemes, plans or projects, then it must be subject to Appropriate Assessment (AA).

The NWRP therefore falls under the governing legislation of the European Communities (Birds and Natural Habitats) Regulations 2011; and as a “competent authority”, Irish Water must ensure that their NWRP meets these requirements.

The draft Framework Plan is not directly connected with or necessary for the management of European sites. The screening for AA (Stage 1) concluded that there was potential for significant effects on one or more European sites to occur as a result of the draft Framework Plan. Therefore, in accordance with Article 6(3) of the Habitats Directive, AA (Stage 2) of the draft Framework Plan was required. The AA screening focused on the potential for significant effects on European sites that may arise due to the implementation of the Framework Plan. An NIS has been prepared and is published for consultation alongside the SEA Environmental Report; however, the SEA and AA processes are clearly distinguished.

1.8 Development of the draft Framework Plan with the SEA and AA

SEA and AA requirements have been incorporated into the development of the draft Framework Plan and have influenced the development of the options assessment methodology for the Regional Plans. This is covered in Chapters 7, 8 and 9 of this report.

Figure 1.4 illustrates how the development of the draft Framework Plan has been integrated with the different steps required for the SEA and the AA.

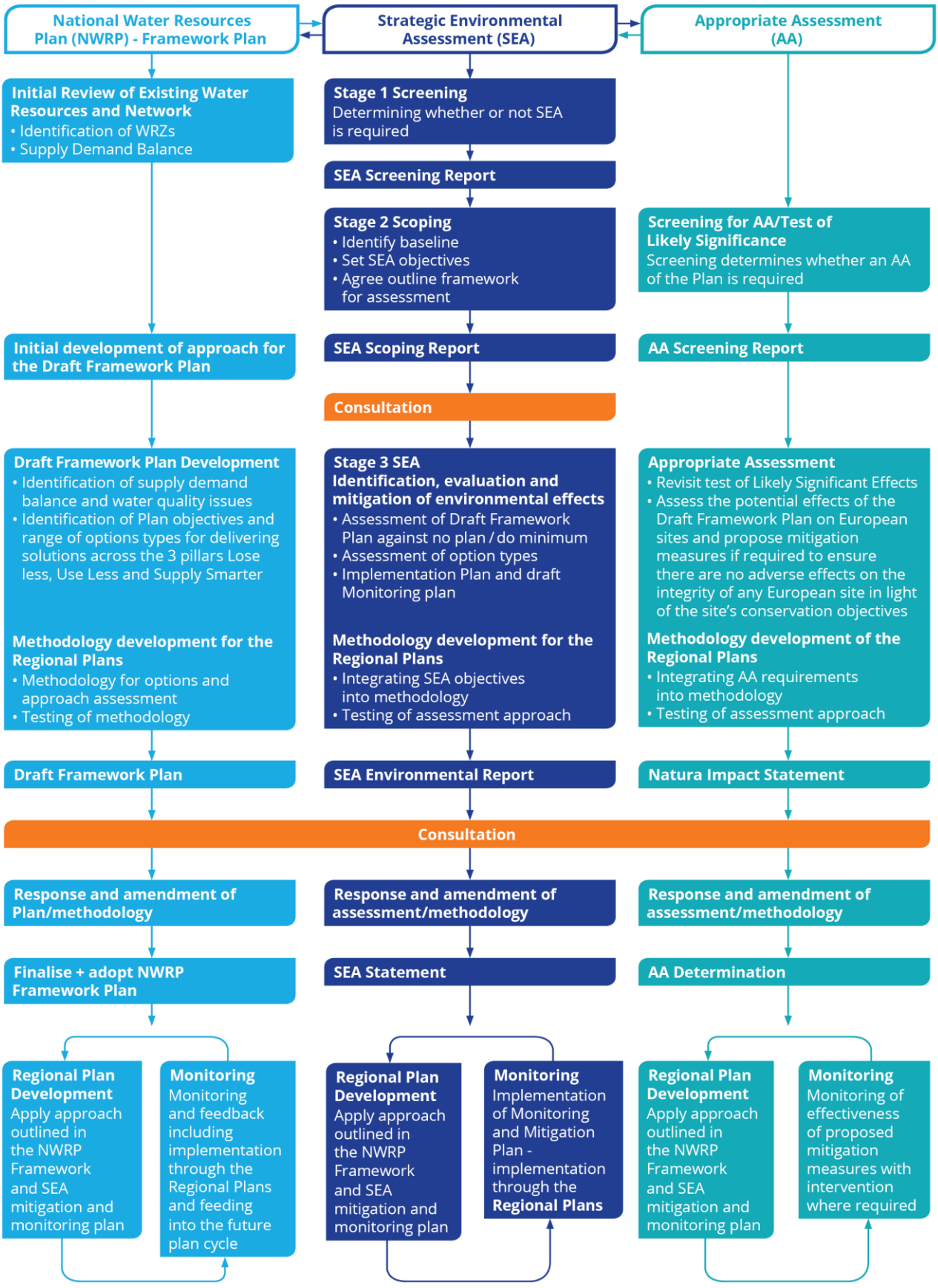


Figure 1.4 – NWRP and Strategic Environmental Assessment process

1.8.1 Consultation

This SEA Environmental Report has been published on the Irish Water website alongside the draft Framework Plan and the NIS. This SEA Environmental Report outlines the assessment of the draft Framework Plan, including effects on the environment and proposed mitigation.

In accordance with Article 11 of European Communities (Environmental Assessment of Certain Plans and Programmes (S.I. No. 435 of 2004), SEA environmental authorities, as well as any relevant transboundary authorities (for example, Northern Ireland Environmental Agency), have been notified so that they may make a submission or observation in relation to the SEA Environmental Report or the draft Framework Plan to Irish Water.

Irish Water have referred to this SEA Environmental Report and the NIS when preparing the draft Framework Plan of the NWRP. The reports are now on display for a ten week statutory public consultation Further information on the consultation on the draft Framework Plan, SEA Environmental Report and NIS is provided in Chapter 4 of this Report.

2

National Water Resources Plan (NWRP) – draft Framework Plan

2.1 Introduction

The NWRP - aims to ensure that water resources are used in an efficient and sustainable way over the long term, giving due consideration to short term operational issues that may occur. The process for selecting options and approaches to meet the SDB underpinning the plan, takes account of:

- The aims and objectives of the Water Framework Directive (WFD) in promoting the sustainable and efficient use of water resources;
- Future pressures on water resources from the effects of climate change on available resources and water use;
- The cost of providing water; and
- Environmental considerations and constraints.

2.2 Context for the NWRP – A Plan based on Policy

The context for the NWRP lies primarily in Government Legislation and Policy for water services, growth and development, protection of the environment and climate change adaptation. Irish Water operate under an economic regulatory regime which requires that they operate efficiently, having regard to total whole life cost. Irish Water must develop a strategic plan for their water supply infrastructure that provides a clear and transparent roadmap for how they operate, maintain, reinforce, develop and invest in their asset base aligned to national policy that ensures the best outcomes for water users.

The key policies feeding into the NWRP are:

- Water Services Policy Statement (WSPS);
- Project Ireland 2040 – National Planning Framework (NPF);
- WFD & RBMP for Ireland (2018-2021);
- National Adaptation Plan & Adaptation Plan for Water Quality and Water Services Infrastructure; and the
- Recast Drinking Water Directive.

Policy on the Water Framework Direct (and RBMP) has a direct correlation with protection of the aquatic environment and European sites and is discussed further below. Further detail on the other policies outlined above are provided in Chapter 1 of the draft Framework Plan.

2.2.1 Water Framework Directive & River Basin Management Plan for Ireland

The European Union WFD (Directive 2000/60/EC) and the RBMP (a requirement under the WFD) are referenced by the draft Framework Plan as they set the framework for managing the water bodies in the natural environment from abstraction to final discharge. The WFD contains a standard European approach for managing surface water, groundwater, coastal water and wetlands to meet common environmental objectives.

The RBMP sets out the WFD objectives for Ireland. It considers the actions Ireland will take to improve water quality and achieve “Good” ecological status in waterbodies (rivers, lakes, estuaries and coastal waters) by 2027. The RBMP drives a programme of measures to deliver a more considered and balanced approach to the water taken from the environment and any potential impacts arising.

The RBMP will influence from where, in what quantities and under what conditions, Irish Water can abstract water for public water supply. The RBMP will set the constraints around existing abstractions including any measures that may need to be undertaken to reduce the environmental impacts on

these existing sources. It will also set the legislative framework within which any new abstractions Irish Water develop must conform.

2.2.2 How the NWRP is designed to incorporate policy

On the 1st of January 2014, through the Water Services Act (No. 1) 2013, Irish Water assumed statutory responsibility for the provision of public water services and management of water and wastewater investment. Subsequent legislation, the Water Services (No. 2) Act 2013, required that Irish Water prepare a Water Services Strategic Plan (WSSP) setting out the company's objectives in relation to the provision of water services for the State over a 25 year period. Under the Act, the WSSP is required to address the following aspects:

- Drinking Water Quality;
- The prevention or abatement of risk to human health or environment relating to provision of water services;
- Existing and projected demand for water services;
- Existing and planned arrangements for provision of water services;
- Existing and reasonably foreseeable deficiencies in the provision of water services;
- Existing and planned water conservation measures; and
- The management of the property of Irish Water.

Work on the WSSP commenced in early 2014 and included the publication of the WSSP Issues Paper in July 2014, which was subject to public consultation for a period of five weeks. Further to responses on the WSSP Issues Paper and stakeholder engagement, statutory consultation as part of Strategic Environmental Assessment (SEA) on the draft WSSP was conducted between the 19 February 2015 and 17 April 2015. The final WSSP was approved by the (then) Minister of Environment Planning and Local Government in October 2015.

The adopted WSSP sets out six strategic objectives, to achieve the statutory requirements of the plan:

- Meet Customer Expectations;
- Ensure a Safe and Reliable Water Supply;
- Provide Effective Management of Wastewater;
- Protect and Enhance the Environment;
- Support Social and Economic Growth; and
- Invest in Our Future.

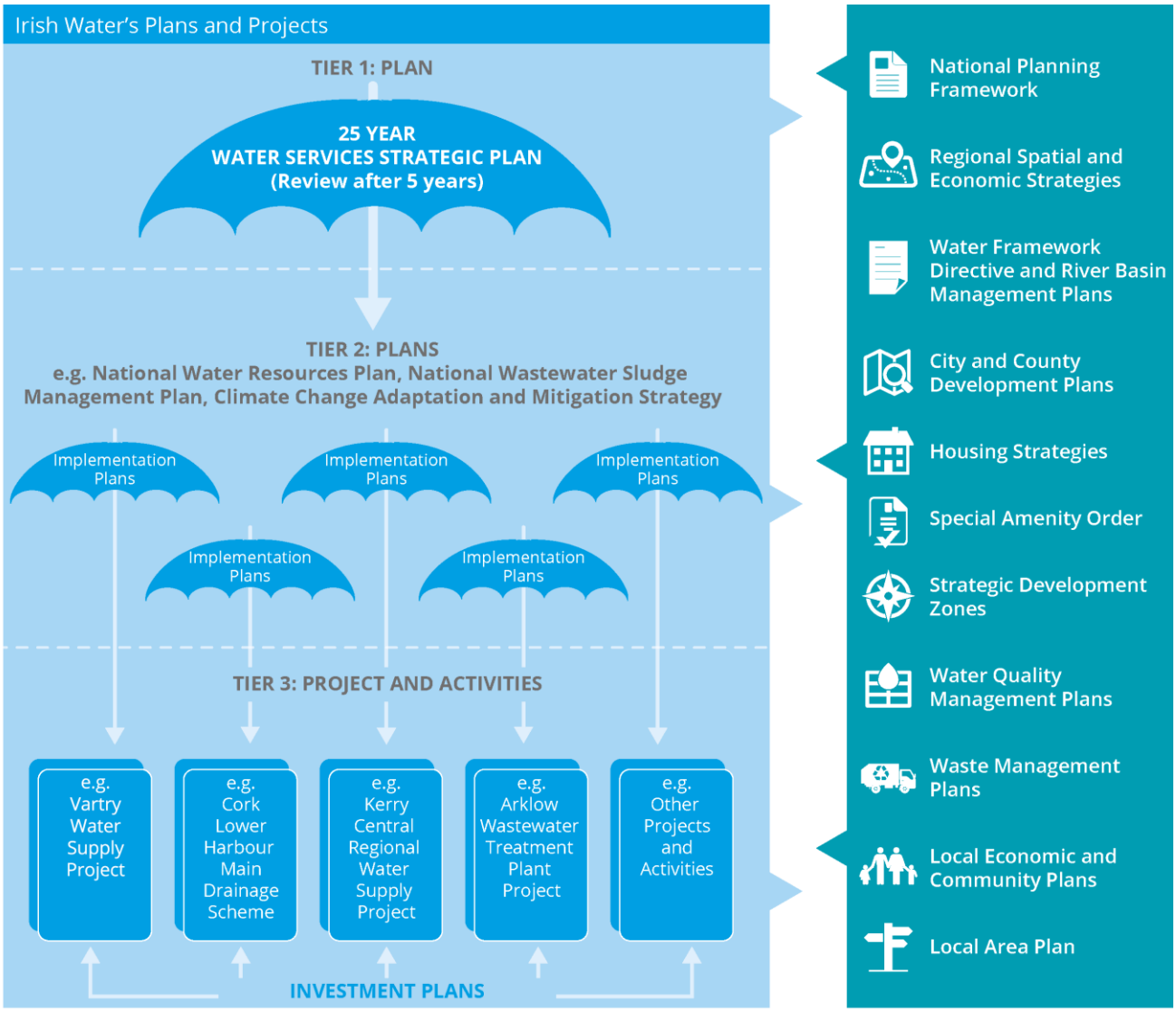
Figure 2.1 shows that the WSSP is a Tier 1 Plan, which sets out the strategic objectives for the business. It also sets the context for the Tier 2 implementation plans which are the framework by which Irish Water develop the processes, programmes and projects to meet the objectives set out in the WSSP.

The NWRP is one of Irish Water's Tier 2 Implementation Plans and was called out as a requirement within the WSSP. The NWRP focusses on water supply, particularly in relation to five of the six objectives set out in the WSSP:

- Meet Customer Expectations;
- Ensure a Safe and Reliable Water Supply;
- Protect and Enhance the Environment;
- Support Social and Economic Growth; and
- Invest in Our Future.

The NWRP will ensure that Irish Water have a transparent Framework Plan and Regional Water Resources Plans to allow them to provide a safe, secure, reliable and sustainable water supply now and into the future.

In line with the statutory requirements of the WSSP, once adopted, the NWRP will become Irish Water's strategic framework for the delivery of water services, which in turn will assist in planning projects and programmes to address water supply issues. These will then be prioritised and brought forward through the regulated 5 year investment cycles. Figure 2.1 also shows that the NWRP will be the means by government policy is aligned with strategic plans for water services.



It should be noted that the listing of the documents on the right of the graphic is not intended to show a hierarchy of plans or an alignment of the plans with the Irish Water Tier 1, Tier 2 and Tier 3 plans/ projects.

Figure 2.1 – How Irish Water incorporates government policy into their strategic plans. Please note the NWRP consists of Phase 1 National Water Resources Plan - Framework Plan & Phase 2 (x4) Regional Water Resources Plans.

2.3 Concepts in Water Resources Planning

In England and Wales, water utilities have a statutory obligation to produce Water Resources Plans every five years. In Scotland and Northern Ireland, where water supplies are publicly owned and operated, water resources planning is recognised as best practice and plans are also developed and published every five years.

Water Resources Planning in the UK has evolved significantly since the first plans were developed in the 1990s. Comprehensive guidelines have been developed by the Environment Agency in conjunction with Defra, the Welsh Government, and Ofwat (the economic regulator for water utilities in England and Wales). A significant body of peer reviewed research on water resources planning has been produced by the UK Water Industry Research (UKWIR), of which Irish Water is a member. This provides a solid platform of research and experience for Irish Water to develop the first NWRP.

However, as highlighted in Chapter 2 of the draft Framework Plan, careful consideration must be given to the stage of development that Irish Water is at in terms of water resources planning. Irish Water asset base is in poor condition compared to other jurisdictions and their data and business intelligence systems have not yet matured sufficiently to facilitate a transparent and regulated resource planning system. In addition, although Irish Water's asset base and approach to supplying water is similar to the UK, Irish Water public water supply includes a large number of small remote supplies due to Ireland's dispersed low-density population. As it is difficult to move small volumes of water over large distances without compromising water quality, finding solutions to address supply need in these small areas can be difficult.

As a result of these issues, Irish Water have had to adapt long established water resources planning methodologies to reflect how they operate. This has included the use of surrogate data from other jurisdictions where available, until their data and intelligence systems have matured and become more established. Irish Water will also need to consider alternative ways to reinforce and provide resilience to small remote supplies, including careful operational incident response such as site specific enhanced plant and network management, drought and critical period plans.

While Irish Water will use the established best practice methodologies to inform their decision-making approach, they will further develop approaches and improve processes as they continue on their journey of data gathering and improvement in data quality. The models developed under this draft Framework Plan for each region will be regularly updated with both input data and output results to support planning.

The key concepts that Irish Water have used to develop the draft Framework Plan are as follows:

- WRZs
- Weather Event Planning Scenarios
- Levels of Service
- SDB

These are summarised below and detailed in Chapter 2 of the draft Framework Plan and accompanying appendices (e.g. Appendix B (Planning Scenarios), Appendix C (Supply Chapter) and Appendix D (Level of Service), respectively).

2.3.1 Water Resource Zones and Water Supply Zones

WRZs are the management units at which Water Resource Planning is undertaken. WRZs represent an area where the supply and demand are largely self-contained. It is where the resources, supply infrastructure such as the WTPs, and the customers are connected. The SDB (see Chapter 2, section 2.3.4 of the draft Framework Plan) is calculated for each WRZ.

A WRZ comprises several Water Supply Zones (WSZs). A WSZ is an area, within which all the customers receive water from the same source. WSZs are areas used to manage water quality monitoring and performance. Table 2.1 outlines the different scales and management units required to function as a regulated water service provider, and how these relate to each other.

Table 2.1 – Water Resource Spatial Management Units

Scale	Management Unit	Purpose	Regulatory Interface
National	Water Services Strategic Plan	Setting Irish Water's Business Objectives	DHPLG
	Framework Plan	Implementing the objectives of the WSSP and applicable legislation and guidance	CRU, EPA
Regional	Regional Groupings	Development of Asset Management Plans covering Irish Water's Operational Regions, for the purpose of planning investment and improving operations	CRU, EPA
Sub Regional	Catchments	Assessing water abstractions and wastewater discharges in relation to legislative requirements including WFD, Habitats Directive and Birds Directive	EPA, DPHLG
Sub Regional	WRZs	Identifying baseline need for Supply and Demand, forecasting future supply and demand, drought and critical period planning, adaptive planning, bulk transfer and strategic storage requirements. Identifying baseline need in relation to water quality and barrier risk, and assessing the customer base that will be impacted by a deterioration in water quality or the failure or non-performance of a water treatment plant within a complex network.	CRU, EPA
Local	Water Supply Zone (WSZs)	Water Resource Zones consists of multiple Water Supply Zones. Water Supply Zones are used to delineate differing areas of water quality within complex networks where multiple water types are blended. The primary function of a WSZ is to report on Drinking water compliance to the regulator, the EPA.	EPA
	District Metered Area (DMAs)	Each Water Supply Zone consists of multiple District Metered Areas. These are small discrete areas of Irish Water's water distribution network which are required for leakage management and Leakage management and control, emergency network interventions, and ensuring water quality at the extremities of Irish Water's distribution networks.	CRU

WRZ boundaries are dynamic and can change over time, for example, when a new trunk mains is constructed to connect separate supplies for example. To establish a measurable baseline for the draft Framework Plan, Irish Water have defined the WRZs as they will be in 2021, which includes planned and ongoing improvement to the water supply network, as set out in Irish Water's capital investment cycle.

There are 539 WRZs in Ireland. Each zone varies in size from small rural systems with populations of less than 30 to the Greater Dublin Area with a population of 1.7 million. A comparison with the WRZs from a number of UK water utilities is shown in Table 2.2.

Table 2.2 – UK water company Water Resource Zone comparison

Water Utility	Number of WRZs	Total number of customers
Northern Ireland Water	7	1.7 million
Welsh Water	24	3 million

Water Utility	Number of WRZs	Total number of customers
United Utilities	4	7 million
Southern Water	10	3 million
Scottish Water	approx. 220	5 million
Irish Water	**539**	**4.2 million**

Ireland has significantly more WRZs than their UK counterparts, which is reflective of the dispersed population in Ireland and the way that water services have developed over time.

Similar sized populations served with fewer WRZs with more connectivity can achieve economy of scale and bring resilience and reliability of supply to customers. Irish Water's current model presents challenges of efficiency, consistent maintenance and service performance. A secondary effect is that in many WRZs, Irish Water have fewer connections per unit length of pipe, a factor that impacts leakage statistics and comparisons.

Irish Water expect the number of WRZs in Ireland to reduce as they invest in providing strategic infrastructure throughout the country. This process will be driven by the need to deliver both the required quality and quantity of water in the most efficient manner. This rationalisation will require both new sources and substantial provision of trunk mains and reservoirs, with an associated need for capital investment. However, it is likely that Irish Water will need to continue to operate a substantial number of WRZs for the foreseeable future, particularly in low density and remote areas. A staged approach to the development of a national plan is needed in light of the fact that Irish Water are at an early stage of this process, and have a far greater number of diverse WRZs than the UK counterparts.

2.3.2 Weather Event Planning Scenarios

As access to a good quality uninterrupted water supply is essential for public health, Irish Water must ensure that their water supplies can withstand variations in climatic conditions.

Although Ireland has a temperate climate and proximity to the Atlantic Gulf Stream means that extreme weather conditions are not common, as global temperatures continue to rise, Ireland may experience more frequent extreme weather events, such as droughts and storms. Irish Water must plan for these events, developing a resilient water supply system to limit impacts of extreme events on their customers.

During certain years, the water supply systems in this state have experienced major stress. For example, during Storm Emma (2018), there was an increase in pipe bursts due to periods of sub-zero temperatures followed by relatively rapid warming. In contrast, summer 2018 and spring 2020 saw prolonged warm dry weather resulting in low flows and water levels in Ireland's rivers and lakes. This reduced water availability within Irish Water's public water supplies coincided with an increase in customer demand.

Table 2.3 outlines the four Weather Event Planning Scenarios considered in the draft Framework Plan. More information on Weather Event Planning and these scenarios are contained within Chapter 2 and Appendix B of the draft Framework Plan.

Table 2.3 – Weather Event Planning Scenarios

Scenario	Scenario Description and Weather Type	Feels like
Normal Year Annual Average (NYAA)	The normal year scenario describes the demand and supply available to Irish Water in typically average weather year.	
Dry Year Annual Average (DYAA)	The dry year scenario in when there is low rainfall but no constraints on demand. Demands are based on the average daily demands experienced over the year under “dry” year weather conditions. Demands would be higher than in normal years.	
Dry Year Critical Period (DYCP)	This occurs within the dry year, generally a few weeks during the summer where demands can be significantly above the annual average.	
Winter Critical Period (WCP)	The WCP generally occurs as a result of freeze – Thaw incidents such as Storm Emma in 2018. High demands during these periods are driven by an increase in leaks from burst of pipes as a result of the very low temperatures.	

Figure 2.2 below illustrates the typical demand profiles for the various planning scenarios for an example WRZ.

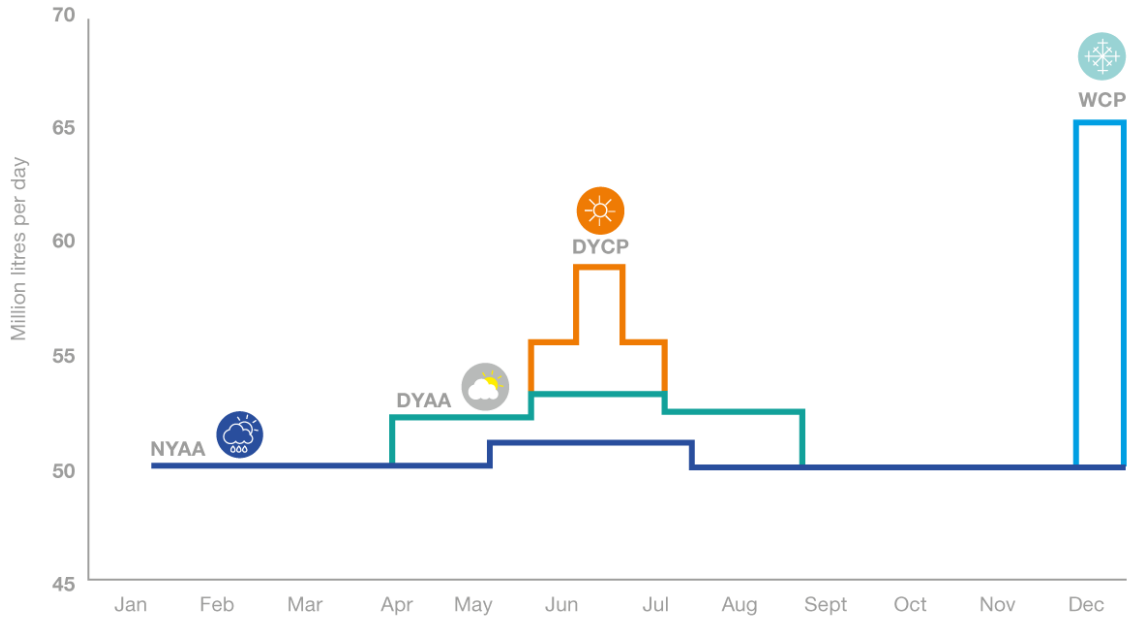


Figure 2.2 – Demand profiles for Weather Event Planning Scenarios for a typical WRZ

Level of Service

Level of Service refers to the reliability of supply that Irish Water customers can expect to receive and is expressed as a frequency or return period of supply failure. For example, if the Level of Service is stated as 1 in 50, as a customer, you would only ever expect to experience a water outage or severe limitations to your supply, on average, once every 50 years. This standard of service is particularly

important in larger supplies, where the social and economic consequences of failure are significant and where mitigation measures such as tankered supplies are not feasible to scale of demand.

The current Level of Service in Ireland varies according to location, ranging from lower than 1 in 10 to better than 1 in 50. Approximately 50% of the population are at risk of receiving a Level of Service of lower than 1 in 50 in the Normal Year Annual Average (NYAA) scenario.

In the draft Framework Plan, Irish Water has developed SDB assessments for each WRZ based on a minimum of 1 in 50 Level of Service. This means Irish Water will plan to address any WRZ SDB deficit, to provide a 1 in 50-year Level of Service. Further information on Level of Service is provided in Chapter 3 of the draft Framework Plan.

2.3.3 Supply Demand Balance

The Supply Demand Balance (SDB) is the difference between the water Irish Water have available in their supplies compared to the demand for water under each Weather Event Planning Scenario.

In terms of supply availability, the SDB considers water availability in the natural environment, current abstractions, water treatment capacity, process losses, trunk main constraints, and required allowances to ensure continuity of supply during planned and unplanned events.

When all of these factors have been considered, Irish Water can develop a Water Available for Use (WAFU) for each WRZ. As part of their supply forecasts they must consider reducing supply availability due to climate change and risks in relation to sustainability driven reductions in allowable abstraction from waterbodies.

Irish Water must produce enough water supply at the top of their distribution networks to ensure that customers receive the volume of water they require at the extremities of a complex distribution network. The demand for water must therefore account for network efficiency and losses across the network during distribution.

When Irish Water assess demand for water as part of the SDB, they assess the current water balance which includes; domestic demand, non-domestic demand, operational usage (such as flushing water mains and fire hydrants), apparent losses and leakage. As part of demand forecasting Irish Water must consider, leakage reduction, growth in demand, and allow for uncertainties (provision of headroom).

A deficit in the SDB means that the demand for water is higher than the available supply. In the event of an identified deficit, Irish Water consider what actions could be taken in response, e.g. reduce future demand, increase supply or a combination of both.

Figure 2.3 identifies the components of the SDB. In Chapters 3 and 4 of the draft Framework Plan, Irish Water outline how each of these components is calculated.

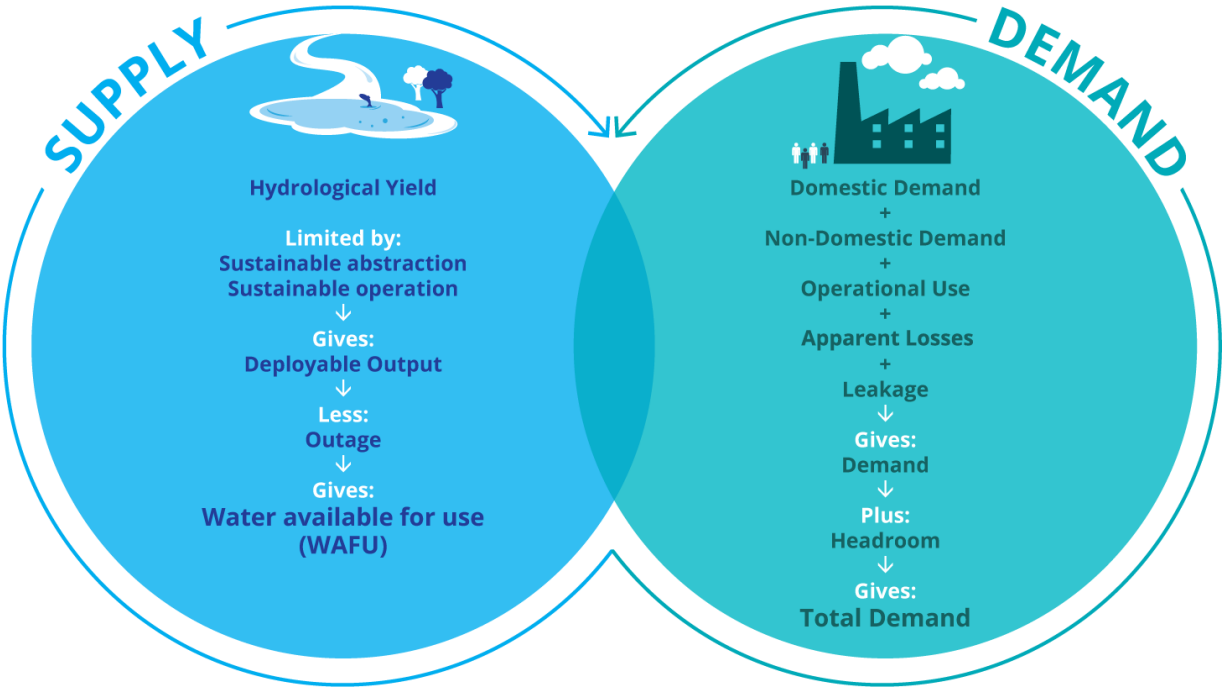


Figure 2.3 – Components of the SDB

2.4 Developing Solutions - Irish Water's Approach

Irish Water faces significant challenges in terms of the quantity, quality, reliability and sustainability of the public supplies across the country. Primary risks identified in over 50% of Irish Water's supplies include insufficient water available for supply, water quality/compliance, and insufficient Levels of Service to meet their customers' requirements.

Irish Water must ensure that their water supplies become more sustainable over time, therefore they need to ensure that solutions to their supply issues consider the broader environment within which they operate. This means:

- Irish Water cannot continue to abstract more and more water from sensitive sources to meet ever increasing demand. Where feasible they must cater for increased growth requirements in the first instance by driving an aggressive leakage reduction programme combined with strong promotion of water conservation measures in homes and businesses; and
- Irish Water fully adhere to the World Health Organisation (WHO) principle that the starting point for good clean drinking water is source protection, rather than relying on ever more complex and costly treatment. Irish Water will achieve this by developing and implementing Water Safety Plans across all their supplies.

In developing appropriate interventions in a sustainable manner, Irish Water have compiled the range of available solutions into three pillars; lose less, use less and supply smarter.

Potential solutions are identified to address supply demand imbalances and address the challenges discussed in Chapter 1.5. The solutions are approached under three pillars (see Figure 2.4).

- **Lose Less** – reducing water lost through leakage and improving the efficiency of Irish Waters' distribution networks;
- **Use Less** – reducing water use through efficiency measures; and

- **Supply Smarter** – improving the quality, resilience and security of Irish Water supply through infrastructure improvements, operational improvements and development of new sustainable sources of water.

Figure 2.4 – Three Pillars to address the key challenges to the draft Framework Plan

Together these pillars will enable Irish Water to optimise their capital and operational interventions to achieve the best outcomes and react to emerging issues. Further information on the "three pillars" is detailed in Chapter 7 of the draft Framework Plan.

2.5 New Options Assessment Methodology

The new Options Assessment Methodology is detailed in Chapter 8 of the draft Framework Plan and SEA Environmental Report and summarised below. Consideration on how the protection of European sites was integrated into the draft Framework Plan development and options assessment process is detailed in Chapter 3.5 of this report.

The process has been applied across each of the key steps as identified in Figure 2.5 below.

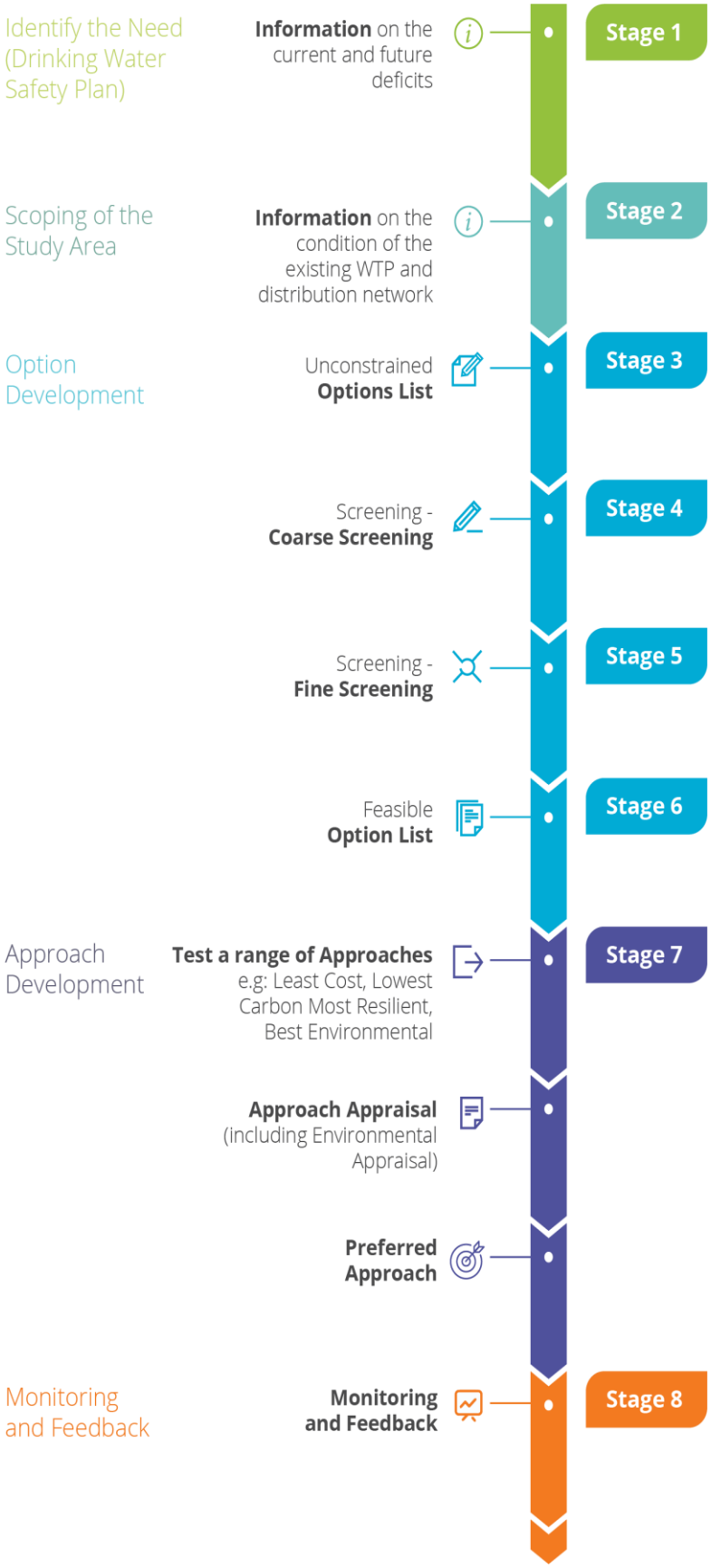


Figure 2.5 – Options Assessment and Preferred Approach Methodology

A range of option types have been developed under these three pillars, focusing on leakage reduction, water efficiency and infrastructure developments. Table 2.4 below shows the generic option types which Irish Water would use to address a water supply deficit. The list is not exhaustive and new technologies or local opportunities may mean other options can be considered in future iterations of Framework Plan.

While these options are listed individually, the solution to meet a deficit in a WRZ or Study Area may be provided from a combination of these options. For example, to meet a deficit of 10Ml/day the solution may be provided by increasing the abstraction from an existing source by 6Ml/d which could include new boreholes or intake structures, pipeline reinforcement and WTP upgrade, pipeline works to reduce leakage by 3Ml/d and water efficiency measures to reduce water demand by 1Ml/day.

Selection of Preferred Approaches

Options will be subject to an options assessment process to identify a combination of options meeting requirements across the WRZs, Study Areas and Regions/Group Areas through comparison of a range of different option combinations or approaches. The best performing combinations are selected as Preferred Approaches and will be identified in the Regional Plans.

All the options identified within the Preferred Approaches will be subject to further project level feasibility and environmental impact assessment and costing, as well as considering project alternatives and variants. No statutory or funding consent is conferred by the inclusion of any option in this plan, and any projects identified will require, where appropriate, their own planning and operational consents and associated environmental assessments.

Table 2.4 – Potential Water Resource Management Solutions (option types)

Draft Framework Plan category	Draft Framework Plan sub-category	Summary
Lose Less		
Leakage Reduction		The identification, assessment and repair of pipelines to reduce leakage from Irish Water existing network is a priority area for Irish Water. This can involve a range of measures for actively detecting and repairing leaks such as using meters to better identify customer leakage activity and advanced monitoring tools and techniques to better identify leaks. Leakage reduction will focus on targeted replacement of ageing pipes, pressure management to minimise fluctuations and excessive pressures providing more constant pressures to Irish Water customers whilst reducing bursts and application of different leak repair approaches to minimise cost and disruption.
Use Less		
Water Efficiency	Education & Awareness	Educational Awareness Campaigns and distribution of educational materials to raise awareness of water shortages and encourage water conservation and efficiency.
	Water Efficiency Measures	Use of water efficient products and processes in new and refurbished housing developments and working with building standards to ensure that water efficiency measures are included in standards regulations as mandatory. Encouraging take up of water efficiency measures by domestic and non-domestic customers such more efficient appliances, repair of leaking toilets and use of water audits. Active engagement with business customers and industry for partnerships that involve water efficiency goals. Investigate how to use water within Irish Water existing assets more efficiently through improved treatment processes and recycling of effluent water for appropriate uses.
	Recycling and Reuse	The recycling of treated wastewater or grey water provides a critical supplementary water source for non-potable activities; therefore, alleviating stress on primary water sources. Grey water refers to the relatively clean waste water from baths, sinks, washing machines, and other kitchen appliances. In periods of drought, in comparison to potable water which can be short in supply, wastewater and grey water can be an abundant and valuable water source for activities such as agricultural and landscape irrigation, industrial process, and toilet flushing.
	Metering	Domestic water metering to build a better understanding of water use and network pressures to improve water efficiency and therefore water security and identify leaks. Water meters with advanced analytics to undertake flow balances across the network can allow Irish Water to gain a better understanding of the whole network from the abstraction point to the customers.
Supply Smarter – resource supply options[5]		

[5] It is important to note that in the majority of WRZs a combination of options will be selected as the preferred / recommended approach.
In addition, some options example could be operated together for example surface water and groundwater abstractions serving the same distribution network could be used conjunctively, Typically this allows the resting of ground water during the winter recharge period while surface water is used and in the summer period using groundwater instead of surface water when rivers are vulnerable to low flows. Most new or increased abstractions/sources will involve upgrades to or construction of new supporting infrastructure such as WTPs and new or upgraded pipelines/water transfers.

Draft Framework Plan category	Draft Framework Plan sub-category	Summary
Surface Water	Surface Water Abstraction	Increasing the abstraction at an existing river or lake source or developing a new river or lake source from which water can be sustainably abstracted. These options would be subject to an abstraction licence.
Groundwater	Groundwater Abstraction	Increasing the abstraction at an existing groundwater source or developing a new groundwater source from which water can be sustainably abstracted. These options would be subject to an abstraction licence.
	Aquifer Storage Recovery	Storage of treated or raw water in suitable aquifers. During times of plentiful water, excess water withdrawn from a river, lake or another groundwater source is injected and stored within an aquifer. This supplementary stored water can be extracted from the aquifer during periods of dry weather and/or increased demand when the primary supply sources are running low. This requires aquifers with suitable characteristics to be available as risks of losses can be high.
Reservoirs	Storage Reservoirs	Provision of storage reservoirs which can be filled with untreated water abstracted during high flow conditions from surface waters to be drawn on during low flow periods or to provide additional resilience during droughts as a back-up supply source.
Catchment Management	Catchment management for ground or surface water sources	Activities such as agriculture, forestry, industry and waste management all have an impact on the retention of water in the catchment and the quality of the water within rivers and lakes. Pollutants in the water can lead to ecological deterioration, increased flood risk and can also create issues for water treatment. There may be scope for changes to land management through working in partnership with landowners, farmers and regulators to develop agreements and share information and resources to provide long term improvements with wide benefits including water suitable for supply from surface of groundwaters.
Effluent Reuse	Effluent Reuse	Recycling of wastewater effluent from treatment plants can produce a new supply source from wastewater which is otherwise discharged to rivers or the sea. This involves treating wastewater to a sufficiently high standard to meet supply standards relevant for the intended use for example for agricultural/horticulture/industry or for water supply
Desalination	Desalination: Coastal or Brackish	This involves the process of removing salt and other minerals from seawater or brackish water6 river estuaries to make it suitable for human consumption and/or industrial use. The process is energy consumptive and required discharge of highly saline effluent back into the environment.
Water Transfers	Transfers	Water transfer is the physical movement of water from one area to another usually via pipelines, although other means such as use of canals or aqueducts can be used. These generally refer to transfer of treated water and can vary considerably in scale in terms of size and length from local transfers from one WRZ to another, to regional transfers and inter-company transfers (from Northern Ireland).
	Tankering	Delivery of treated water to customers via road tanker to alleviate temporary short-term water shortages for certain localised situations.

[6] Brackish water is water that has more salt than freshwater, but not as much as seawater generally located in estuaries.

Draft Framework Plan category	Draft Framework Plan sub-category	Summary
Network Improvements	Network Improvements (general)	Network improvement involves infrastructural improvements such as upgrade or replacement or operational improvements. They are undertaken to facilitate better water distribution and avoid network limitations. Therefore, strategic network reinforcement improving connections between different sources and customer supply can significantly improve supply security and resilience.
	Service Reservoir Expansion	Service reservoirs store treated water. They are used to balance out the steady supply of treated water they receive from WTPs and the fluctuating variations in customer demand during a 24-hour period. They can also be used to store a backup supply in low flow events but for a limited period of time.
WTPs	WTP Expansion / Rationalisation	Expansion of existing WTPs to facilitate the treatment of a higher volume of water. This option would be considered in combination with an increase of a surface water or ground water abstraction or the provision of a new surface water or ground water source. Expansion of existing WTPs may be carried out as part of a rationalisation process which involves the merging of WTPs. Rationalisation is carried out to reduce water supply costs, take a malfunctioning WTP out of service or to cease abstraction from an unsustainable source.
	WTP Process Losses	For every litre of untreated water extracted from a source and fed through a WTP to the supply distribution network, at least a small fraction of the water will be lost from the system as result of the treatment process. Generally, WTPs are designed to recover, treat and recycle as much of the waste stream as economically feasible. However, there can be opportunities to improve efficiency through the upgrading and installation of more complex treatment processes to reduce these process losses and therefore increase the water available for use.

2.5.1 Understanding water planning requirements

The draft Framework Plan sets out the methodologies and approaches for the following:

Defining the SDB:

- An assessment of the availability of water resources at a national level (including lakes, rivers and groundwater).
- An assessment of the potential impacts of climate change on Ireland's water resources.
- An assessment of the current and future water demand from homes, businesses, farms and industry.
- Identification of areas where there are current and potential water supply shortfalls, taking into account normal and extreme weather conditions.

Prioritising WRZ Areas for action:

- Identifying WRZs with SDB resource deficit and/or with water quality deficit.

Developing solutions to resolve SDB issues:

- Identification of the types of options Irish Water is likely to consider resolving potential shortfalls in water supplies.
- Development of a methodology for determining the best solution, or combination of solutions.

Dealing with other issues related to the provision of water supplies:

- Description of the drought management process and identification of potential actions to be taken before, during and after a drought.
- Development of a strategy that sets out how Irish Water deal with the material (residuals) that is produced as a result of treating drinking water.

2.6 Geographical scale of the draft Framework Plan

The draft Framework Plan covers Irish Water's operating area, which is Republic of Ireland. The first stage of the draft Framework Plan process involved re-defining the WRZs within the country. The draft Framework Plan has identified 539 WRZs based on the low level of interconnectivity currently. The distribution of WRZs in relation to key settlements in Ireland is illustrated in Figure 2.6 below.

In order to provide a more secure and resilient supply of water, the draft Framework Plan identifies all WRZs within the supply area with a current or projected deficit of water. Phase 1 of the Plan also proposes a methodology which will allow Irish Water to identify and assess all potential option types that may contribute to meeting any shortfall in a WRZ or a group of WRZs in the future. If there were a small number of WRZs in Ireland, then this assessment would be undertaken exclusively at WRZ level. However, as there 539 WRZs, 400 of which are forecast to require an intervention over the 25-year plan period, larger areas combining a number of WRZs will be considered. There are a several reasons for this:

- Identifying options for larger areas encourages more regional, strategic, efficient solutions while still ensuring local issues are addressed.
- Identifying options for larger areas ensures consideration of larger solutions that can address multiple problems.

Water Resource Plans can become unwieldy when options appraisal is undertaken on a large number of WRZs, which makes it difficult to make broader strategic decisions.

Irish Water's NWRP will cover the entire country. This is a larger spatial area than would be considered by most water resource plans and, as a result, Irish Water are delivering it in two phases.

In the draft Framework Plan, Irish Water have:

- Produced SDB calculations across all of their WRZs to identify the locations where Irish Water might need to invest to resolve the differences between supply and demand maintain supply.
- Developed a new Options Assessment Methodology that Irish Water plan to use to develop a national programme of proposed solutions for delivery over the next 25 years to resolve any differences between supply and demand.
- Tested the Options Assessment Methodology using an example Case Study - Study Area 5 within "Group Area 4" in Figure 1.2.

For the Regional Plans of the NWRP, Irish Water will:

- Subject to the outcomes of the draft Framework Plan consultation, apply the Options Assessment Methodology to the areas identified as Group Areas 1, 2, 3 and 4 in Figure 1.2.

On completion of the Regional Plans, Irish Water will present a national programme of preferred approach for delivery over the next 25 years to resolve the differences between supply and demand. This will also include a priority plan for the next investment cycle.

The draft Framework Plan of the NWRP recommends the following for the purposes of selecting Study Areas for developing solutions to meet supply demand deficits:

- Urban Areas: Urban WRZs are defined as those that comprise major settlements as defined by the National Planning Framework, Regional Assemblies and Local Authorities (see Figure 2.6). The raw water sources used to supply these areas are identified and if neighbouring WRZs also abstract from the same water bodies, they are included in the Study Area. This allows Irish Water to assess cumulative impact on water bodies and ensures that all abstractions from the one source are coordinated. For example, if there are multiple abstractions from the same river suppling different WRZs, the combined effect of these abstractions might be missed if they were considered on a single WRZ basis.

- Rural Areas: In rural areas Irish Water strive to develop geographical groups of small WRZs to form Study Areas. This approach allows Irish Water to consider regional solutions for these water supplies. The geographical groups can be within an individual county or cross multiple county boundaries.

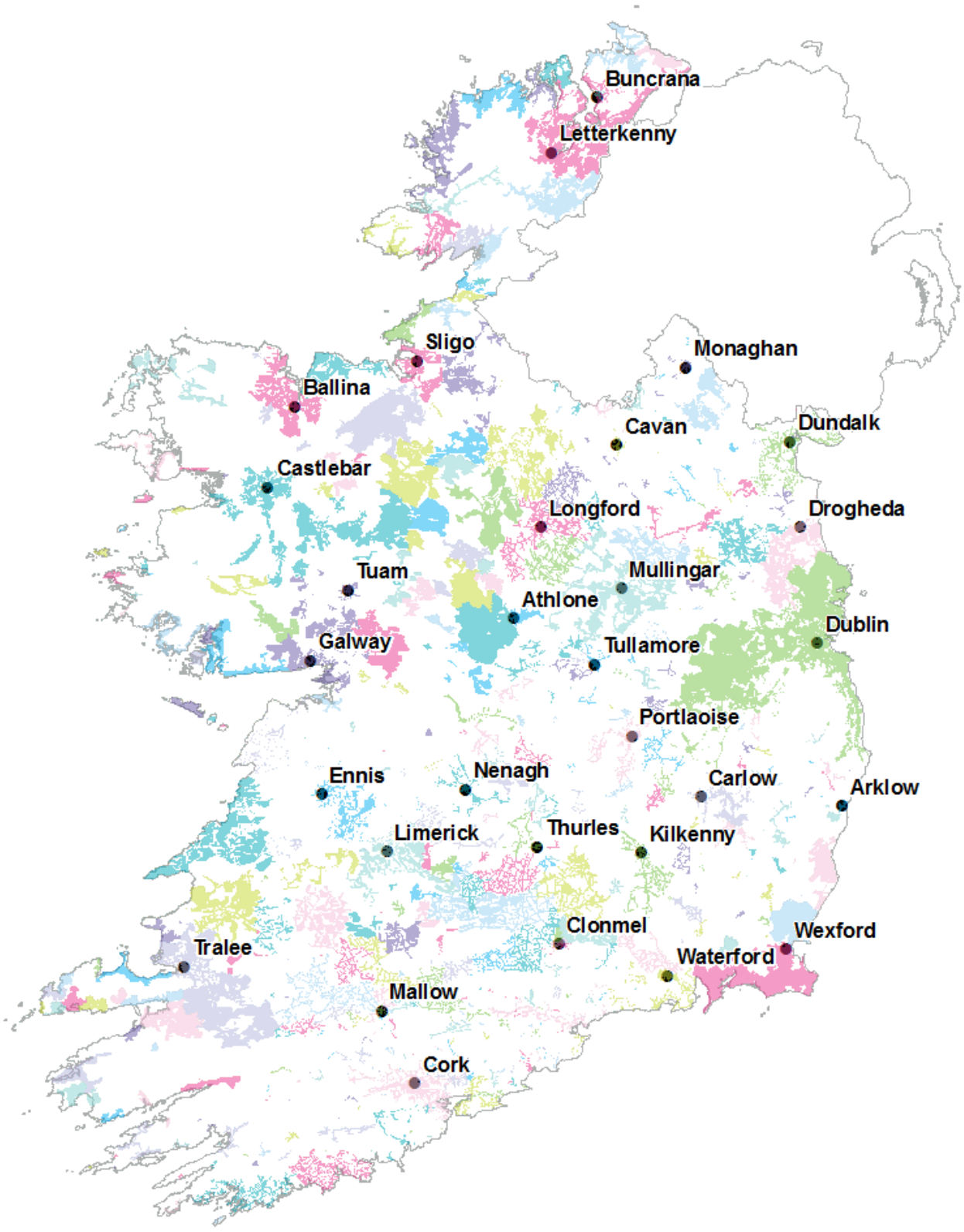


Figure 2.6 – WRZs and key settlements

2.7 Timescale for assessment

In line with the WSSP, the NWRP will cover a 25-year period. The Plan will be reviewed cyclically, at least every five years. Following the first review of the NWRP, the plan will be revised, recommending water resource options for the next 25-year period, prioritising stressed WRZs.

The Regional Plans will apply the Option Assessment Methodologies detailed in the draft Framework Plan, following the consultation process and final amendment, to undertake full water resource planning in all parts of the country. This will include a review of the detailed, comprehensive SDB based on the agreed Level of Service, options identification and appraisal, and ultimately, making recommendations to ensure all parts of the country have a safe and secure supply to meet their needs over the plan period.

Irish Water will aim to close as many of the data gaps identified in this draft Framework Plan as possible, to ensure the robustness of the Regional Plans. The development of the Regional Plans will also take account of any changes in best practice methodologies, changes in government policy, legislation and customer behaviour as well as using the latest and best available data.

3 SEA Approach for the Draft Framework Plan

3.1 Scope of the Strategic Environmental Assessment

3.1.1 The Strategic Environmental Assessment Study Area

The NWRP covers Irish Water's operating area: Republic of Ireland. The broad Study Area for the SEA similarly covers the entirety of Ireland, including the surrounding coastal waters.

3.1.2 Transboundary considerations

While there are currently very minor water imports from Northern Ireland Water, the draft Framework Plan will be considering transfers as an option type and will not be making any recommendations for water resource planning in Northern Ireland and is therefore not a transboundary plan. However, potential transboundary issues or effects will be taken into consideration in the SEA. As there are a number of river catchments shared between Ireland and Northern Ireland, potential transboundary issues to be considered will include for example, any potential impacts on the water environment and biodiversity.

3.2 Strategic Environmental Assessment stages completed

3.2.1 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. A screening exercise was conducted in August 2017 and Irish Water (as the responsible authority) determined that SEA of the NWRP was required in accordance with Directive 2001/42/EC.

3.2.2 Scoping

The Scoping Report provided an outline of the NWRP, described the environmental characteristics of the Study Area and presented a review of relevant policies, plans and legislation and an initial understanding of the key environmental issues relating to the NWRP. The environmental topics in the SEA Directive that have been scoped in for the assessment of the Framework Plan are:

- Population, economy, tourism and recreation and human health;
- Water environment;
- Biodiversity (including flora and fauna);
- Geology and soils;
- Climate change;
- Material assets;
- Cultural heritage (including archaeology and architecture); and
- Landscape and visual amenity.

The Scoping Report proposed a framework of SEA objectives to inform the next stage of the SEA process, outlined the external influences on the NWRP, set out the draft SEA assessment approach including the potential interrelationships between environmental areas, and other plans, policies and projects.

3.3 Stage 3 SEA - assessment approach

The NWRP is a national level strategic plan. Therefore, a strategic level environmental assessment is required. As such, the baseline environment has been considered within broad themes based on the environmental topics listed in the SEA Directive. A review of policy, plans and programmes (PPP review) has been undertaken for each topic, and from these reviews and consideration of the baseline

environment and likely development of the baseline, issues relevant to the plan and the SEA have been identified. This has informed the development of high-level SEA objectives for each topic area.

The SEA objectives provide a framework for the assessment of the potential significant effects of the draft Framework Plan which is reported within this SEA Environmental Report. The SEA assessment methodology for the draft Framework Plan is explained in further detail in Chapter 7.

Overall, the purpose of the SEA Environmental Report is to document how the SEA process undertaken for this Stage 3 assessment has met the requirements of Annex I of the SEA Directive and to demonstrate how sustainable development principles have been considered throughout the development of the draft Framework Plan.

Appendix A illustrates where in this environmental report the requirements of the directive have been fulfilled and lists the requirements of Article 5 and Annex I of the SEA Directive alongside the corresponding chapter of the SEA Environmental Report.

3.4 Environmental Report

This Environmental Report has been completed for the draft Framework Plan, as an initial part of Stage 3 of the SEA process as outlined in Table 1.2. Figure 3.1 below sets out the structure for the elements of the assessment covered by the Environmental Report.

Figure 3.1 – Environmental Assessment Structure

4

Consultation

4.1 Background

Public consultation and stakeholder engagement is a key element in ensuring stakeholders and members of the public have an opportunity to contribute to the development of plans and projects in Ireland. Irish Water is undertaking an accessible, meaningful, and accountable consultation and engagement process with stakeholders and members of the public throughout the development of the National Water Resources Plan (NWRP).

The consultation approach involves a number of key stages in the development of the NWRP, as follows:

- NWRP introduction;
- Consultation one – Strategic Environmental Assessment Scoping Report;
- Consultation two – NWRP – draft Framework Plan and associated environmental reports;
- Consultation on the four draft Regional Water Resources Plans (RWRP) and associated environmental reports.

This approach recognises that Irish Water will be engaging with stakeholders throughout the process and allows the opportunity for stakeholders to contribute to the NWRP, and outlines to stakeholders how they can influence the NWRP. It ensures continuous communication and engagement with environmental authorities, interested parties and the general public as the plan progresses. It also provides an opportunity to communicate the purpose and relevance of the NWRP, how it is being developed, and outlines how and when they can contribute to the NWRP.

In October 2017, a dedicated NWRP webpage went live on the Irish Water website at www.water.ie/nwrp, introducing the NWRP and the Consultation Roadmap. The NWRP Consultation Road map, as seen in Figure 1.3, set out the process in developing the Plan and detailed the two stages where formal consultation would be undertaken in the development of the NWRP.

As well as the launch of the webpage in October 2017, an email informing the environmental authorities and interested parties, introducing the NWRP and highlighting the upcoming consultation on the SEA Scoping Report was issued. This email also outlined when consultation would be undertaken throughout its development, highlighting when stakeholders would have the opportunity to feed into the process. This stage of stakeholder engagement introduced the NWRP, outlined the main objectives of the plan and provided details on how to contact the NWRP team through the dedicated information service.

Figure 4.1 – Consultation Roadmap

4.2 Strategic Environmental Assessment Scoping Report public consultation phase

The first stage of formal consultation was to inform the development of the SEA and NIS (the environmental reports that accompany the NWRP). Consultation One commenced on Thursday 9 November 2017, ran for six weeks with the publication of the SEA Scoping Report (see Figure 4.1), and concluded on Friday 22 December 2017. Members of the public, interested parties and environmental authorities were invited to contribute to the development of the NWRP, as part of the SEA and AA process, through public consultation.

The Scoping Report set the geographical and temporal scope of the NWRP and SEA and aimed to inform the development of the SEA Environmental Report and AA Natura Impact Statement (NIS). The report provided an outline of the NWRP, described the environmental characteristics of the Study Area and presented the initial understanding of the key environmental issues relating to the plan.

The environmental topics in the SEA Directive that have been scoped in for the assessment of the NWRP are:

- Population, economy, tourism and recreation and human health;
- Water environment;
- Biodiversity (including flora and fauna);
- Material assets;
- Landscape and visual amenity;
- Climate change;
- Cultural heritage (including archaeological and architectural); and
- Geology and soils.

Air Quality and Noise were scoped out of the assessment in the scoping phase as potential water supply or demand options were not considered likely to result in significant impacts in terms of air or noise pollution, however it was recognised that noise and dust during construction could cause disturbance to nearby receptors such as communities, recreation areas or biodiversity interest. Therefore, these should be considered in terms of potential effects on the relevant receptors and addressed through mitigation and monitoring where required. Due to the likely short-term nature of these impacts they will be taken into consideration under the Population, Economy, Tourism and Recreation and Human Health and the Biodiversity topics.

The Scoping Report proposed a framework of SEA objectives to inform the next stage of the SEA process, outlined the external influences for the NWRP, set out the draft SEA assessment approach, and identified potential interrelationships between environmental topic areas, and other plans, policies and projects.

Irish Water asked for feedback on the SEA Scoping Report and invited comments and suggestions for consideration when developing the NWRP.

The following consultation questions were prepared to guide stakeholders in making a submission on the SEA Scoping Report:

1. Do you have any suggestions that you would like Irish Water to consider in the preparation of its NWRP?
2. Section 2.1 in Chapter 2 of the SEA Scoping Report outlines the objectives of the NWRP. Do you have any comments on these objectives?

3. Irish Water has reviewed plans, policies and programmes relevant to the NWRP in Chapter 3 of the SEA Scoping Report. Are there any others that should be considered?
4. Chapter 4 of the SEA Scoping Report[7] sets out the current baseline environment conditions and future trends. Do you have any comments on these?
5. Chapter 5 of the SEA Scoping Report sets out the environmental objectives that will be used to assess the NWRP and its potential effects on the environment. Table 5.1 summarises these objectives. Have you any comments on these?
6. How would you like Irish Water to communicate with you as the plan progresses?

In line with the SEA Directive, Irish Water consulted specific statutory environmental authorities on the scope and level of detail on the information to be included in the Environmental Report. The statutory environmental authorities who participated in the consultation on the Scoping Report were:

- EPA;
- Department of Housing, Planning, and Local Government;
- Department of Culture, Heritage and the Gaeltacht;
- Department of Agriculture, Food and the Marine;
- Department of Communications, Climate Action and Environment; and
- Northern Ireland Environment Agency (transboundary related).

4.3 Stakeholder workshops and briefings

4.3.1 Consultation engagement on Scoping Report

Following the publication of the SEA Scoping Report for consultation, Irish Water invited environmental authorities to briefings and workshops to further inform them on the NWRP, SEA and AA process. Meetings were held between December 2017 to December 2018, including a briefing to the Irish Water National Stakeholder Forum, Industrial Development Authority (IDA) and the Commission for the Regulation of Utilities, Water and Energy (CRU) and a presentation made to the National Water Forum (An Foram Uisce).

4.3.2 Consultation engagement on the Environmental Report and NWRP

The environmental authorities were invited to attend pre-consultation workshops to present key aspects of the NWRP including methodology for selecting and assessing water supply and demand management options. The workshop gave the environmental authorities a platform to feed into the development of the NWRP and SEA.

Workshop 6th December 2017 - to present an overview of the NWRP with particular focus on the Options Assessment Methodology. The workshop was attended by the EPA and involved general discussion around the scope and content to be included in the NWRP, and feedback on the scoping questions from the scoping report in relation to the NWRP and the SEA and AA process to assist the environmental authorities in making a formal submission on the Scoping Report.

Workshop 6th June 2018 - to present an update on the NWRP and case studies on the Options Assessment Methodology. Organisations that participated in this workshop included: EPA, Inland Fisheries Ireland (IFI), Department of Culture, Heritage and the Gaeltacht (DCHG), and Department of Housing, Planning and Local Government (DHPLG).

[7] https://www.water.ie/projects-plans/our-plans/nwrp/321060AS-REP-016-0002-01-SEA-Scoping-Report-_Dec17.pdf

Workshop 4th December 2018 – to present the final approach for the NWRP. This was attended by EPA and IFI and covered an update to the proposed approach for the NWRP following the experience gained from storm and drought events in 2018 as well as emphasis on improving water efficiency and leakage reduction as integral to the plan approach.

4.3.3 Key themes from the Scoping consultation feedback

Over the SEA Scoping Report consultation period (November to December 2017), submissions were received from 17 consultees including; Dublin City Council, Tipperary County Council, Limerick Chamber, DCHG, EPA, Health Service Executive, Health Service Executive Environmental Health Service, Transport Infrastructure Ireland, Geological Survey Ireland (GSI), National Water Forum, Inland Waterway Association of Ireland, Inland Fisheries Ireland, Irish Creamery Milk Suppliers Association, Indaver, Green Party, and 2 members of the public.

The feedback from workshops and briefings and the Scoping Report consultation submissions, can be grouped within the themes below:

- Projects and Development: consultees highlighted the importance of considering specific infrastructure projects and developments, including Irish Water projects;
- Environmental issues including water quality, abstractions, agriculture, energy efficiency, flood risk, climate change and aquatic biodiversity;
- Legislation: key plans, strategies and policies related to the plan were raised and requirements of the SEA Directive reinforced; and
- Economy and Social: the importance of the environment for economic and social reasons was stressed, including the importance of water for recreation and the economy and the need for Irish Water to facilitate regional growth in Ireland.

Further details on the feedback received and how these comments have been responded to can be found in Appendix C of this Environmental Report. An overview of the feedback is provided in the NWRP Framework consultation one report available at www.water.ie/nwrp.

4.4 Consultation on the draft Framework Plan, SEA Environmental Report and NIS

4.4.1 Public consultation

The second stage is a statutory public consultation and seeks feedback on the NWRP – draft Framework Plan, this report (SEA Environmental Report) and NIS. A sample Case Study of the draft Framework Plan methodology applied to a number of WRZs (including sample environmental review information) will also be provided as supporting material for the stage 1 consultation. However, this is for illustrative purposes only and does not form part of the consultation during this stage. The consultation period will run for ten weeks from December 2020.

Members of the public, interested parties and environmental authorities are invited to make a submission on the development of the NWRP – draft Framework Plan. The following consultation questions were prepared to guide stakeholders in making a submission:

1. Do you have any suggestions that you would like Irish Water to consider as part of the Draft National Water Resources Plan Framework?
2. Do you have any suggestions that you would like Irish Water to consider as part of how we assess supply/ demand balance, water quality, quantity and resilience?
3. The Draft National Water Resources Plan Framework sets out Irish Water's methodology to find high level solutions to address short, medium and long term issues. Do you have any comments on our methodology?

4. Do you have any comments on the Strategic Environmental Assessment (SEA) Environmental Report and associated Natural Impact Statement (NIS) which accompanies the Draft National Water Resources Plan Framework?
5. The project roadmap has been updated. Do you have any comments or feedback on this?
6. How would you like Irish Water to communicate with you as the NWRP progresses?

Submissions will not be individually responded to but will be summarised in a Consultation Report which will be published on www.water.ie/nwrp.

All submissions made on the draft Framework Plan and associated environmental reports will be reviewed and relevant feedback incorporated into the final Framework Plan and associated SEA Statement. Submissions from individuals will be reported anonymously and feedback from organisations will be attributed to them.

A number of communication tools were developed to promote the consultation and to further engage the environmental authorities and encourage public participation in the consultation process. In order to publicise the consultation period, the following communications tools were used:

- Update to the NWRP webpage on the Irish Water website in English and Irish;
- Information leaflet available in English and Irish;
- NWRP infographic;
- Press release to national and local media;
- Newspaper advert;
- Hard copies of the draft Framework Plan, environmental reports, Non-technical Summary and consultation leaflet made available at planning counters nationally;
- FAQs;
- Freephone number 1800 46 36 76;
- Social media; and
- Correspondence and briefings to:
    - Elected representatives;
    - Local authorities;
    - Environmental authorities;
    - Interested parties; and
    - Media.

Further information requests and written submissions or observations can be sent to Irish Water:

By post:	**By email:**
National Water Resources Plan,	nwrp@water.ie
Irish Water,	
PO Box 13216,	
Glenageary,	
Co. Dublin.	

Feedback from the Consultation two on the draft Framework Plan will be reviewed by the NWRP team, and relevant feedback will inform the development of the final Framework Plan.

A sample Case Study of the draft Framework Plan methodology applied to a number of WRZs (including sample environmental review information) will also be provided as supporting material for

the consultation two. However, this is for illustrative purposes only and does not form part of the consultation during this phase.

Irish Water will present Four Draft Regional Water Resources Plans during 2021. The NWRP will comprise the final Framework Plan and Four Regional Water Resources Plans once they are adopted by Irish Water.

4.4.2 Transboundary consultation

Northern Ireland's statutory stakeholders and environmental authorities will be notified on the release of the draft Framework Plan and associated SEA Environmental Report and NIS.

5

Review of Relevant Plans, Policies and Programmes

5.1 Introduction

A review of other plans, policies and programmes and the legislative framework is an important part of setting the context for the SEA and the Framework Plan. The review also identifies wider environmental protection objectives.

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

In accordance with this requirement, the relationship with the relevant policy, plan programme and legislative framework was explored. This review was conducted as part of the SEA Scoping Report and has been further refined following consultation.

A list of the relevant plans, policies and programmes considered for each environmental topic is provided in Table 5.1 below. A summary of the review conducted on the key documents is set out in Appendix B. The review process has helped inform the scope of the SEA, the focus for identifying the baseline environment and the development of the SEA objectives.

Table 5.1 – List of the policies, plans and programmes reviewed

Theme	Policies, plans and programmes	
All aspects	1	EU Sustainability Policy
	2	UN Sustainable Development Goals
	3	Our Sustainable Future, a Framework for Sustainable Development for Ireland
	4	Strategic Environmental Directive (2001/42/EC) and associated Irish legislation
	5	Environmental Impact Assessment Directive (2014/52/EU) and associated Irish legislation
	6	Environmental Liability Directive (2004/35/EC)
	7	Water Services Act, 2013
	8	Ireland 2040: Our Plan, National Planning Framework
	9	Water Services Policy Statement 2018 - 2025
	10	National Spatial Strategy for Ireland 2002-2020 (Department of the Environment and Local Government, 2002)
	11	Regional Spatial and Economic Strategies
	12	County and City Development Plans
	13	Planning and Development Act 2000 (as amended)
	14	Planning and Development Regulations 2001 (as amended)
	15	Capital Investment Plan 2016-2021
	16	Climate Action Plan 2019

Theme	Policies, plans and programmes	
Population, economy, tourism and recreation and human health	17	Aarhus Convention
	18	Drinking Water Directive (98/83/EC)
	19	World Health Organization Guidelines for Drinking Water Quality
	20	Irish Water - Water Services Strategic Plan 2015
	21	Irish Water - National Wastewater Sludge Management Plan
	22	Irish Water - Lead in Drinking Water Mitigation Plan
	23	Healthy Ireland Framework
	24	Food Wise 2025
	25	Food Harvest 2020
	26	EU Tourism Policy
	27	National Countryside Recreation Strategy
	28	Tourism Policy Statement
	29	Tourism Action Plan 2016-2018
	30	County based recreation strategies
Water environment	31	Water Framework Directive (2000/60/EC)
	32	River Basin Management Plan (April 2018)
	33	General Scheme of the Water Environment (Abstractions) Bill 2018
	34	Bathing Water Directive (2006/7/EC)
	35	Floods Directive (2007/60/EC)
	36	Nitrates Directive (91/676/EEC)
	37	Urban Wastewater Treatment Directive (91/271/EEC)
	38	Marine Strategy Framework Directive (2008/56/EC)
	39	Groundwater Directive (2006/118/EC)
	40	Transposing Regulation for the above Directives
	41	Catchment Flood Risk Management (CFRAM) Programme
	42	Flood Risk Management Plans
	43	Draft Fourth Nitrates Action Programme
Biodiversity, flora and fauna	44	International and EU Conventions
	45	EU Biodiversity Strategy, 2011
	46	The Habitats Directive (92/43/EEC)
	47	The Birds Directive (2009/147/EC)
	48	Green Infrastructure: Enhancing Europe's Natural Capital Strategy
	49	Creating Green Infrastructure for Ireland: Enhancing Natural Capital for Human Wellbeing
	50	Wildlife Act 1976-2010
	51	Shellfish Waters Directive (2006/113/EC)
	52	Fish Directive (2006/44/EC)
	53	Fisheries Consolidation Act, 1959
	54	European Communities (Birds and Natural Habitats) Regulations 2011 as amended (S.I. No. 477/2011)
	55	Other National Biodiversity related regulations
	56	National Biodiversity Plan
	57	County and City Heritage Plans
Material assets	58	Waste Framework Directive (2008/98/EC)
	59	Infrastructure and Capital Investment Plan 2016-2021
	60	Waste Management Acts 1996 – 2005
	61	National Spatial Strategy for Ireland 2002-2020

Theme	Policies, plans and programmes	
	62	National Peatland Strategy
	63	Forestry Programme 2014-2020
	64	Regional/County based waste management strategies and mineral plans
Landscape and visual amenity	65	European Landscape Convention
	66	National Landscape Strategy for Ireland 2015-2025
	67	County Landscape Character Assessments
Air quality	68	Ambient Air Quality Directive (2008/50/EC)
	69	Industrial Emissions Directive (2010/75/EU)
Noise	70	Noise Directive (2002/49/EC)
Climate change	71	The Kyoto Protocol
	72	Paris Agreement 2015
	73	EU Energy and Climate (2020) Package 2009
	74	The Climate Action and Low Carbon Development Act 2015
	75	National Climate Change Adaptation Framework including the Sectoral Adaptation Plans
	76	Ireland's National Policy Position on Climate Action and Low Carbon Development (2014)
	77	National Mitigation Plan
	78	Energy White Paper: Delivering a Sustainable Energy Future for Ireland – The Energy Policy Framework 2007-2020
	79	National Renewable Energy Action Plan
	80	Offshore Renewable Energy Development Plan
	81	Irish Water Sustainable Energy Strategy
Cultural heritage (archaeological and architectural)	82	EU Conventions on Archaeological, Architectural and Cultural Heritage
	83	Planning and Development Acts
	84	Heritage Act
	85	National Monuments Act
	86	Architectural Heritage and Historic Monuments Act
	87	County Heritage Plans
Geology and soils	88	Planning and Development Act
	89	Action Plan for Rural Development
Transboundary	90	Planning Act (NI) 2011Planning Act (NI) 2011
	91	Regional Development Strategy: Building a Better Future, 2035
	92	Northern Ireland Climate Change Adaptation Programme
	93	The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009
	94	Water Abstraction and Impoundment (Licensing) (Amendment) Regulations (Northern Ireland) 2007
	95	The Water Supply (Water Quality) Regulations (NI) 2007, as amended (2015)
	96	NI Water (2020) Our Strategy 2021-2046
	97	NI Water (2020) Water Resource and Supply Resilience Plan

5.1.1 Key influences

Water Framework Directive and River Basin Management Plan

The EU WFD (Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy) and the RBMP (required under WFD) are of particular relevance to the development of the Framework Plan as they set the framework for managing Irish waters from abstraction and pollution. They will strongly influence where and how much can be abstracted in creating new supplies and enhancing existing sustainable abstractions.

The WFD establishes a standard European wide strategic approach to managing surface water, groundwater, transitional and coastal waterbodies, wetlands and to meeting common environmental objectives.

The WFD environmental objectives for surface waters include the following:

- Prevent deterioration.
- Aim to achieve good ecological status (or for Artificial or Heavily Modified Water Bodies, good ecological potential).
- Aim to achieve good chemical status[8].
- Aim to reduce/cease emissions, discharges and losses from priority substances and priority hazardous substances.
- Meet protected area objectives where relevant.

The WFD environmental objectives for groundwater include the following:

- Prevent deterioration of status;
- Aim to achieve good quantitative status;
- Aim to achieve good chemical status;
- Prevent or limit the input of pollutants;
- Reverse significant upward trends in the concentration of pollutants; and
- Meet protected area objectives where relevant.

Under Article 4(1)(a) of the WFD, Ireland must adopt the necessary measures to achieve the objectives of non-deterioration, preservation and enhancement of the status of bodies of water by making the programmes specified in the RBMP operational for the achievement of the WFD environmental objectives. Both the obligations to enhance, and to prevent deterioration of the status of bodies of water, are designed to attain the qualitative objectives pursued by the EU legislature, namely the preservation or restoration of good status, good ecological potential and good chemical status of surface waters.

More details on the WFD and the current baseline and key trends for the water environment are presented in Chapter 6.3 of this SEA Environmental Report.

The RBMP for Ireland sets out how organisations, stakeholders and communities will work together to improve the water environment and fulfil the requirements of the WFD. The RBMP is updated every six-year river basin planning cycle; the current RBMP is the second cycle and sets out what measures

[8] While WFD objective of Good Status or Good Ecological Potential exists, if a higher objective (high status) exists then that is the objective for the waterbody because of the no deterioration condition.

will be undertaken to protect and improve Irish Water waters, which will then be reviewed again in 2021.

One of the key points which informed this RBMP was the recognition that its implementation requires effective and efficient national, regional and local structures, and thorough integration of some structures, to ensure effective co-ordination between scientific understanding of the problems to be addressed, and policy development and on-the-ground delivery. Such coordinated action is designed to protect public health, the environment, water amenities and to sustain water-intensive industries, including agri-food and tourism, particularly in rural Ireland.

Having learned lessons from the first RBMP cycle, the Government have combined three River Basin Districts into one for this second RBMP, using a national and more integrated approach. The second RBMP aims to build on the positive aspects of the first cycle, and also to learn from those aspects which did not progress as well as they had expected to; for example:

- The structure of multiple River Basin Districts did not prove effective in terms of resource management and coherent management of similar challenges across the country.
- The governance and delivery structures in place were not effective and were overly complex.
- The targets set were not realistic due to the concept of planning RBMP being new to EU member states and within the Irish context, and the level of ambition was not grounded on a sufficiently well-developed evidence base.

The Government is introducing new initiatives and policies to address many of Ireland's water quality challenges, building on the measures implemented during the first planning cycle, but also seeks to implement supporting measures on a prioritised basis; where necessary. A programme of key measures has been established, including:

- Local authorities to put in place Support and Advisory Teams to carry out scientific assessments and to drive the implementation of mitigation measures at local level;
- Recruitment of investigative assessment personnel (which commenced in early 2018) and provision has been made for up to 43 specialist staff to be in place by mid-2018. These resources will be assigned across the five regions. These specialist local authority investigative assessment personnel will carry out scientific assessments of water bodies and drive the implementation of measures at a local level;
- Compliance with the Good Agriculture Practice Regulations will be improved through implementation of the enhanced Nitrates Action Programme for 2018–2021 and of the associated inspection regime. The Programme entails new strengthened water-protection measures, focused on intercepting and breaking nutrient transport pathways and preventing sediment and nutrient losses to water bodies; and
- Greater opportunities for public consultation and engagement.

The RBMP sets out the objectives, targets and measures to improve water bodies throughout Ireland. To improve water quality and achieve "Good" ecological status in waterbodies (rivers, lakes, estuaries and coastal waters) by 2027.

Abstraction licensing

In summer 2018, a draft Bill was published proposing alignment of abstraction licencing with the requirements of the Water Framework Directive. Irish Water has assessed their existing abstractions and has taken a precautionary approach based on their current understanding of how abstraction legislation might be applied, as outlined in Section 3.7.2 and Appendix J Regulatory and Licensing

Constraints of the draft Framework Plan. This suggests certain schemes may be subject to reduction in abstraction.

As Irish Water do not have full visibility of the future regulatory regime and have not progressed through the licencing process on a site by site basis, they have not included their estimation of sustainable abstraction within the SDB calculations. Instead Irish Water use the hydrological yield, water treatment capacity and bulk transfer limitations in their calculation of DO. Irish Water also use the sustainable abstraction assessment to assess the sensitivity of the Preferred Approaches (solutions) they develop as part of the NWRP.

Therefore, the draft Framework Plan assumes that existing abstractions can continue on a transitional basis, subject to the registration requirements as outlined in the General Scheme of a Water Environmental (Abstractions) Bill published by the Government in December 2017.

For these abstractions, further studies will be undertaken in conjunction with the EPA and appropriate stakeholders. Following investigation, if an abstraction is confirmed to be affecting a waterbody status the SDB will be updated and solutions will be delivered through the future cycles of RBMPs and/or Regional Water Resources Plans.

As the objective of the NWRP is to achieve, safe, secure, reliable and sustainable supplies, all new abstractions developed by Irish Water as part of their Regional Water Resources Plans will be based on conservative assessments of sustainable abstraction. This will ensure that their water supplies continually improve in terms of environmental sustainability over time. More information on Regulatory and Licensing Constraints can be found in Appendix J Regulatory and Licensing Constraints.

National Planning Framework – Project Ireland 2040

The National Planning Framework is a national document prepared by the DHPLG published on 16th February 2018. It will guide, at a high level, strategic planning and development for the country over the next 20 years and beyond, so that population growth is sustainable in economic, social and environmental terms.

The National Planning Framework is accompanied by the ten-year National Development Plan, together forming one plan to guide strategic development and infrastructure investment at a national level.

Irish Water have taken account of the National Planning Framework in the approach to the SEA assessment for the options required to support growth.

National Adaptation Framework Sectoral Adaptation Planning

Building on the work completed under the National Climate Change Adaptation Framework (NCCAF, 2012), the Department of Communications, Climate Action and Environment published Ireland's first statutory National Adaptation Framework (NAF) in January 2018. The NAF sets out the national approach to adaptation in Ireland in order to reduce the negative impacts of climate change. The framework requires each government department to develop a sectoral adaptation plan for their area of responsibility.

As part of this framework, the DHPLG produced the Adaptation Plan for Water Quality and Water Services Infrastructure. Figure 5.1 lists the acute priority impacts on water services and their associated risk controls and adaptation measures as stated in the Adaptation Plan. The NWRP is called out as an adaptation measure under all the identified acute priority impacts.

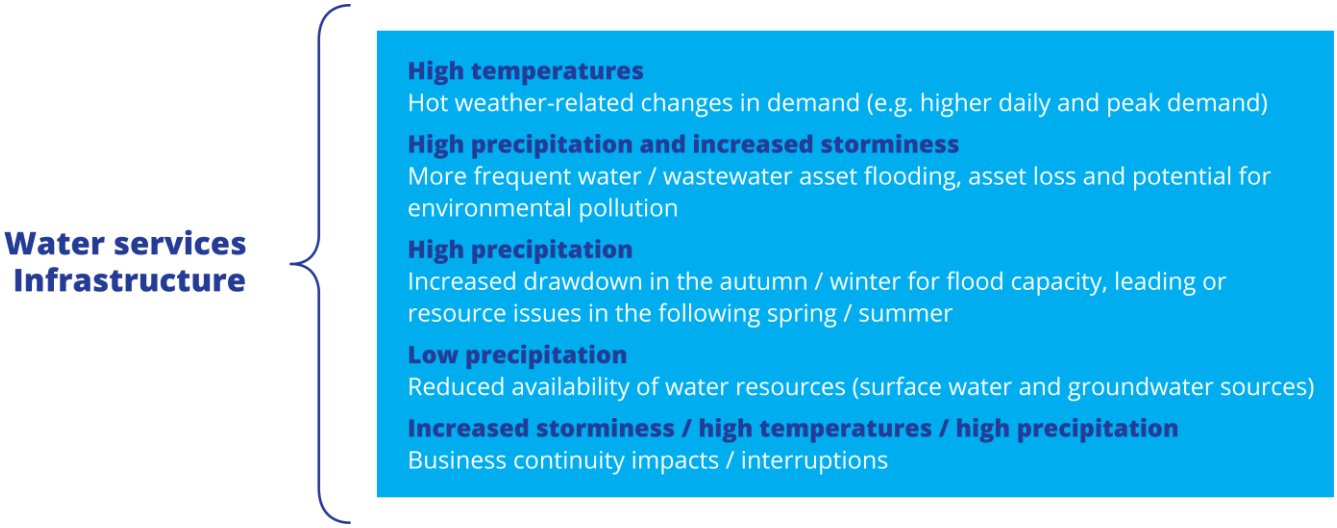


Figure 5.1 – Adaptation Plan Acute Priority Impacts

5.2 Related Irish Water plans and strategies

As illustrated in Figure 2.1, the NWRP falls into a wider hierarchy of plans and strategies. The relevance or scope of some of these plans and strategies is explained below.

5.2.1 Water Services Strategic Plan (Tier 1 plan)

The WSSP is the highest tier Irish Water asset management plan, as discussed in Chapter 2.2.2 and illustrated in Figure 2.1. It sets the overarching framework for detailed Implementation Plans. The NWRP is just one of the Implementation Plans developed to achieve the objectives of the WSSP.

The WSSP has six strategic objectives; one of which is to 'ensure a safe and reliable water supply', and another to 'protect and enhance the environment'. A number of aims have been identified in order to achieve these objectives. Under the objective 'ensure a safe and reliable water supply', two of the aims to support the achievement of this are to "reducing drinking water quality problems" and to "manage the sustainability and quality of drinking water from source to tap to protect human health". Under the objective 'protect and enhance the environment', Irish Water intend to "operate our infrastructure to support the achievement of objectives under the Birds, Habitats and WFDs" and "manage our residual waste in a sustainable manner". The NWRP will consider all strategic objectives and supporting aims within the WSSP during its development.

5.2.2 Other Related Tier 2 Plans

National Wastewater Sludge Management Plan

The National Wastewater Sludge Management Plan sets out the long-term strategy for the management of wastewater sludge produced at wastewater treatment plants (WwTPs) under the control of Irish Water. The siting of new wastewater sludge infrastructure has the potential to impact the same receptors affected by the NWRP, including aquatic habitats and water quality. There is the potential for opportunities and impacts in terms of how the biosolid/sludge by-product of the

wastewater treatment process can be used as an organic fertiliser, which can improve agricultural soil quality. Where this replaces artificial fertilisers, there may be potential to support catchment management approaches within the Plan.

Lead in Drinking Water Mitigation Plan

In 2015, the Government published the National Strategy to reduce exposure to Lead in Drinking Water. The main aim of this strategy is to protect human health and solve the issue of lead in drinking water in Ireland. As the national public water utility, Irish Water developed the Lead in Drinking Water Mitigation Plan. Irish Water developed this to address the risk of failing to comply with the drinking water quality standard for lead due to lead pipework serving properties connected to the public water network, for which Irish Water are responsible. The Lead in Drinking Water Mitigation Plan identifies investment needs which, combined with needs from the NWRP, may influence the choice of an optimal approach.

The SEA will have to consider the potential for in-combination with the Lead in Drinking Water Plan. There is potential for in-combination effects on human health, biodiversity and water quality as a result of the orthophosphate treatment at Water Supply Zone where lead replacement is not feasible.

Sustainable Energy Strategy - Climate Change Mitigation and Adaptation Strategy

Improving energy efficiency is one of Irish Water's key sustainability measures for improving their carbon footprint and reducing greenhouse gas emissions. Irish Water is implementing a sustainable energy strategy to become a low carbon, energy efficient, sustainable water utility and improve energy efficiency by 33% by 2021 against 2009 levels. The strategy includes 36 business wide energy action plans to improve energy efficiency, including Energy Efficient Design, Energy Innovation, Energy retrofit upgrades, Water Conservation, Renewable Energy, Lighting and Heating, Capital Maintenance, Transport and Process Optimisation. Significant progress has been made in implementing the sustainable energy strategy, in 2019, a 30% improvement in energy efficiency performance with a corresponding saving of over 75,000 tonnes of carbon was achieved. Irish Water are on track to meet their target of 33% energy efficiency improvement, putting them in a strong position to meet the new target of 50% by 2030.

Energy efficiency improvement is a key mitigation measure of Irish Water's climate change policy to help ensure water and wastewater services are resilient to climate change, developing a low greenhouse gas emitting water and wastewater service. Irish Water is implementing a business wide climate mitigation and adaptation strategy, aligned with the Water Sector Adaptation Plan under the National Adaptation Framework. The strategy identifies the adaptation and mitigation actions to be undertaken to minimise the consequences of climate change on Irish Water, their customers and the environment.

5.2.3 Framework Plan Tier 3 projects and activities

Leakage Reduction Programme

Irish Water is undertaking a national programme of works to reduce leakage and improve their water supply. This programme will see over €500 million invested in the public water network over the next five years. The National Leakage Reduction programme was established in 2017, as a long-term strategic initiative to sustainably tackle the leakage problem and maintain leakage savings. The programme involves finding and fixing damaged and shared water mains, pressure management and replacing the worst-performing mains in terms of leakage with the aim of saving 166 million litres of water every day by 2021. The programme supports the leakage reduction objectives of the NWRP

and the committed and planned investments under it will need to be taken into account in the implementation of the Framework Plan. The same types of impacts identified by the SEA for leakage reduction options will also apply to the proposals under this programme.

National Disinfection Programme

Irish Water has developed a programme to improve the quality of drinking water across the country. The phased programme involves the upgrade and standardisation of disinfection systems currently installed in WTPs for the disinfection of contaminated sites across the country. The programme supports the quality objectives of the NWRP. The programme is in progress and will be taken into account in the baseline for the Regional Plans and priorities for future investment considered in the options assessment process in the development of the Regional Plans.

6 Baseline Environment

6.1 Introduction

This chapter describes the baseline environment within the Study Area. The baseline is simply the environmental condition in the absence of the proposed plan over a defined period of time and provides a benchmark to assess the likely significant environmental effects. This Environmental Report outlines the environmental sensitivities and trends that are considered relevant to water resource management at the strategic scale. This is based on a desk review of environmental datasets available from web-based searches, published documents and Geographical Information System (GIS) based information.

Reference has been made to the EPA's State of the Environment Report published in November 2016. This report provides:

- An assessment of the overall quality of Ireland's environment;
- An outline of the pressures being placed on this environment; and
- The key actions that can address these pressures.

The report recognises the importance of the natural environment and that the overall quality of Ireland's environment is good. However, the report also acknowledges that many environmental issues, such as air quality and water pollution, can be more localised and can be subject to masking by the national level assessments. The report also acknowledges that the environment faces many challenges, particularly as the economy begins to grow (EPA, 2016). Chapter 6.2 to Chapter 6.10 includes an overview of the overarching state of the environment based on the EPA assessment conducted in 2016. The key themes relevant to the development of the Framework Plan are highlighted within the blue boxes. The seven key actions aimed to address the associated pressures (EPA, 2016a) are also presented within the grey boxes.

The assessment of the baseline influences the development of the scope of the assessment identifying key relevant issues for the draft Framework Plan and the likely evolution of the baseline without a plan in place.

6.2 Population, economy, tourism and recreation, and human health

6.2.1 Introduction

Population

The 2016 Census recorded the population of Ireland to be over 4.2 million. The population of Ireland has been rising continuously since the 1960s, resulting in a constant increase in the demand for water. This is attributed to increasing birth rates, decreasing death rates, an increase in life expectancy and a decrease in net migration (Central Statistics Office (CSO), 2016a).

The change in population within the administrative counties of Ireland in the last five years is illustrated in Figure 6.1. This also gives a good indication of the change in demand for water in each area. The largest population increase was seen in Fingal, and the biggest decrease in population was

seen in County Donegal. Almost all counties experienced some level of population growth with the exception of Donegal, Mayo and Sligo. Figure 6.1 also illustrates a clear geographic trend with population reduction experienced in the west of the country, and increases in the south, east and particularly within the Dublin area.

Population density is continually increasing in Ireland, but the biggest growth is occurring in urban areas as the rural to urban shift continues. Approximately 80% of the population increase, between 2011 and 2016, was in urban areas. The density average in 2011 was 1,736 people per km^2, increasing to 2,008 in 2016 for urban areas, and 26 people per km^2 in rural areas[9]; increasing marginally to 27 in 2016 (EPA, 2016a). In April 2016, 44% of Ireland's urban population lived in Dublin and 11% in Cork. The highest rate of urbanisation was seen in County Sligo, and the largest rural population increase was seen in Cork, followed by Kildare. As the urban populations continue to grow, there is continued strain on urban water services to meet demand in these areas. Population density across Ireland (from the 2011 census[10]) is illustrated in Figure 6.2. This figure indicates where the key settlements in Ireland are and, in turn, where the greatest demands for water are likely to be.

[9] An "urban area" refers to towns with a total population of 1,500 or more. Similarly, the term "rural area" refers to the population outside urban areas and includes towns with a population of less than 1,500 persons.

[10] Data on population density was not available in the most recent 2016 census.

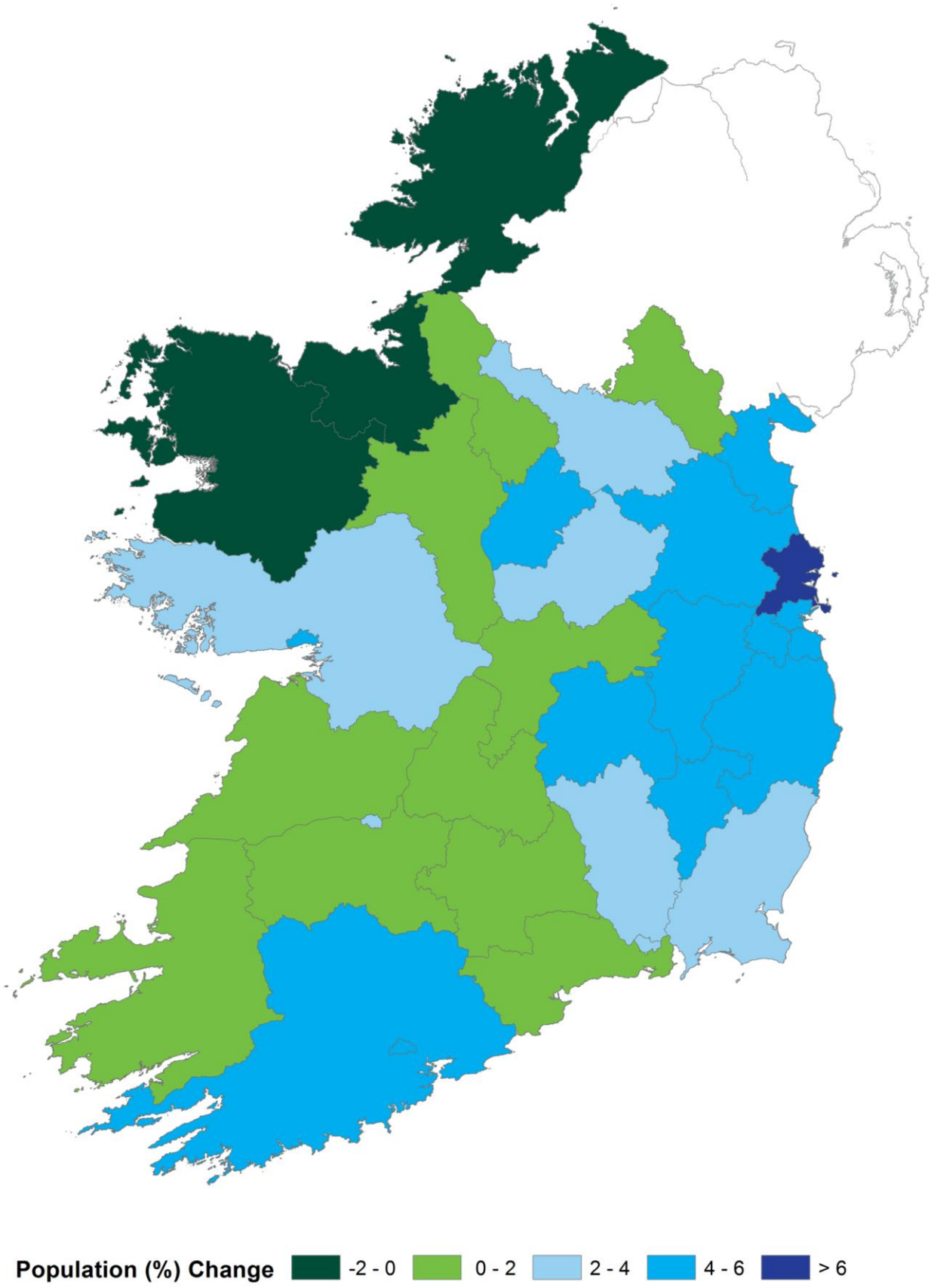


Figure 6.1 – Percentage population change per county in Ireland 2011–2016
(CSO, 2016b)

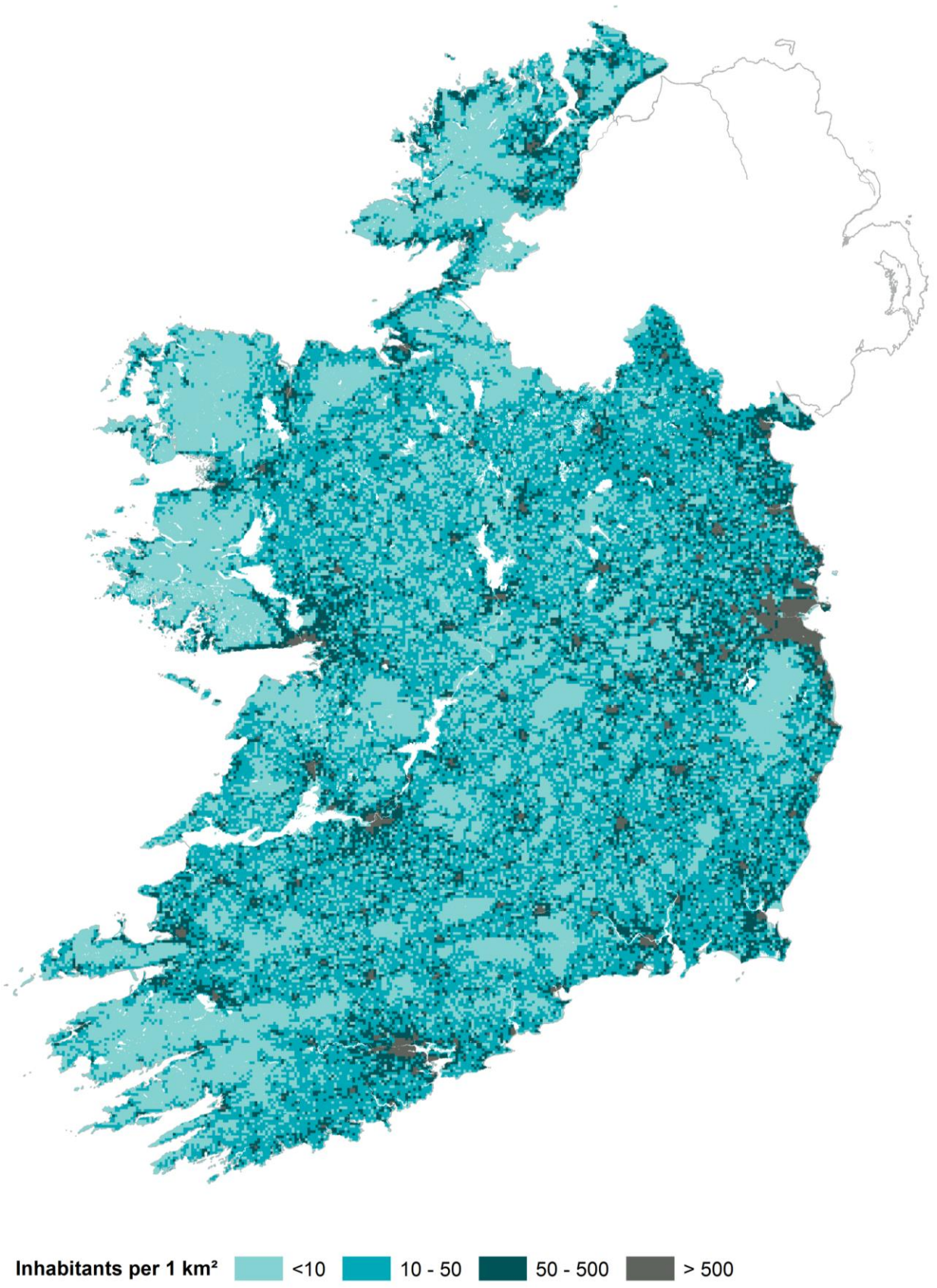


Figure 6.2 – Population density in Ireland 2011 (CSO, 2011)

The population of Ireland has increased by over 30% between 1996 and 2016. The percentage change in age groups within Ireland between 1996 and 2016 is shown in Table 6.1 below. It can be seen from Table 6.1 that the population of Ireland is getting older. There is a notable decrease in those under 25 years old, particularly those aged 15–24 (30%), and the highest increase is among those aged 45–64

(22%). The impacts of an aging population on the demand for water is not fully known. However, it is recognised that an older population could be more vulnerable to the potential threat of increased water scarcity.

Table 6.1 – Population breakdown by age group (%) 1996–2016

Age group	Percentage of population 1996 (%)	Percentage of population 2016 (%)	Percentage change 1996-2016 (%)
0 – 14 years	23.7	21.14	-10.80
15 – 24 years	17.45	12.11	-30.60
25 – 44 years	28.02	29.53	-5.39
45 – 64 years	19.41	23.84	22.82
65+ years	11.41	13.39	17.35

(CSO, 2016b)

The number of households in Ireland has been steadily increasing since 1971, with over 1.7 million private households registered in Ireland in 2016 and the average number of persons per household at 2.7 (CSO, 2016). The rise in the number of urban households over rural has been much more apparent, as illustrated in Figure 6.3. During the same period, the average number of persons per household was steadily decreasing until 2011 whilst the total number of households was rising. Households in rural areas have remained larger than those in urban areas since the mid to late 1970s by approximately 0.1 persons per household. As households get smaller, the demand for water per household would, in turn, be expected to decrease. However, with increasing household numbers requiring a potable water supply comes increasing water demand, which is likely to be seen in urban areas more than rural areas as indicated in Figure 6.3.

Overall, it can be shown that the population of Ireland is increasing along with the number of households, particularly in urban areas. Fewer people per household was the trend up to 2011, with a slight reverse since that time.

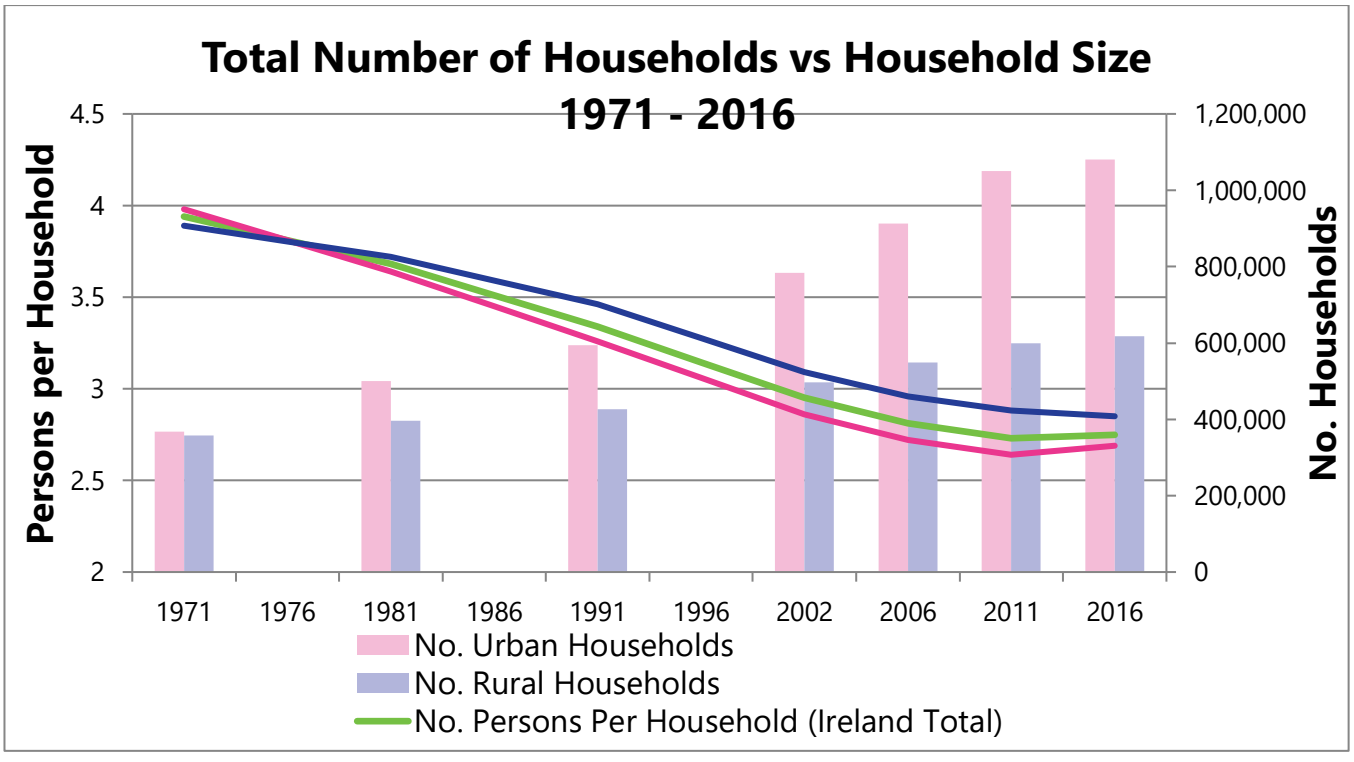


Figure 6.3 – Total number of households vs household size 1971–2016 (CSO, 2016d)

In 2016, 7.9% of the population was registered unemployed. This is an increase in the ten-year period since 2006 when unemployment was 5.3%, but an improved scenario from the previous census in 2011 when unemployment was 11.8%. The breakdown of the employment sector in the Ireland is as follows (CSO, 2016d):

- 14% in wholesale and retail trade;
- 13% in industry;
- 13% in human health and social work;
- 8% in education;
- 7% in construction;
- 7% in accommodation and food services;
- 6% in professional, scientific and technical; and
- <5% in each of the following sectors: administrative and support services; agriculture, forestry and fishing; education; financial, insurance and real estate; information and communication; transportation and storage; and public administration and defence, which collectively make up the remaining 32% of the national workforce.

The percentage of the population working in each employment sector has changed over the last ten years by around 1-2% for most instances in the region. However, the largest shifts were seen in the construction sector, which decreased from 12% in 2006 to 7% in 2016 (most likely to be as a result of the global recession in 2008), and in the human health and social work sector, which increased from 10% to 13% over the same period. Increases and decreases in employment within sectors with high water usage, such as agriculture and industry, between 2006 and 2016 were not significant, with no change noted for agriculture and a 1% decrease from the 2006 level for industry.

The Environment and the Economy (EPA, 2016a)

The environment is under increasing pressure from population growth, urbanisation, changing economies and the competition for depleting resources. As the economy begins to recover, the challenge surrounding waste generation and greenhouse gas emissions will increase. Irish Water's challenge is to find solutions that balance these issues.

There were some consistencies between the change of employment by sector and the change in the number of people attaining education in that field of study between 2011 and 2016, which may indicate trends for future employment and economic growth of business sectors. The largest increase in employment was seen in human health and social work between 2006 and 2016, and similarly, the largest increase in people obtaining qualifications was seen within this field between 2011 and 2016. There were also increases in the number of people gaining qualifications in education, financial, insurance and real estate, and information and communication. Therefore, it is expected that there will be similar trends in the growth of employment within these particular sectors in future.

Environmental Health and Wellbeing (EPA, 2016a)

Ireland has a high number of green spaces (parklands, woods, open countryside) and blue spaces (lakeshores, seashores, ponds and rivers) which contribute to good health and healthy lifestyles. The protection of these resources is seen as essential to environmental health and wellbeing.

Economy

The Irish economy grew rapidly in the period between 1998 and 2008 by 12% per year on average. This period of rapid growth was often referred to as the

"Celtic Tiger". Following the global economic recession in 2008, GDP[11] in Ireland reduced by almost 20% between 2008 and 2010. Since 2010, however, the Irish economy has recovered considerably, with a period of steady and rapid economic growth, on average 7% each year. In 2015, Ireland's GDP had recovered to beyond the level of GDP from 2008, which was at the peak of the "Celtic Tiger" years (countryeconomy, 2018). GDP also rose by 5.5% in quarter 4 of 2019. (CSO, 2020a)

Tourism and recreation

Tourism and recreation are important to the health and wellbeing of people but also contribute to the economy at a local and national level. Tourism is a very important sector in Ireland, delivering revenues of almost €8 billion to the Irish economy in 2016 (Department of Transport, Tourism and Sport).

Approximately 32.9 million passengers passed through Dublin airport in 2019 and 1.7 million passengers passed through Shannon airport. There was an overall increase in the number of passengers travelling through Irish airports in 2019 compared to 2018. A total of 315 cruise vessels arrived into Irish ports in 2019, with approximately 432,443 passengers (CSO, 2019).

In 2019, 11.2 million overseas visitors came to Ireland spending €5.8 billion. 325,000 people were employed in the tourism industry in 2019 (Tourism Ireland, 2019).

Following the economic recession, tourism in Ireland was affected and revenues dropped, not returning to the same level until 2014. In 2011, the Government launched a number of initiatives, such as "the Gathering" and "the Wild Atlantic Way", which have resulted in growth in the tourism sector in recent years. Ireland's "Ancient East" is the newest promotional campaign, which aims to bring in revenues of €204 million by 2020.

The National Planning Framework recognises that many of Ireland's waterbodies are also a resource for leisure activities and for the tourism sector (Government of Ireland, 2018). Many of the most popular tourist attractions are reliant on water, whether it be water usage or the natural water environment, and some recreation activities are dependent on water quality and quantity. Activities such as boating, canoeing, fishing and other water sports rely on certain flows of water, and the water quality is essential for the health of bathers and other water users. Angling alone is worth €836 million to Ireland's economy annually, supporting over 11,000 jobs; many of which are in rural and coastal areas. Under the National Strategy for Angling Development, Inland Fisheries Ireland (2015) is aiming to increase the contribution from angling by €60 million per annum and 1,800 jobs.

Water quality and quantity in Ireland's waterbodies are key to the continued ability of Ireland to host international water events, including the major sailing world championships, such as the Laser Masters World Championships in 2018. The hosting of these events is great for Irish tourism, which can come directly and indirectly through the hosting of such events. The economic impact these types of events have can be huge, not to mention a location's global profile being raised and the boost to trade and investment.

The quality of the water environment is also important for other land-based recreation activities at water sites, such as walking and cycling, as coastal waters, lakes, rivers, canals and wetlands are

[11] Gross Domestic Product (GDP) is commonly used as a measure of a country's economy. It is the total value of all goods produced and services provided by all people and companies (either by Irish or foreign-owned companies). However, it is important to note that GDP is not a perfect measure of economic growth; as a metric designed to measure the physical production of goods in the economy, GDP is not well suited to accounting for private and public sector services with no output that can be measured easily by counting the number of units produced. Given the data that is available for Ireland over the past 20 years, GDP was determined to the metric that made sense.

popular locations for nature trails. Therefore, protection of the water environment is of importance to the Irish tourism industry. However, conversely, recreational use of the water environment can also have potential risks to water quality through fuel and contaminant pollution.

Human health

Health and wellbeing are an essential resource for everyday life. It affects public good, human development, and quality of life.

The health of the population within Ireland is generally "good" to "very good", based on the Healthy Ireland Survey 2016, published by the Department of Health. Of the population aged 15 and older, 84% perceived their health to be "very good", whilst 3% perceived their health to be "bad" or "very bad".

Environmental Health and Wellbeing (EPA, 2016a)

Ireland's environment is generally classified as "good" and provides a clean, safe environment to live in. Some of the most prevalent health issues, at a national level, include localised air pollution and water contamination.

Good quality drinking water is key to achieving good public health. The Healthy Ireland Framework uses detailed indicators and targets for reducing public health threats, and existing statutory requirements for water quality are one of the key performance indicators which will be used for measuring the progress of the Framework.

Irish Water currently supplies about 1,730 million litres per day (Ml/d) of water to approximately 4.2 million people. This represents about 87% of the total population of Ireland (the remainder receive water from private supplies or Group Water Schemes). Under the EU (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014), Irish Water must monitor public water supplies and report to the EPA of drinking water non-compliances or risks to public health from a public water supply. Compliance with *E. coli* standards is very good in Ireland; in 2016, 99.7% of supplies complied with the standard, with only three supplies exceeding the standard. *E. coli* detections have reduced by 94.2% since 2007 (EPA, 2016a). Compliance with trihalomethanes (by-product of the disinfection process) is lower, with 92% of supplies complying with the standard, and 59 supplies exceeding. It is important to note that compliance has been improving in recent years, from 87% to 92% between 2012 and 2016 (EPA, 2016a).

6.2.2 Future trends and evolution of the baseline without the Plan

Population

The population throughout the Study Area is predicted to increase during the 25-year lifespan of the NWRP. According to CSO projections, the population is expected to exceed 5 million by 2025 and 5.5 million by 2045. Over the plan period, the percentage of people living in urban areas is expected to increase from approximately 63% to 77%, and the population density per km^2 is expected increase to approximately 84 persons per km^2 (CSO, 2016).

The Government has set out key strategic goals for employment within the Action Plan for Jobs 2017 (Department of Business, Enterprise and Innovation, 2017). Some of the key aims are to create 200,000 jobs by 2020, 135,000 of which need to be outside Dublin; drive productivity; and deliver competitive regions to drive regional employment. The Government has also identified cluster sectors for growth, including agri-food and marine, retail, design, construction and housing, and financial services. Meeting the SDB is key to achieving these goals.

The National Planning Framework was published in February 2018 (Government of Ireland, 2018). This plan will guide future development in Ireland up to 2040. The National Planning Framework

recognises the strategic importance of Ireland's water resources, as clean water is essential for creating a healthy society and supporting a growing economy. It is essential that there is a resilient water supply to serve the existing population and the additional 1 million people projected by 2040. The National Planning Framework targets set out a planning framework to grow the five major cities of Ireland; Dublin, Cork, Limerick, Galway and Waterford. A target of 50% of future population and employment growth with be focused in the existing five cities and their suburbs. The targeted growth for the Dublin area is 20-25% and 50-60% in the other four cities. Ireland's larger towns, villages and rural areas will then make up the other 50% of targeted population growth. A range of complementary strategies in the context of planning this future growth are identified to achieve more balanced and sustainable growth such as new homes, new jobs, amenities and transport links in order to attract increased population.

The draft Framework Plan includes an assessment of the aspects influencing future demand for water including:

- Existing household consumption patterns as per property consumption (PPC) and individual or per capita consumption (PCC);
- Forecast population;
- Forecast consumption; and
- Non-domestic consumption forecasts.

Table 6.2 – Population growth rate of settlements based on the National Planning Framework

Settlement/type of settlement	Percentage population growth 2019 to 2044 (%)	Comment
Dublin city and suburbs	22.5	Growth from 1,173,179 in 2016 to 1,437,000 in 2040
Cork city and suburbs	55.3	Growth from 208,669 in 2016 to 324,000 in 2040
Galway city and suburbs	55.1	Growth from 79,934 in 2016 to 124,000 in 2040
Limerick city and suburbs	55.0	Growth from 94,192 in 2016 to 146,000 in 2040
Waterford city and suburbs	55.1	Growth from 53,504 in 2016 to 83,000 in 2040
Towns with population over 10,000 in 2016	40 (Western region) 25 (other regions)	40% growth assumed for Letterkenny, Sligo, Castlebar, Cavan and Ballina in Western region 25% growth assumed for towns in other regions
Towns with population between 1,500 and 10,000	25 (specific towns) 15 (other towns)	25% growth assumed for Carrick on Shannon, Monaghan, Nenagh and Roscommon 15% growth assumed for other towns
Settlements with population <1,500	15	15% growth assumed for all settlements with population <1,500

Economy

The Government's Capital Investment Plan 2016-2021, published by the Department of Public Expenditure and Reform (2017), outlines the investment in capital infrastructure over that period. The Capital Investment Plan combines investment from the Exchequer, Public Private Partnerships and State-owned investment accumulating to €27 billion.

> Key Action: Community Engagement (EPA, 2016a)
>
> Keep communities informed and engaged and provide support in terms of the protection and improvement of the environment.

The Irish economy has experienced considerable growth after the recession over the last few years. Ireland's economy is anticipated to grow throughout the plan period.

The education attainment figures give a good indication of sectorial economies which are set to continue to grow in the coming years in Ireland. The healthcare, accommodation and food industries will be reliant on a secure supply of water; therefore, increased demand looks likely to continue. Similarly, a high increase in the number of qualifications obtained in information and communication could have an impact on water demand; there has been an increasing number of companies looking at Ireland as a potential location for data centres, which are potentially large water users.

As the population grows and the economy strengthens, it is likely that an increased water supply will be needed in order to facilitate this growth. The greatest demand is expected to come from urban areas.

The agri-food industry, a sector which has high water demand and is reliant on a good quality water supply, has played an important role in Ireland's economic recovery to date (Department of Agriculture, Food and the Marine, 2015). The agri-food industry has targeted a 60% increase in primary production over the coming decade (Department of Agriculture, Food and the Marine, 2015), therefore, water demand from this sector can be expected to increase further in the coming years.

Non-domestic demand such as water required in the agri-food industry is considered when calculating the supply demand forecast for the draft Framework Plan, however there are significant differences in water use trends amongst non-domestic customers across Irish Water WRZs. This is because water use at non-domestic properties varies enormously from sector to sector, and from property to property. The consumption volumes are primarily related to economic factors, water-use intensity and how this is changing, rather than to numbers of business customers. An allowance for non-domestic growth will be required for towns and cities identified as strong growth areas in Project 2040. For example, regional cities such as Athlone, Cork City, Drogheda, Dundalk, Galway City, Letterkenny, Limerick City, Sligo and Waterford are identified in the NPF as strong growth areas with an expected population growth of 50% by 2040. A 10% growth in non-domestic demand will be applied to these regional centres over the 25 years. For other areas, it is assumed that there will be no significant increase in non-domestic demand.

Tourism and recreation

Revenues from the tourism industry have increased in the last 10 years, and with the anticipated €55 million investment in the Irish tourism industry, as outlined in the Tourism Action Plan 2016-2018, it is anticipated that this growth will continue. (Department of Transport, Tourism and Sport, 2016)

Many of the County Development Plans report that the growth of tourism plays a major role in future development. In addition, infrastructure plans such as those at Dublin Airport (a new runway) and Dublin Port (increased cruise liner capacity) will facilitate increased tourist numbers into Ireland.

The National Strategy for Angling Development 2015-2020 (Inland Fisheries Ireland, 2015) governs the protection of angling infrastructure, and delivers a range of investments, innovations and promotions up to 2020. One of the desired outcomes of Fáilte Ireland's (2016) five-year Tourism Strategy is to encourage "Engaging with the Outdoors" by creating "opportunities for outdoor activity businesses". Therefore, the future security of water supply and the quantity and quality of waterbodies in Ireland are key to the development of the tourism industry.

Human health

The Government is aware of ongoing health trends, and in 2013, the Healthy Ireland Framework (Department of Health, 2013) was adopted by the Government in response to Ireland's changing health and wellbeing profile. The four high-level goals to improve health in Ireland set out by Healthy Ireland going forward are:

- Increasing the proportion of Irish people who are healthy at all stages of life;
- Reducing health inequalities;
- Protecting the public from threats to health and wellbeing; and
- Creating an environment where every sector of society can play its part in achieving a healthy Ireland.

The health of the population is inextricably linked to a healthy environment; it is reliant on access to clean water. European Union drinking water standards, WFD objectives and the transposed Irish legislation should ensure that drinking water quality continues to improve.

6.2.3 Key issues relating to the Plan

The key issues in relation to population, economy, tourism and recreation and human health are as follows:

- Population and economic growth will increase the demand for water within Ireland;
- Inward investment in Ireland, industrial growth and growth in the agricultural sector will increase the demand for water within Ireland;
- Age structure, household sizes, growth in education and employment in particular business sectors may also influence water requirements within Ireland;
- Growth in the tourism industry and the continued number of international tourists coming into the country will influence the demand for water within Ireland, and increasing security of supply of water will aid development of the tourism industry;
- The location of important tourist attractions and recreational areas will influence the location of water resource options;
- The construction of water resource options may cause temporary disruption to tourist attractions or recreational areas in the form of, for example, noise, disruption to services and utilities and traffic;
- Potential for loss or gain of public amenity as a result of development;
- Health risks associated should there be an inability to provide clean and safe drinking water;
- Patterns for settlement and economic growth will influence the demand for water and, in turn, the location of water resource options; and
- The construction of water resource options may cause temporary disruption to the local community in the form of, for example, noise, dust, disruption to services and utilities and traffic.

6.2.4 Baseline information sources for the Strategic Environmental Assessment

The assessment in relation to population, economy, tourism and recreation, and human health will use the following information sources:

- Ordnance Survey Ireland Mapping;

- CSO;
- Health Service Executive;
- Department of Health;
- World Health Organization;
- National Spatial Strategy for Ireland 2002-2020 (including the new National Planning Framework) (Department of the Environment and Local Government, 2002);
- Capital Investment Plan 2016–2021 (Department of Public Expenditure and Reform, 2017);
- Irish Water's WSSP;
- Department of Transport, Tourism and Sport;
- Fáilte Ireland; and
- National Trails Office.

6.2.5 Scope of the assessment

Population increases and the ability to continue to supply clean and safe drinking water are not only drivers for the Framework Plan, but vital to the health of the population and the economic development of the country. Therefore, population, human health and the economy has been scoped into the SEA.

The Framework Plan will directly deal with the security of water supply in Ireland, and future water resource management options could affect the enjoyment of areas for tourism and recreation, either directly or indirectly, positively or negatively. Direct impacts could include severance of footpaths and changes to water levels or water quality. Subtler, indirect changes could include changes to the landscape character, altering the attraction or perception of an area. Some water resource options could have the potential to create opportunities for further recreation. Therefore, tourism and recreation are also scoped into the assessment.

6.3 Water environment

6.3.1 Introduction

Ireland's rivers, lakes, estuaries, seas and groundwater provide water to sustain many of their core social and economic activities whilst providing drinking water to the population. In Ireland, there is over 70,000km of river channel, 12,000 lakes, 850km^2 of estuaries and 13,000km^2 of coastal water (EPA, 2016a). Whilst most of Ireland's bedrock is classified as an aquifer, it is relatively poor at storing and transmitting groundwater, thus limiting the volumes available for abstraction and in some cases resilience during dry periods. According to EPA, groundwater provides 20–25% of all water supplies (EPA, 2016a) but 17% of Irish Water drinking water supplies.

Water Framework Directive

One of the key instruments in the protection of water resources is the WFD. This Directive aims to maintain "High" and "Good" status waters and prevent deterioration in the status for all waterbodies, including rivers, lakes, estuaries, coastal waters and groundwater. The WFD is transposed into Irish law by a number of regulations, including:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009);
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010);

- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010);
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011); and
- European Union (Water Policy) Regulations 2014 (S.I. No. 350 of 2014).

The WFD requires the protection of the ecological status of river catchments, including water quality and conservation of habitats for ecological communities. One of the primary objectives of the WFD is to promote sustainable water use based on long-term protection of available resources and aims to contribute to mitigating the effects of floods and droughts and "*thereby contribute to the provision of good surface water and groundwater as needed for sustainable, balanced and equitable use*".

Inland and Marine Waters (EPA, 2016a)

The current quality of water in Ireland is considered among the best in Europe. However, as acknowledged in the EPA report, there are a number of issues that need to be addressed to bring all waterbodies to a satisfactory level and to continue to protect waterbodies which are currently in good condition.

Ireland's RBMP was produced as part of the WFD requirements and is key to the protection, improvement and sustainable management of the water environment in Ireland. The first six-year cycle ran from 2009 to 2015 and prepared plans and programmes of measures for each of the eight River Basin Districts in Ireland. The second cycle of RBMPs, running from 2015 to 2021, has merged the Eastern, South Eastern, Western, South Western and Shannon Districts to form one national River Basin District. The North Eastern, North Western and Neagh Bann River Basin Districts remain the same, and a single administrative area will be established in the Republic of Ireland for these areas. The consultation period for the draft RBMP (second cycle) closed in August 2017, and the final plan was published in April 2018.

The second RMBP aims to learn from those aspects which did not progress as well as they had been expected to. The second RBMP benefitted from a stronger, more integrated approach to public consultation and engagement. The Government is introducing new initiatives and policies to address many of Irish Water's water-quality challenges in a more coherent and effective way, building on the (sometimes overly ambitious) measures implemented during the first planning cycle by using a better developed evidence base. The RBMP has implemented more realistic measures in addition to supporting measures where necessary.

The RBMP sets out the objectives, targets and measures to improve water bodies throughout Ireland which the Framework Plan must be in line with. Additionally, the plan sets out an economic analysis of water use in Ireland.

Water Framework Directive status

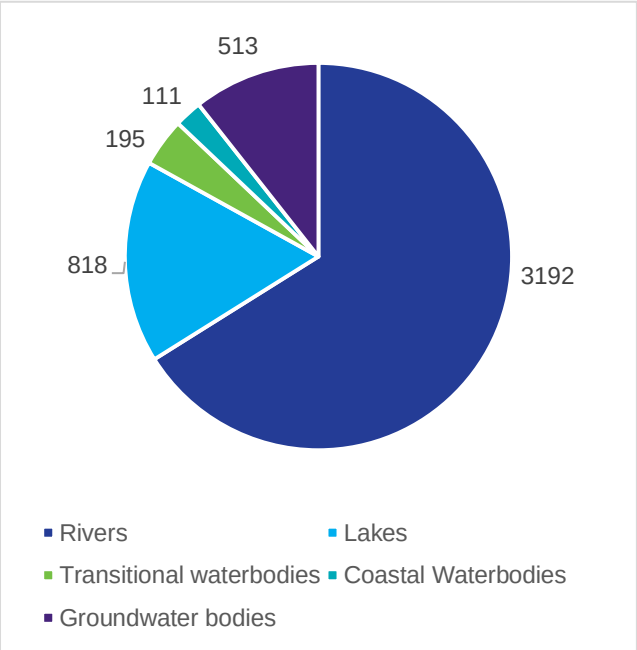


Figure 6.4 – WFD waterbodies

There are 3,192 rivers, 818 lakes, 195 transitional waterbodies, 111 coastal waterbodies and 513 groundwater bodies classified as WFD waterbodies[12] (Figure 6.4). Of the surface water bodies, 33 are currently classified as heavily modified and 15 are currently classified as artificial waterbodies. WFD classification consists of chemical and ecological status. There are five classes of WFD status for surface water bodies and two classes for groundwater bodies, and the status of each waterbody is determined by that of the poorest quality element of that waterbody.

The river network consists of 3,193 monitoring sites covering 2,345 river waterbodies. Within the lakes network there are monitoring sites at 216 lakes and 9 reservoirs. The transitional waters network consists of 80 monitored waterbodies, and the coastal waters network consists of 43 monitored waterbodies. The groundwater monitoring network consists of 332 monitoring sites.

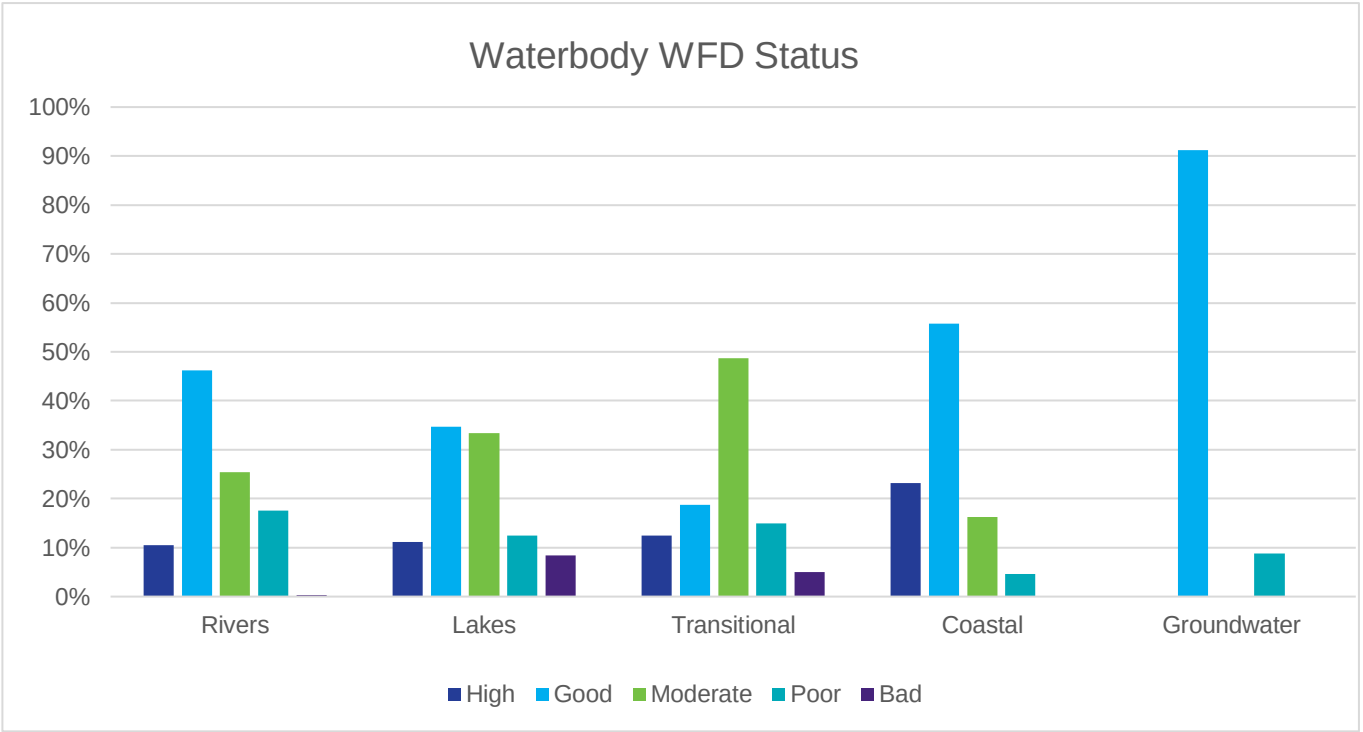


Figure 6.5 – Percentage of WFD Waterbodies in Ireland at each WFD status (2010-2015) (Source: RBMP (2018 - 2021))

Figure 6.5 summarises the WFD status of all monitored waterbodies within the Study Area (both surface water and groundwater).

[12] Department of Housing, Planning and Local Government, River Basin Management Plan for Ireland 2018 – 2021 https://www.housing.gov.ie/sites/default/files/publications/files/rbmp_report_english_web_version_final_0.pdf

Over 50% of Irish river and coastal waters are at “Good” or “High” status, whereas 50% of estuarine and lacustrine waters are at “Moderate” or lower status. A long-term trend that has been previously observed is the decline in the number of “High” status river waterbodies (DHPLG, 2017). Measures aimed to protect and enhance “High” status waters have therefore been developed in recent years to address the significant individual and in-combination pressures. These include the Green, Low-Carbon, Agri-Environment Scheme, forestry measures, the domestic wastewater treatment system inspection plan and the Nitrates Action Programme. (Department of Housing, Planning, Community and Local Government, 2018).

Four of the 297 waterbodies were at “Poor” chemical status because they exceeded standards for metals (cadmium, lead and nickel), pesticides (atrazine and simazine) and the plasticiser Di(2ethylhexyl)-phthalate (Department of Housing, Planning, Community and Local Government, 2018).

It is generally understood that mercury and polycyclic aromatic hydrocarbons are widespread in the environment, a trend seen globally and in the EPA monitoring data for the WFD.

Water Framework Directive protected areas

Protected areas under the WFD are areas that have been designated as needing special protection because of their particular sensitivity. The register of protected areas required under Article 6 includes the types of protected areas set out in Table 6.3.

Table 6.3 – WFD protected areas

WFD protected area	Description	Current trend (River Basin Management Plan 2018-2021)
Drinking water sources	Designated areas for the abstraction of water intended for human consumption under Article 7 of the WFD	The quality of drinking water following treatment for over 99% of samples complied with microbiological and chemical standards. Of the 1,277 public water supply sources, 61 indicated elevated levels of pesticides and three indicated elevated levels of nitrate.
Shellfish areas	Designated areas for the protection of economically significant aquatic species	Dissolved metals complied with the Environmental Quality Standards for the period 2009 to 2015 in most instances. The majority of designated shellfish waters are meeting the E. coli guide values.
Bathing waters	Bodies of water designated as recreational waters, including areas designated as bathing waters under Directive 76/160/EEC	Of the 134 bathing waters, 128 (93.4%) met the EU mandatory values.
Nutrient sensitive areas	Areas designated as vulnerable zones under Directive 91/676/EEC and areas designated as sensitive areas under Directive 91/271/EEC	Of the 72 agglomerations, 47 were identified as having areas downstream showing evidence of nutrient sensitivity.
Water dependent habitats or species	Designated areas for the protection of habitats or species where the	There are 44 different water dependent habitat types and 22 water dependent species, of these:

WFD protected area	Description	Current trend (River Basin Management Plan 2018-2021)
	maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 Network designated under Directive 92/43/EEC and Directive 79/409/EEC and codified by Directive 2009/147/EC	• Five water dependent habitats (11%) are deemed to be at Favourable Conservation Status • Eleven water dependent species (50%) are at Favourable Conservation Status

Water Framework Directive risks and pressures

The RBMP outlined that of the waterbodies (river and lake waterbodies) assessed to date:

- 44% are "Not at Risk";
- 30% are "At Risk" of not meeting their environmental objective of "Good" or "High" status; and
- 26% are currently under review.

The RBMP identified and outlined a number of key pressures on "At Risk" waterbodies. The percentage of "At Risk" waterbodies affected by each key pressure is as follows (those in bold are of particular relevance to the Framework Plan):

- Agriculture[13] (53%);
- Hydromorphology[14] (24%);
- Urban wastewater (20%);
- Forestry (16%);
- Domestic wastewater (11%);
- Urban runoff (9%);
- Peat (8%);
- Extractive industry (7%);
- Mines and quarries (6%); and
- Other (13%):
    - Land use planning;
    - Flood risk;
    - Climate change;
    - Lead in drinking water;
    - Hazardous chemicals;
    - Invasive species; and
    - Water abstraction.

Hydromorphology, climate change and water abstractions are of particular relevance to the Framework Plan because hydromorphological characteristics, vulnerability to climate change and the extent of existing abstractions or capacity to cope with increased or new abstractions of any watercourse are key when developing existing and new sustainable and efficient sources.

[13] It should be noted that, while agriculture and land management can influence water quality, other industries/urban and non-farming rural sources can also influence water quality.

[14] The pressure relates to physical modification or damage to habitat and natural river/lake processes, changes functions causes by channelisation, land drainage, dams, weirs, barriers and locks, overgrazing, embankments, and culverts.

The RBMP states that 47% of “At Risk” waterbodies are subject to one single key pressure, and 53% are subject to more than one key pressure.

Water abstractions

Irish Water is currently abstracting from around 1,090 abstraction points, divided approximately into 17% groundwater and 83% surface water.

It is a requirement of the WFD that waters used for the abstraction of drinking water are protected to avoid deterioration in quality as a result of contamination from substances which would lead to the need for more treatment. The EPA has identified stretches of some rivers and lakes as rivers/lakes for drinking water, and the entire Republic of Ireland is protected as groundwater for drinking water (Drinking Water Protected Areas).

In addition, the WFD requires that abstractions of surface water or groundwater which are likely to have a significant effect on water status are regulated. Under the recent RBMP, the following measures were outlined:

- The EPA will undertake further assessment of the 6% of waterbodies (rivers, lakes and groundwater) identified as potentially at risk of over-abstraction[15];
- The Department for Housing, Planning, and Local Government (DHPLG) intends to progress a legislative framework to establish a register for water abstractions greater than 25m^3/day; and
- DHPLG will consult on a framework for the regulation of relevant abstractions which aims to ensure continued sustainable use of water resources.

Water availability and climate change

A range of challenges in relation to water availability in Ireland is expected as a result of climate change. The RBMP has detailed the following considerations in relation to water supply:

- Significant reductions are expected in average levels of annual, spring and summer rainfall;
- The more frequent occurrence of dry spells will result in increased pressure on water supply;
- The number of very intense storms is projected to increase, with ensuing risks to water infrastructure; and
- Sea level rises and temperature increases will create an increased risk to coastal aquifers and water supply.

Groundwater Directive

The EPA states that In Ireland, groundwater sources account for 20–25% of water supplies nationally. The Groundwater Directive (2006/118/EC), transposed by the European Union (Drinking Water) Regulations 2014, provides the EPA with the responsibility to manage the quality of public water supply. Irish Water must notify the EPA of drinking water non-compliances or risks to public health from public water supply (EPA, 2016a).

The WFD also provides requirements for preventing the deterioration of groundwater, which include the assessment of groundwater bodies over a six-year cycle. There are two classes of ecological status in groundwater: “Good” and “Poor”. Between 2010 and 2015, 9% of groundwater bodies had

[15] The EPA is currently reviewing the risks to these waterbodies from abstraction pressures. It is likely that the actual level of impact will be lower than 6%.

"Poor" chemical or quantitative status, a decrease on the first RBMP cycle (2003–2008) in which 14% of groundwater bodies recorded "Poor" status.

Floods Directive

Flooding is becoming a bigger issue in Ireland; the frequency of flood events has been increasing and, with climate change, is expected to increase further. Increased flooding can cause pressure on drains and sewers and can affect water quality.

> Key Action: Restore and Protect Water Quality (EPA, 2016a)
>
> Continue to implement measures to achieve ongoing improvements to the environmental status of waterbodies.

The Floods Directive (2007/60/EC) required member states to develop Flood Risk Management Plans for areas of existing and future potentially significant flood risk. The Floods Directive was transposed into Irish law by the EU (Assessment and Management of Flood Risks) Regulations 2010 and sets out the responsibilities of the Office of Public Works (OPW). The OPW has been implementing the Directive mainly through the Catchment Flood Risk Assessment and Management (CFRAM) Programme, through which 29 draft Flood Risk Management Plans have been developed. Approximately 300 Areas for Further Assessment have been established along with a range of measures to reduce or manage the flood risk within each catchment. CRFAMS mapping for all Areas for Further Assessment is available to view on the CRAMS website (OPW, 2018).

The Marine Strategy Framework Directive is similar to the WFD, but it provides for the protection of the marine environment beyond the areas considered under the WFD. The Marine Strategy Framework Directive requires Ireland to reach good environmental status in the marine environment by the year 2020. Since 2016, a programme of measures and monitoring programme have been in place to facilitate the overarching aim of the Directive, which is to protect and preserve the marine environment.

6.3.2 Future trends and evolution of the baseline without the Plan

The target of 13.6% improvement in ecological status for surface waters within the RBMP from 2009 to 2015 has not been achieved. Therefore, there is a need to improve the implementation of the new water management planning in the second cycle RBMP.

Climate change could also alter the water environment of Ireland significantly. Rising sea levels, hotter, drier summers, ocean acidification and ocean deoxygenation are the key pressures on the water environment. The most obvious direct impact is changes in river flows. Flood events are also likely to become more frequent; these are likely to seriously affect marine and coastal ecosystems and existing water infrastructure.

6.3.3 Key issues relating to the Plan

The key issues in relation to the water environment are as follows:

- Potential to affect or impede the WFD objectives from the construction and operation of water resource options; and
- Potential for climate change and the effects of climate change, such as increased flooding or drought, to impede Irish Water's ability to meet water supply.

6.3.4 Baseline information sources for the Strategic Environmental Assessment

The assessment in relation to water will use information from the following sources:

- WFD data from the EPA; and
- CFRAM Study and associated Flood Risk Management Plans (OPW, 2016).

6.3.5 Scope of the assessment

The Framework Plan has the potential to influence the quantity and quality of water within surface water and groundwater bodies, such as rivers and lakes, through abstraction or discharges. The assessment may also need to consider the potential transboundary effects on water catchments and river basins which are located both in Ireland and Northern Ireland. Therefore, the water environment (both surface water and groundwater) was scoped into the assessment.

6.4 Biodiversity, flora and fauna

6.4.1 Introduction

There are a number of Nature Conservation designations in Ireland at an international, European or national level, including:

- At international level:
    - UNESCO (United Nations Educational, Scientific and Cultural Organisation) World Heritage and Biosphere sites; and
    - Sites designated as Wetlands of International Importance or RAMSAR sites.
- At a European level:
    - SACs; and
    - SPAs.
- At a national level:
    - National Heritage Areas (NHAs) and proposed National Heritage Areas (pNHAs); and
    - Other designations such as Salmonid Waters and Nature Reserves etc.

The Habitats Directive seeks to ensure the appropriate conservation of natural habitats and of wild fauna and flora. The Habitats Directive (92/43/EEC) was transposed into Irish law in 1997 by the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997). The Regulations were subsequently revised and consolidated in the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). Under the Directive, Ireland, like other member states, was required to establish an ecological network of SACs (sites which host a range of natural habitats and species listed in Annex I and II of the Directive) The Birds Directive (2009/147/EC) ensures the appropriate protection of SPAs (sites which are classified for rare and vulnerable birds listed in Annex I of the Directive).

There are approximately 439 SACs and 165 SPAs in Ireland, covering a terrestrial area of 906,000ha. Roughly 53% are land based designations, the remainder being marine or other aquatic environments; rivers make up just over 6% of designations (NPWS, 2016) (see Figure 6.6). The 165 SPAs are designated for the protection of bird species and their habitats and encompass over 570,000ha of marine and terrestrial habitats (NPWS, 2016). Six offshore SACs cover 1,042,000ha of marine habitat. Given the potential for transboundary impacts to SACs and SPAs in Northern Ireland, these sites are also considered and are listed in the NIS. There are a total of 58 SACs and 16 SPAs within Northern Ireland. Figure 6.6 shows the locations of SACs and SPAs located within Ireland and Northern Ireland.

The National Parks and Wildlife Service (NPWS) monitors and assesses the status of protected species (Annex II of 92/43/EEC) and habitats in Ireland (Annex I of 92/43/EEC). This takes into account the status of the range, area, structure, functions and future prospects of each species/habitat before defining an overall status for each. A total of 59 different habitats and 61 species are listed. The overall status of Annex I habitats as of 2013 are as follows (NPWS, 2019):

- 15% as “Favourable”;
- 46% as “Inadequate”; and
- 39% as “Bad”.

Nature (EPA, 2016a)

The majority of Ireland’s protected habitats are reported as “inadequate” or “bad” in terms of conservation status. However, levels of many protected species are reported to be stable.

The EPA report outlines that considerable effort and resources will be required to improve the status of habitats and species and will be dependent on land use changes, climate change, the inclusion of biodiversity in economic development decisions, improvement of co-ordination across regulatory bodies and the effective implementation of legislation.

The overall status of Annex II species as of 2019 is as follows:

- 57% as “Favourable”;
- 15% as “Inadequate”;
- 15% as “Bad”; and
- 13% as “Unknown”.

There are 155 NHAs designated under the Wildlife Act 1976 across the country, the majority of which are bog related, and 630 pNHAs which have yet to be statutorily proposed or designated (NPWS, 2016). Other ecological designations across Ireland include:

- Six National Parks;
- 45 sites designated as Ramsar sites;
- Two designated UNESCO World Heritage Sites and a further seven heritage sites currently listed as tentative, but yet to be officially designated; and
- A number of protected sites, such as Nature Reserves or Wildlife Refuges, which are outlined and identified in the various County Development Plans.

Under the EU Biodiversity Strategy, Ireland must halt biodiversity loss by 2020. On the back of this strategy, Ireland has published its second National Biodiversity Plan, Actions for Biodiversity 2011–2016 (Department of Arts, Heritage and the Gaeltacht, 2011). This set out several Strategic Objectives and over 100 actions to achieve these objectives. In 2015, an Interim Review of the 2011–2016 Plan (Department of Arts, Heritage and the Gaeltacht, 2015) was published and indicated that the majority of targets were implemented or that implementation was in progress. Specific targets which required further action were highlighted. The third National Biodiversity Plan 2017-2021 was published in October 2017 and builds on the actions not completed in the previous plan.

In response to the Biodiversity Strategy, the EU published the “Green Infrastructure: Enhancing Europe’s Natural Capital” strategy. It aims to *“promote the deployment of green infrastructure in the EU in urban and rural areas*”. At a national level, the Department of Arts, Heritage and the Gaeltacht; the Heritage Council; NPWS; and the Sustainable Development Council are the key stakeholders who provide information on, and deliver, green infrastructure in Ireland. The Sustainable Development Council published “Creating Green Infrastructure for Ireland: Enhancing Natural Capital for Human Wellbeing” in August 2010, which sets out how a network of green spaces can be developed to benefit natural heritage and biodiversity as well as the greater economy and society. The National

Spatial Strategy (Department of the Environment and Local Government, 2002) emphasises that a "Green Structure" should be put in place in regional level plans and strategies with the aim of preventing urban sprawl; reducing the loss of agriculture and other land to urban uses; protect rural identity; as well as create a green setting for cities and towns which will provide people with opportunities for outdoor recreation.

Biodiversity can be affected by proposals in a water resource plan such as abstraction and infrastructure construction and the biodiversity strategy provides baseline information informing identification of future trends and identification of the likely evolution of the baseline.

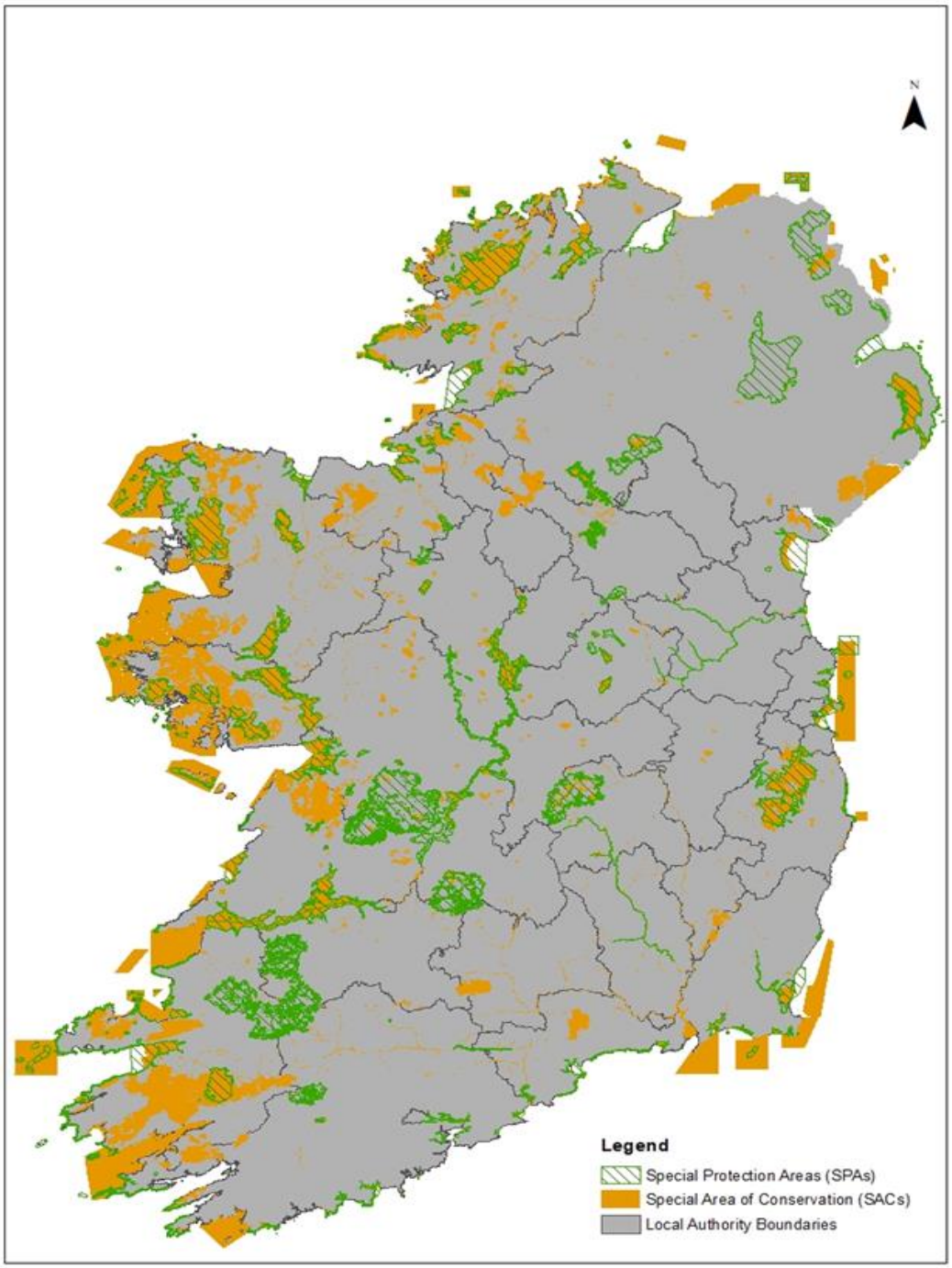


Figure 6.6 – Special Areas of Conservation and Special Protection Areas

Aquatic biodiversity

Aquatic biodiversity encompasses freshwater ecosystems including lakes, ponds, reservoirs, rivers, streams, groundwater, wetlands, coastal and marine; therefore, it will be significant to the Framework

Plan. Aquatic species are dependent on clean water and suitable flows; macro-invertebrates and some species of fish, such as Atlantic salmon, are therefore good indicators of the condition of the overall water environment. Water supply can involve modification to watercourses, such as new abstractions or increases to existing abstraction regimes, which can reduce water flows and, in turn, reduce a watercourse's potential to support fish life.

The NPWS has identified 44 different water dependent habitat types and 22 water dependent species in Ireland. Of these, the freshwater pearl mussel, is considered to be a highly sensitive surface water dependent species in Ireland, and coastal lagoons a highly sensitive water dependent habitat (EPA, 2016a). Of the water dependent habitats, 11% are deemed to be at Favourable Conservation Status, while 50% of water dependent species are at Favourable Conservation Status.

Invasive species

In addition to the objective to halt biodiversity loss, Ireland has a responsibility to prevent the spread of invasive species. An invasive species is a non-native species which has a tendency to spread to an extent determined to cause damage to the environment, the economy or human health in the country into which it has been introduced. Invasive species can dominate and marginalise native species, lowering the value of the overall ecosystem. Invasive species (including aquatic species) in Ireland are controlled under regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011. The 'Third Schedule' of the regulations provides an extensive list of the non-native species subject to those restrictions, which includes some of the following:

- Asian clam* (*Corbicula fluminea*);
- Zebra mussel* (*Dreissena polymorpha*);
- Giant hogweed (*Heracleum mantegazzianum*);
- Nuttall's pondweed* (*Elodea nuttallii*);
- Himalayan balsam (*Impatiens glandulifera*);
- Giant rhubarb (*Gunnera tinctoria*);
- Japanese knotweed (*Reynoutria japonica*); and
- Rhododendron (*Rhododendron ponticum*).

The National Biodiversity Data Centre have written a report, 'Ireland's invasive and non-native species', which provides an overview of the apparent trends in Ireland for the first time. The study assessed 377 non-native species; of these, 21% occur in freshwater environments. Freshwater environment has had the greatest rate of invasive species increase since 1980 (National Biodiversity Data Centre, 2014).

6.4.2 Future trends and evolution of the baseline without the Plan

Increasing land use change, such as urbanisation, afforestation and its associated management, and changing agricultural practices are likely to continue to pose risks to the quality and distribution of aquatic and terrestrial habitats and species; both within and outside protected sites. However, the continued implementation of measures required in achieving the objectives of the WFD and the requirements of the Habitats Directive are likely to benefit protected sites and the wider aquatic environment into the future.

Key Action: Nature and Wild Places (EPA, 2016a)

Continue to protect pristine and wild places which are key to biodiversity and provide sustainable tourism opportunities.

The Conservation Management Plans and conservation objectives which are being developed by the NPWS for many of the European sites, as well as other management plans for declining species (for example, Species Management Plans), will help protect biodiversity resources going forward.

Future trends will be influenced by changes and/or additions to existing designated sites (SACs, SPAs and NHAs). A number of pNHAs may be reviewed and upgraded to NHAs and, similarly, sites listed as tentative on the UNESCO Heritage List may be upgraded to designated heritage sites.

The EPA's report on alien invasive species and the continuing development of the National Biodiversity Data Centre National Invasive Species Database will aid in the documentation of the distribution of invasive species in Ireland. The National Biodiversity Centre report has indicated that freshwater environments are more likely to have a high impact non-native species introduced in the future. This study also looks at the potential invaders to Ireland. To date, the majority of invasive species in Ireland are plants, but future trends may be towards invertebrate and vertebrate species, with the threat from high impact invertebrates posing the greatest concern for freshwater environments. (National Biodiversity Data Centre, 2014). These reports and datasets will go towards the implementation of the recent European legislation on halting the spread of invasive species (Regulation 1143/2014, entered into force on 1st January 2015).

6.4.3 Key issues relating to the Plan

The key issues in relation to biodiversity are:

- Potential to affect protected areas, including European sites (SACs, SPAs and Ramsar sites), national sites (NHAs, pNHAs) and other sites of regional or local importance (National Heritage Sites, Wildlife Reserves);
- Potential for protected sites to pose constraints to planning of water resource options;
- Potential to impact biodiversity in non-designated areas; and
- Potential to spread invasive species during construction and operation.

6.4.4 Baseline information sources for the Strategic Environmental Assessment

The assessment of biodiversity will use information from the following sources:

- NPWS;
- UNESCO;
- The Ramsar Convention;
- Department of Agriculture, Food and the Marine;
- Invasive Species Ireland;
- Biodiversity Data Centre National; and
- Invasive Species Database.

Land and Soil (EPA, 2016a)

The majority of the Irish landscape comprises agricultural land, wetlands and forests (CORINE). Land use has changed significantly in Ireland since the early 1990s. A reduction in agricultural land and peatland has been influenced by increased forested land and artificial areas.

National policies for forestry, agriculture, peatlands and the built environment will continue to influence land use change and resource management. Land use changes will be heavily influenced by agricultural policies (Food Harvest 2020 and the 2025 Agri-food strategy) and by the National Forestry Programme.

6.4.5 Scope of the assessment

Many habitats and species could be affected by the proposed plan, both directly through construction of options or indirectly by changes to water quality or quantity. Therefore, biodiversity, flora and fauna were scoped into the assessment. The SEA will focus on international, national and local designated sites with some focus on specific habitats and species within the AA NIS.

6.5 Material assets

6.5.1 Introduction

SEA legislation includes “material assets” as a topic to be addressed in the SEA. However, it does not clearly define what this topic includes. For the purpose of this SEA Scoping Report, material assets are considered to be the natural and built assets (non-cultural assets) required to enable a settlement to function as a place to live and work, in giving them material value.

Natural assets can include agricultural lands, peatlands and forestry. Built assets can include infrastructure relating to energy generation and distribution, water supply and wastewater management, transport, waste management, buildings, and residential and social infrastructure such as housing, healthcare facilities, schools, greenspace and cycle paths.

National natural assets

The total land cover of Ireland is 6.9 million ha, of which 4.5 million ha is used for agriculture, almost 68% according to the CORINE land cover report (EPA 2012). Of this, 81% is devoted to pasture, hay and grass silage, 11% to rough grazing, and 8.2% to crop, fruit and horticulture production (EPA, 2012) (see Figure 6.7). Valuable agricultural land is a key asset to the Irish economy; the agri-food sector generated 5.7% of gross value added (€13.54 billion), 9.8% of Ireland’s merchandise exports and provided 8.5% of national employment in 2015 (Teagasc, 2016).

Peatlands and wetlands are the second most widespread land cover type, covering almost one-fifth (20.6%) of the country; Bord na Móna own 7.5% of all Irish bogs (EPA, 2016a). Forest cover in Ireland is the lowest of all European countries according to Teagasc, with land cover of 11%. Coillte is a commercial, semi-state forestry company which owns over 445,000ha of land in Ireland (approximately 7%). County Wicklow has the highest forest cover in Ireland and County Meath has the lowest. Both forestry and peatlands are important assets to Ireland’s carbon sequestration. The National Peatlands Strategy (NPWS, 2015) and the Forestry Programme 2014-2020 (Department of Agriculture, Food and the Marine, 2015) set out the approach to peatland management and forestry in Ireland. The management of wetlands to reduce organic materials and suspended solids emissions into waterways would both lead to a higher raw water quality intake for drinking water supplies[16], as well as meet other public policy goals, including mitigating greenhouse gas emissions, controlling flooding, restoring both terrestrial and aquatic biodiversity, and restoring landscapes.

Water resource infrastructure can involve land-take affecting agricultural and forestry land. In addition, water resources and water quality are influenced by agricultural and forestry operations and land use within river and groundwater catchments. This can affect the availability and quality of water for supply.

National built assets

Irish Water operates and maintains approximately 749 WTPs, which deliver clean water through over 65,000km of pipelines, and over 1,000 WwTPs, which collect wastewater from an estimated 25,000km of sewer network.

Waste is managed at different WTPs in various ways; these range from on-site management of liquid streams to stockpiling of dewatered solid residuals on-site or removed from site for licensed disposal

[16] By reducing the generation of carcinogenic trihalomethanes in the water supply.

or recycling. The Waste Management Act 1996 governs the handling and disposal of solid residuals and prohibits the discharge of WTP solid residuals into receiving waters, setting out the need for disposal to an approved licensed facility. The requirements for the handling and disposal of liquid residual streams are exempt from having to hold a license under the Local Government (Water Pollution) Act 1977. Liquid residual discharges are based on the conditions imposed through the planning process; usually regarding the sampling, measurement and the parametric limitations on the discharged liquid residual. These conditions stem from the WFD objective to prevent further deterioration and to enhance the status of all waterbodies with the aim of achieving 'Good' status by 2015.

In Ireland, hydroelectric power plants make good use of water infrastructure to generate electricity. The most common type of hydroelectric power plant use a dam across a river to release the reservoir flow through a turbine. The biggest in Ireland are Ardnacrusha on the River Shannon, Ballyshannon on the River Erne and Poulaphouca on Blessington Lake.

Ireland's canals once played a significant role as a transport network. However, they are now mainly used for recreational and heritage purposes. Key canals are the Grand Canal, Royal Canal, Boyne Canal and Shannon-Erne Waterway.

There are five "Ports of National Significance" in Ireland: Dublin Port, Shannon Foynes, Port of Cork, Rosslare and Port of Waterford. There are also four "Ports of Regional Significance": Bantry Bay, Drogheda, Galway and Greenore.

Other significant transport infrastructure includes 100,000km of road network and 2,400km of railway. There are three main airports (Dublin, Cork and Shannon) and a number of regional airports, including Donegal, Galway, Kerry, Knock, Sligo and Waterford.

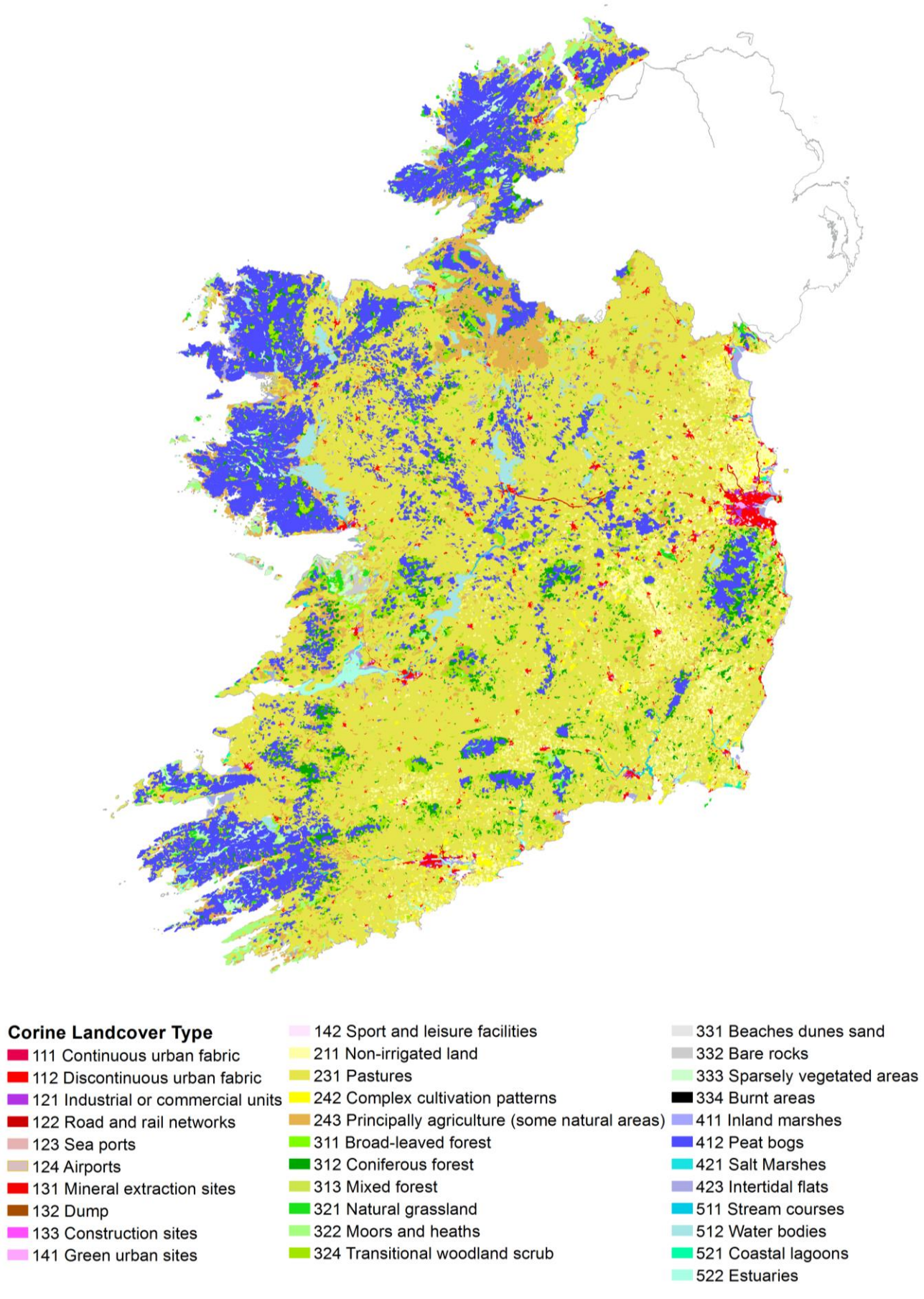


Figure 6.7 – CORINE Landcover Ireland 2012

6.5.2 Future trends and evolution of the baseline without the Plan

The Government's intention for the future development of Ireland is to maximise the use of valuable land for agriculture, business and society. Government policy is to bring the national forest cover up to 17% by 2030. The Department of Agriculture, Food and the Marine (2015) has prepared a series of schemes to meet the overall "Afforestation and Creation of Woodland" measure in the National Forestry Programme 2014-2020. Two strategies, Food Harvest 2020 and Food Wise 2025, have been implemented to develop the Irish agri-food sector. Both include a range of ambitious targets for the agri-food sector, which will result in an increase in the demand for water and pose challenges to water quality.

Local authorities have zoned land across Ireland for rural/agricultural use to protect and improve rural amenity and to provide for the development of agriculture. The growth of the agricultural sector in Ireland will present a challenge to Irish Water in relation to water quality. The EPA (2016) reported that agriculture was the suspected cause in 53% of cases of river pollution in the period between 2010–2012 in the State of the Environment Report and RBMP (2018). The EPA also reported an increasing trend in public water supplies affected by pesticides.

Waste (EPA, 2016a)

Ireland is gradually moving away from reliance on landfills through the increasing focus on waste prevention, reuse, maximising recycling and using waste as a fuel in replacement of fossil fuels. This is being achieved by government policy, which concentrates on waste as a resource. The report recognises that economic growth and an increase in construction will place increasing pressures on how waste is handled and managed.

The Government's Capital Investment Plan (Department of Public Expenditure and Reform, 2017) (worth €27 billion between 2016 and 2021) presents the investment in infrastructure in Ireland throughout the six-year period.

Irish Water's (2015) Business Plan 2015-2021 details a €5.5 billion investment in current infrastructure in order to deal with challenges such as compliance with drinking water standards, meeting demand and improving efficiency of the system. Nine deliverables have been set as part of their Business Plan, and the NWRP will play a role in achieving many of them, including:

- Delivering capital efficiency savings of €500 million; and
- Supporting economic growth in line with economic and spatial planning policy.

The local authorities have zoned land for utilities and strategic infrastructure, residential development and community-educational-institutional infrastructure. Within the Government's Capital Investment Plan 2016–2021 (Department of Public Expenditure and Reform, 2017), there are plans for over €3 billion investment in healthcare, including new intensive care units and facilities, and just under €3 billion investment in housing, including further investment in social housing and various other residential developments. Land zoning and Local Area Plans will have to be taken into consideration for future water resource management and potential WTPs and WwTPs.

6.5.3 Key issues relating to the Plan

The key issues in relation to material assets are as follows:

- Economic growth and development is likely to increase the demand for water within Ireland, particularly within urban populations;
- Strain on existing water services infrastructure to support greater water demand;
- Building materials used, their manufacture and management and/or disposal of waste generated from Irish Water's activities;

- Effects of construction of specific plan options on current infrastructure such as road/rail/waterway networks;
- Temporary or permanent loss of valuable agricultural land during construction and/or operation of specific options;
- Investment into new or expanded WTPs could increase residual waste;
- Effects of other infrastructural development (not related to the Framework Plan) on water quality in Ireland will present a risk/challenge for Irish Water; and
- Effects on other water abstractors.

6.5.4 Baseline information sources for the Strategic Environmental Assessment

The assessment in relation to material assets will use information from the following sources:

- Irish Water;
- Transport Infrastructure Ireland;
- Iarnród Éireann;
- CORINE Land Cover;
- Waterways Ireland; and
- Electricity Supply Board.

6.5.5 Scope of the assessment

The Framework Plan and specific options will consider existing water infrastructure in Ireland such as WTPs, pipeline infrastructure, reservoirs etc. It will also consider impacts on other infrastructure including, but not limited to, road and rail infrastructure, electricity generation and distribution infrastructure, and social infrastructure; including schools, housing and healthcare facilities. The Framework Plan will outline option types that may be on or close to valuable land or infrastructure. Therefore, material assets have been scoped into the assessment.

6.6 Landscape and visual amenity

6.6.1 Introduction

There is currently no published national level landscape mapping for Ireland. In accordance with the Planning and Development Act 2000 (as amended), all local authorities need to identify Landscape Character Areas within their Development Plans to ensure that defining features are protected and managed. There is no national classification system for Landscape Character Areas, as these are geographically specific and have their own distinctive character based on their location and surrounding environment. Some county councils have yet to formally document Landscape Character Areas. Many local authorities have incorporated landscape designation into their Development Plans, for example, in the form of protected views, prospects, landscape conservation areas and scenic routes. Similar to the Landscape Character Areas, there is no national standardised approach for designating these landscape features/sites.

The European Landscape Convention is the first international treaty to focus solely on landscape. The Convention promotes the protection, management and planning of European landscapes. The Irish Government ratified the Convention in 2002. The National Landscape Strategy 2015-2025 published by the Department of Arts, Heritage and the Gaeltacht (2015) was put in place to drive compliance with the European Landscape Convention by establishing principles that provide the high-level policy framework to achieve the Convention's objectives.

The landscape of Ireland is varied with a mix of lowland and upland, rivers, lakes and shores. The majority of uplands in Ireland are close to the coast. There are 45 peaks which exceed 750m and which are within 56km from the coast. However, most of the landmass of Ireland, particularly the centre, is low-lying land. Less than 5% of the total landmass lies above 500m and over 80% is below 200m.

The EPA CORINE Land Cover data series specifies that the dominant land cover type in Ireland is agricultural land, which accounts for over 68% of the national landmass, followed by peatlands and wetlands (covering 20.6%), and forestry and semi-natural areas (covering almost 11.5%). Forests in Ireland are relatively young, with almost 40% of total forest areas planted since 1990.

6.6.2 Future trends and evolution of the baseline without the Plan

The existing landscape is not expected to change significantly in the immediate future. The National Landscape Strategy will be used to aid compliance with the European Landscape Convention, and as part of this, a National Landscape Character Assessment is currently being developed. It is a high-level policy framework aimed at achieving a balance between the protection, management and planning of the landscape by way of supporting actions (DAHG, 2015 (now known as DCHG)). The Planning and Development (Amendment) Act 2010 defines the term “landscape” based on the meaning given in Article 1 of the European Landscape Convention which states “The landscape covers the national territory, including land, inland water and seascapes of each member state.” It refers equally to natural, rural, urban and peri-urban areas; from the outstanding to the degraded. It covers, in short, the entire physical environment as specified by each country upon ratification of the Convention.

Key Action: Implementation of Legislation* (EPA, 2016a)

Need to improve how plans/policies are tracked and the overall enforcement of environmental legislation.

*relevant to all aspects

The main changes to landscape and land cover in Ireland between the 2006 and 2012 CORINE programmes was afforestation. There was an increase of 0.13% in the national area covered by forestry and a resultant decrease in agricultural (0.12%) and peatland (0.04%) areas. There was also a small increase in industrial or commercial units, road and rail networks and construction sites. Given the projected trend for urbanization, and the government policy to bring the national forest cover to 17% by 2030, as detailed in Chapter 6.5.2, it is anticipated that these land cover trends will continue.

6.6.3 Key issues relating to the Plan

The key issues in relation to landscape and visual amenity are:

- Potential for permanent infrastructure to impact landscape and visual amenity temporarily during construction or permanently throughout operation; and
- Potential for water resource options to be constrained by the need to protect the landscape character and local visual amenity.

6.6.4 Baseline information sources for the Strategic Environmental Assessment

The assessment in relation to landscape will use information from the following sources:

- National Landscape Strategy for Ireland 2015-2025 (Department of Arts, Heritage and the Gaeltacht, 2015);
- CORINE Land Cover data; and
- County Development Plans (as appropriate).

6.6.5 Scope of the assessment

Landscape and visual amenity have the potential to be affected by the Framework Plan. Therefore, they have been scoped into the assessment.

6.7 Air quality and noise

6.7.1 Introduction

Air quality

Ireland's air quality is generally good in comparison to other EU member states, largely down to the prevailing Atlantic air flow and the absence of large cities and heavy industries. Ireland's air quality standards are dictated by the EU Cleaner Air for Europe (CAFE) Directive (2008/50/EC). The EPA is responsible for monitoring the nation's levels of air pollutants within four zones as follows:

- Zone A: Dublin;
- Zone B: Cork;
- Zone C: Other cities and large towns in Ireland; and
- Zone D: Rural Ireland.

Air Quality (EPA, 2016a)

Current air quality in Ireland is of an acceptable standard and remains within the European Union (EU) legislative and target values. However, ozone, particulate matter and polycyclic aromatic hydrocarbons are emerging as pollutants of concern in the short-term when compared with World Health Organization guidelines and European Economic Area reference level values. Levels of nitrogen oxide are also expected to increase. Under World Health Organization and EU estimates, approximately 1,200 deaths in Ireland are attributable to air pollution.

According to the most recent Air Quality in Ireland report, Ireland has not exceeded EU limits on air quality in recent years. However, there have been exceedances of the more stringent air quality indicators devised by the World Health Organization. For example, in 2015, PM_{10} (particulate matter with a diameter less than or equal to 10 microns) concentrations were below the EU limit at all stations, but World Health Organization air quality guideline values were exceeded on some occasions (EPA, 2016b).

In the State of the Environment Report, the EPA (2016) and World Health Organization estimated that more than 400,000 premature deaths are attributable to poor air quality in Europe annually, including 1,200 deaths in Ireland. Therefore, the EPA recognises the importance of the World Health Organisation's more stringent limits.

In general, the water industry is not a major contributor to air quality issues, although there is potential for contribution to local air pollution through Irish Water vehicles, generator plants and drinking water residuals treatment facilities. There is a requirement to comply with air pollution regulations and also identify potential opportunities for reducing emissions.

The biggest contributors to air pollution in Ireland are vehicle emissions, electricity generation, industry and agriculture (EPA, 2016a).

Noise

Noise is defined as unwanted sound and can be harmful to human and ecosystem health (World Health Organization, 2003). The Noise Directive (2002/49/EC), relating to the assessment and management of environmental noise, was transposed into Irish national legislation via the Environmental Noise Regulations 2006 (S.I. No. 140 of 2006). This Directive called for the development of strategic noise maps and action plans for major roads, railways, airports and cities. To date, these have been produced for the road network only.

The relevant planning authorities are required to prepare noise action plans designed as a means of managing land use planning, traffic management and control of noise sources. This has yet to be completed, but the EPA has now published guidance for local authorities on the content of the plans.

6.7.2 Future trends and evolution of the baseline without the Plan

Although air quality in Ireland is good, there is potential for emerging pollutants to rise above limits/targets in the future. The main contributors to emissions in Ireland are the transport and agriculture sectors. Agriculture emissions are projected to grow on an annual basis until 2020, which reflects the impact of Food Harvest 2020 and removal of the milk quota. In total, agriculture emissions are projected to increase by 12% by 2020 on current levels. Transport emissions are also projected to show strong growth over the period to 2020 with a 12–22% increase on current levels, depending on the level of policy implementation (EPA, 2013).

Future noise trends are difficult to predict. The Environmental Noise Regulations 2006 may be revised in future to enforce a stricter level of noise management, and further strategic noise maps and plans are to be developed.

6.7.3 Key issues relating to the Plan

The key issue in relation to air quality and noise is the generation of dust or noise during construction where this causes disturbance to sensitive receptors, such as in residential areas. It is anticipated that these impacts will be short-term and are not considered to be of major significance.

6.7.4 Baseline information sources for the Strategic Environmental Assessment

The assessment in relation to air quality and noise will use information from the following sources:

- EPA; and
- World Health Organization.

6.7.5 Scope of the assessment

Water resource and its associated infrastructure development is not a significant contributor to air pollution. Therefore, it is not considered to be relevant to water resource planning at the strategic level, nor will it influence the choice of option. On this basis, air quality was scoped out of the assessment. However, there is the potential that dust during construction could cause nuisance to nearby communities, and therefore this is scoped into the assessment as part of impacts on population and health and to biodiversity.

Noise has also been scoped out of the assessment, however, there is potential for short-term noise pollution during construction, in terms of noise disturbance to nearby receptors/communities. Due to the likely minor nature of these impacts with standard mitigation this will be considered as part of the assessment of impacts on population and health and on biodiversity.

Key Action: Climate Change (EPA, 2016a)

Need to accelerate the implementation of mitigation measures/adaptation to reduce greenhouse gas emissions/increase resilience to adverse climate impacts.

6.8 Climate change

6.8.1 Introduction

The National Policy Position on Climate Action and Low Carbon Development and the Climate Action and Low Carbon Development Act 2015 provide the policy framework for climate action at national level in Ireland. At EU and United Nations level, there are a number of strategies and policies that set out the requirements for national mitigation and adaptation. In summary, these policies and strategies are looking to minimise global temperature rise to 1.5°C. Ireland's aim is to achieve greenhouse gas emission reductions for non-Emission Trading Scheme[17] sectors by at least 20% of 2005 levels by 2020 and 40% of 1990 levels by 2030.

Climate Change (EPA, 2016a)

Ireland is considered particularly vulnerable to extreme weather events and sea-level rises caused by climate change.

Ireland has adopted its first NCCAF in 2012 which aims to ensure that adaptation actions are taken across all sectors from a national to local level to reduce vulnerability to climate change.

The DPLG is responsible for leading Sectoral Adaptation Plans for Water. In 2015, Ireland adopted the Climate Action and Low Carbon Development Act 2015 which provides for an approach to transition to a low carbon economy, by integrating the framework for two statutory plans: the National Mitigation Plan (Department of Communications, Climate Action and Environment, 2017) and the NAF.

The National Mitigation Plan sets out a series of mitigation measures and actions to address the challenges of meeting the 2020 and 2030 targets. Ireland's key focus to achieve its emissions target is to reduce emissions from its largest contributing sectors: agriculture, transport and energy. On 31 July 2020, the Supreme Court held that the National Mitigation Plan did not comply with the requirements of the 2015 Act and that it must be quashed.

Ireland has adopted its first NAF in 2018 which aims to ensure that adaptation actions are taken across all sectors, from a national to local level. to reduce vulnerability to climate change. The DHPLG is responsible for leading sectoral Adaptation Plans for Water. Irish Water as a public body has responsibility under these plans to mitigate it's impacts to climate change through provision of water supply and to ensure that it is adapted to the impacts of climate change. Irish Water has therefore developed a Climate Change Policy Statement underpinning their commitment to "address the potential impacts of climate change on Irish Water and its customers".

A warming climate will mean less water in Ireland. Ireland will experience significant decreases in average precipitation for the spring and summer months as well as over the full year. Climate change

[17] These sectors cover agriculture, transport, built environment (residential, commercial/institutional), waste and non-energy intensive industry.

will also reduce the quality of some water supplies due to contamination, flooding or increased growth of biological organisms such as algae. In a warmer climate Ireland's most damaging storms will become more powerful and carry more rain, increasing the risk of flooding and loss of power.

Climate change has a direct relevance to water resource management as changes, including increased temperatures, droughts and changes in rainfall, could affect surface and groundwater resources alike, both in terms of quantity and quality.

Within the Irish Water Climate Change Policy, Irish Water has identified the likely key impacts of climate change to be:

- Increased rainfall and storm intensity resulting in:
    - Pluvial, fluvial and coastal flooding damaging their assets and impacting on raw water quality;
    - Sewer flooding and increased combined sewer overflow spills leading to flooding of properties and causing negative environmental impacts in receiving waters; and
    - Threat to security of water supply and wastewater collection arising from flooding impacting on their operations.
- Reduced rainfall and drought resulting in:
    - Lower river flows reducing the availability of water for abstraction and dilution capacity available for wastewater treatment; and
    - Reduced capacity to supply treated water and increased demand for water.
- Changes in water quality classification:
    - Impacting on water and wastewater treatment costs.; and
    - Increases in water temperature affecting treatability and assimilative capacity of waters.

Changes to the quantity of water available will make it increasingly complex to manage demand. Rainfall is the main source of additional water into the system and increasing temperatures will affect the amount of water leaving the system either directly through evaporation or indirectly through uptake from plants and animals. Reductions in rainfall in the spring and summer months will likely cause an increase in agricultural water use for irrigation and stock. Even if reliant on private water supplies, increases in agricultural and other sector use will affect Irish Water's ability to increase abstraction in water stressed areas. Lower flows and higher water temperatures may also affect the water quality. These factors can have significant implications for the Framework Plan.

6.8.2 Future trends and evolution of the baseline without the Plan

The RBMP 2018 – 2021 outlines the main climate change impacts expected for Ireland as follows:

- Sea level rise;
- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east of the country;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species on land and in the ocean.

In May 2018 the EPA reported that Ireland is set to fail to meet the 2020 EU greenhouse gas targets for all sectors. Current projections indicate that Ireland will be 1% below 2005 levels by 2020 against the target of 20% target for non-ETS emissions under the '*With Additional Measures'* scenario, and

0% under the '*With Existing Measures'* scenario (EPA, 2018). Total emissions including the non-ETS sectors are set to increase by 1% and 4% under the '*With Existing Measures'* scenario and increase 2% by 2020 and decrease by 1% by 2030 under the '*With Additional Measures'* scenario.

6.8.3 Key issues relating to the Plan

The key issues in relation to climate change are:

- Increased pressure on the water environment and reduced water resources due to increased temperatures, more demand and less rainfall;
- Increase in frequency and duration of droughts which can, in turn, have water quality impacts;
- More incidents of heavy rainfall and more frequent and damaging storms leading to flooding and pollution runoff to water sources from land, damage to assets and loss of power;
- Wetter winters causing flooding;
- Sea level rise causing flooding and contamination of water sources;
- Climate change effects on peatlands, grasslands and/or forest ecosystems which are important for retention of water in the catchment and also valuable for carbon offsetting;
- Carbon emissions from energy use and the requirement for energy efficiency;
- Water quality impacts as a result of increased flooding or droughts;
- Reduced water quality due to runoff, increased agricultural growing season and low waters;
- Impeding of Atlantic current increasing likelihood of snow and ice; and
- Greenhouse gas emissions from power generation and use.

6.8.4 Baseline information sources for the Strategic Environmental Assessment

The assessment in relation to climate change will use information from the following sources:

- The Department of Communications, Climate Action and Environment;
- EPA;
- CFRAM Studies (OPW, 2016);
- A 250-year drought catalogue for the island of Ireland (1765–2015) (Noone et al., 2017); and
- Met Eireann.

6.8.5 Scope of the assessment

Climate change and extreme weather events could have a significant impact on water demand and availability in Ireland. The effect of climate change on the resilience of water supplies and effects on demand is a core part of the Framework Plan. The potential for water resource schemes to add to pressure on ecosystems likely to be affected by climate change needs to be considered. This includes habitats sensitive to climate change or important for climate change adaptation such as rivers and wetlands, peatlands, grasslands and forests.

Energy efficiency and the carbon emissions associated with energy consumption for potential water resource and demand management schemes will be a consideration for the selection of future schemes to ensure the Framework Plan contributes to overall objectives on carbon emissions.

As a result, environmental resilience to climate change (climate change adaptation), and energy efficiency and carbon emissions (climate change mitigation) have been scoped into the assessment.

6.9 Cultural heritage (architectural and archaeological)

6.9.1 Introduction

Archaeological sites are legally protected by the provisions of:

- The National Monuments Acts;
- The National Cultural Institutions Act 1997; and
- The Planning and Development Act 2000 (as amended).

One of the primary sources of information for known archaeological features is the Record of Monuments and Places (RMPs) which was established under the National Monuments Acts 1930 to 2004. The RMP is the statutory inventory of sites and areas of archaeological significance. It holds records of known upstanding archaeological monuments, the original location of destroyed monuments and the location of possible sites. Monuments listed in the RMP are afforded legal protection and any work taking place at, or in relation to, a Recorded Monument will typically need to be notified to the Minister. There are some 80,000 sites recorded in the RMPs (Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, 2016). Of these RMPs, approximately 1,000 are under state care; in other words, they are in the ownership or guardianship of the Minister for Arts, Heritage, Regional, Rural and the Gaeltacht Affairs (National Monuments Service, n.d.).

Another key source of information for cultural heritage features is the Sites and Monuments Record where there are 138,000 records related to archaeological monuments. The Sites and Monuments Record formed the basis for issuing the RMP. However, not all sites within the Sites and Monuments Record are included in the RMP, and those that are not have no statutory protection.

Architectural Conservation Areas are designated under Section 81 of the Planning and Development Act 2000 (as amended) for the protection of areas for their special characteristics and distinctive features. Architectural Conservation Areas in Ireland are detailed in the various County Development Plans (some of which are pending designation).

A primary source of information for known architectural heritage is the Record of Protected Structures (RPS). Local authorities are obliged to compile and maintain the RPS under Section 51 of the Planning and Development Act 2000 (as amended). These RPS are listed in the County Development Plans but are not available in digital map format for some county councils.

The NIAH was established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. The purpose of the NIAH is to identify, record, and evaluate the post-1700 heritage of Ireland; there are over 50,000 listings on the NIAH in Ireland (Department of Arts, Heritage, Regional Rural and Gaeltacht Affairs, 2016). It is noted that the RPS documented in County Development Plans may not represent all Ministerial recommended sites/structures which are included in the National Inventory of Architectural Heritage (NIAH).

There are two registered UNESCO World Heritage Sites in Ireland: Brú na Bóinne - Archaeological Ensemble of the Bend of the Boyne in County Meath and Skellig Michael off the coast of County Kerry. Since 2010, a number of sites have been on the UNESCO tentative list.

There are also potentially unknown, undesignated archaeological and architectural remains including underwater and marine archaeology throughout Ireland.

6.9.2 Future trends and evolution of the baseline without the Plan

It is unlikely that the cultural heritage environment will change significantly in the near future due to the continued protection of cultural, archaeological and architectural heritage in national legislation. However, there could be minor revisions to the cultural heritage datasets within the plan period, and

there are also a number of sites on the UNESCO tentative list that could be designated within the plan period.

6.9.3 Key issues relating to the Plan

The key issues in relation to cultural heritage are:

- Potential for the construction of options to permanently or temporarily damage archaeological and architectural heritage monuments/sites;
- Potential for permanent structures to impact the setting of heritage monuments/sites;
- Water resource options could be constrained by the need to protect the character of areas; and
- The potential to uncover (and/or damage) unknown, undesignated remains, including underwater archaeology.

6.9.4 Baseline information sources for the Strategic Environmental Assessment

The assessment in relation to cultural heritage will use information from the following sources:

- The Department of Culture, Heritage and the Gaeltacht;
- National Monuments Service;
- Built Heritage and Architectural Policy Section (the NIAH);
- County Development Plans (as appropriate);
- Heritage Council; and
- UNESCO.

6.9.5 Scope of the assessment

Cultural heritage sites and their settings, including architectural and archaeological sites and the disturbance of buried archaeological remains have been scoped into the assessment as they have the potential to be affected by the Framework Plan; including options involving construction or ground works.

6.10 Geology and soils

6.10.1 Introduction

Geology

As part of the Irish Geological Heritage (IGH) Programme, a partnership between the Geological Survey of Ireland (2017) and the NPWS, the Geological Survey of Ireland has identified important geological and geomorphological sites which could be conserved as NHAs. Until designation is confirmed, these sites are classified as Irish Geological Heritage Sites (IGHSs). There are over 900 IGHSs identified around Ireland.

The geology of Ireland is varied and influenced by the topography, landscape, soils, and water environment and, in particular, is intimately linked to groundwater flow and resource. Geology has influence on:

- Groundwater water quality distribution (different bedrock and unconsolidated geologies influence aquifer development);
- Groundwater and surface water natural chemistries;
- Surface water seasonal sustainability (different geologies influence runoff/base flow rations); and
- Some water dependent ecosystems.

The main rock type in Ireland is carboniferous limestone, which covers approximately 50% of Ireland in the low-lying centre of the country. The nature of limestone strongly influences karstification. Karst springs are ready sources of drinking water in the absence of surface water sources; most of the largest springs in Ireland emerge from karst.

The mountainous areas on the coast of Ireland surrounding this are varied. The west coast of Ireland (Donegal, Mayo and Galway) has the most varied bedrock and is made up of precambrian dalradian rocks and quartzites, as well as deposits of ordovician, silurian and granite. The mountains to the east of Ireland (Wicklow) mainly comprise ordovician and granite, and the bedrock in the south of Ireland primarily comprises old red sandstone.

Soils

There is no legislation solely directed to soil protection in Ireland. In 2006, the European Commission developed a Soil Thematic Strategy that aims to protect soils and ensure the sustainable use of soils across Europe.

Soil quality in Ireland is generally of good quality. Brown fertile earth, which is quite shallow, makes up most of the soil formation and is mostly found in the midlands and eastern counties. Of Ireland's landmass, 68% is used for agriculture due to this brown earth being rich and fertile. The other large soil type is gley, which is peaty soil, mainly found in the low-lying centre of Ireland. This soil has a large clay composition and is poorly drained. Brown podzolics and grey-brown podzolics also make up a large part of the soil formation of Ireland and are mainly found in the central and southern counties of Ireland. Podzolic soils are typical of the geology and landscape of those areas, typically found on sandy deposits on forested soils (EPA, 2012). Peatland areas comprise 20.6% of our land area (An Taisce, 2016). Peatlands include blanket bogs, raised bogs, fens and wet and dry heath.

6.10.2 Future trends and evolution of the baseline without the Plan

Changes in geology are generally considered to happen over very long timescales. Therefore, baseline forecasting is not considered to be critical with regards to geology and soils over the lifetime of the Framework Plan. However, as discussed above, the NPWS is evaluating proposed IGH sites, and in the near future, some of these will be designated as NHAs and gain statutory protection.

6.10.3 Key issues relating to the Plan

The key issues in relation to geology and soils are:

- Potential for water resource options to be constrained by future NHA/IGH sites;
- Potential for impacts on geological resources/soil resources; and
- Potential to impact vulnerable soils or unearth contaminated material.

6.10.4 Baseline information sources for the Strategic Environmental Assessment

The assessment in relation to geology and soils will use information from the following sources:

- Geological Survey of Ireland;
- NPWS; and
- EPA.

6.10.5 Scope of the assessment

Given the importance of karst limestone to sources of water, geology has been scoped into the assessment. Soil has also been scoped in as water resource options may have the potential to affect soil resources.

6.11 Transboundary effects

The SEA will consider, where relevant and/or appropriate, potential transboundary effects in Northern Ireland.

6.11.1 Key issues relating to the draft Framework Plan

The key issues are similar to those outlined under each theme in the previous sections but are primarily related to the water environment in Northern Ireland due to work within close proximity of the border or from water abstraction within a common catchment.

Table 6.4 – Northern Ireland baseline environment

SEA Topic	Key Findings
Population, economy, tourism and recreation	The latest figures from the Northern Ireland Statistics and Research Agency (NISRA) show that in June 2016, the Northern Ireland population was estimated to be 1,862,137, an increase of 6.8% over the decade from 2006 and an increase of 20.9% since 1971. The population is projected to top 1.90 million by 2021, with further growth to 1.97 million by 2032. The 2 million milestone is anticipated to be reached by 2040. Tourism Ireland in its 2018 Marketing Plan has committed to promoting tourism in Northern Ireland including major themes attractions such as the Causeway Coastal Route, Titanic Belfast, the Giant's Causeway, National Trust properties and 'Screen tourism' such as the Game of Thrones tours and attractions. (Tourism Ireland, 2017) Many overseas visitors take the opportunity to visit Northern Ireland when visiting Ireland and vice versa. Any proposals in proximity to Northern Ireland should assessed in terms of the potential to impact or reduce access to tourism and recreation attractions in Northern Ireland.
Water environment	There are numerous waterbodies which cross the Irish border which have the potential to cause transboundary impacts. Cross border catchments in Ireland include: • Lough Neagh and Lower Bann: This catchment includes the area drained by the River Bann and by all streams entering tidal water between the Barmouth and Ballyaghran Point, Co. Derry. This is a cross border catchment with a surface area of 5,787km², 374km² of which is located within the Republic of Ireland. • River Foyle: The Foyle catchment includes the area drained by the River Foyle and by all streams entering tidal water between Culmore Point, Co. Derry and Coolkeeragh, Co. Derry. This is a cross border catchment with a surface area of 2,919km², 914km² of which is located within the Republic of Ireland. The eastern half of the catchment, located in Northern Ireland, drains most of County Tyrone and a small part of north western County Derry. The part of the catchment located in Donegal is largely mountainous. • Newry, Fane, Glyde and Dee: This catchment includes the area drained by the Newry, Fane, Glyde and Dee rivers, and by all streams entering tidal water between Murlough Upper and The Haven, Co. Louth. This is a cross border catchment with a surface area of 2,125 km², 1390 km² of which is located within the Republic of Ireland.
Biodiversity, flora and fauna	Internationally and nationally designated sites within Ireland include: • Special Protection Areas (SPA) – 16; • Special Areas of Conservation (SAC) – 58; • Ramsar Sites - 20; • Nature Reserves – 48; • Marine Nature Reserves – 1 (Strangford Lough); • Areas of Special Scientific Interest (ASSI) – over 400; • Sites of Local Nature Conservation Importance (SLNCIs) – over 100; • Areas of Outstanding Natural Beauty – 9;

SEA Topic	Key Findings
	• World Heritage Site – 1 (Giant's Causeway).
Material assets	Viable agricultural land is a key asset to the Northern Ireland economy; approximately 75% of Northern Ireland's land is used for agriculture. Forestry is also a significant asset to Northern Ireland. Forests and woodlands provide important habitats, natural resources and diversity to landscapes. NI has the lowest level of tree cover (8%) of any UK regional territory or EU member states. Resource depletion is becoming an increasingly significant issue at a global and national level. Registered forest and woodlands are recognised for the significant part the play in tourism and recreation as well as enhancing and protecting habitats and biodiversity. Given the role forestry plays in carbon offsetting, and the current low levels of afforestation at present it is expected that the area covered by forest will not increase significantly but the level of protection will remain high. Ireland has many important road connections with Northern Ireland in addition to a cross-border rail connection between Dundalk and Newry. Northern Ireland has three commercial airports, in Belfast International Airport and Belfast City Airport and City of Derry Airport, as well as five commercial ports in Belfast, Larne, Londonderry, Coleraine and Warrenpoint. Any proposals in proximity to Northern Ireland should assessed in terms of the potential to impact or reduce access to transport networks in or to Northern Ireland.
Landscape and visual amenity	The landscape environment and trends are similar in Ireland and Northern Ireland and therefore the same key issues should be considered.
Air quality and noise	There are 28 Air Quality Management Areas in Northern Ireland that are leading the activity to tackle air quality problems. There is continued improvement in air quality, but problems do remain for nitrogen dioxide emissions due to transport. Agricultural emissions from ammonia still remain high and threaten ecosystems and habitats. Continued effort is required to reduce air pollution from key sources such as road transport and agriculture. Noise emissions are of a similar level to Ireland with similar sources.
Climate change	There is evidence that the climate in Northern Ireland is changing. There has been a reduction in greenhouse gas emissions, but road transport emissions are still increasing. There are government targets towards reducing greenhouse gas emissions of at least 35% by 2025 based on 1990 levels but this will prove challenging. The UK Climate Change Act commits the UK to reducing emissions by at least 80% by 2050 from 1990 baseline levels. In 2015, Northern Ireland's total greenhouse gas emissions accounted for 4.2% of the UK total. Since the base year (1990), Northern Ireland's total greenhouse gas emissions have decreased by 17.8% from 25.2 to 20.7 million tonnes of carbon dioxide equivalent (MtCO2e). This is less than the reduction seen for the UK as a whole, which saw a decrease of 38.2% compared to the base year.
Cultural heritage	Cultural Heritage designations of Northern Ireland include: • Sites and Monuments – approximately 16,000; • Monuments in State Care – almost 200; • Scheduled Historic Monuments – almost 2,000; • Historic Buildings – over 9,000; • Listed Buildings – approximately 8,500; • Areas of Significant Archaeological Interest – 10; • Conservation Areas – 60; • Defence Heritage Features – over 600; • Battlefields – over 30; • Heritage Gardens Inventory – over 154; • World Heritage Sites – 1 (The Giant's Causeway). The Northern Ireland Department of Communities historic environmental datasets

SEA Topic	Key Findings
	have been be important in consideration of potential transboundary impacts on the setting of heritage assets along the border region. These are available at: https://www.communities-ni.gov.uk/services/historic-environment-map-viewer
Geology and soils	Northern Ireland has a similar geological make up to Ireland in terms of the presence of predominantly limestone, but also granite, sandstone and basalt. Numerous ASSI's have been designated for geological value.

Given the nature of the draft Framework Plan, those topic areas with highest potential for transboundary effects are water environment (due to the several catchments listed in Table 6.4 which cross the Irish border) and biodiversity (primarily where habitats may be affected by changes to the water environment). Landscape and cultural heritage assets will also need to be considered.

6.11.2 Baseline information sources for the Strategic Environmental Assessment

The assessment in relation to transboundary effects will use information from the following sources:

- Northern Ireland Environment Agency;
- Joint Nature Conservation Committee; and
- Geological Survey of Northern Ireland.

6.11.3 Scope of the assessment

Transboundary effects have been scoped into the SEA, as there is potential for environmental effects in Northern Ireland where infrastructure development or water resource options are proposed in close proximity or involving shared surface or groundwater catchments. At the draft Framework Plan level, no specific proposals and locations are identified but the approach for selecting proposals for the Regional Plans is outlined.

6.12 Summary of the scope of the SEA Environmental Report

To establish the likely significant environmental effects[18] of the draft Framework Plan in general, Irish Water must first achieve an understanding of the key environmental issues and considerations.

Table 6.5 summarises the key environmental issues identified as relevant to each aspect from the draft Framework Plan based on the baseline assessment; the EPA's (2016) State of the Environment Report; review of the relevant plans, policies and programmes; and the consultation undertaken as part of the SEA Scoping Report. The scope of the assessment is also outlined in Table 6.5.

Table 6.5 also lists the key policies, plans and programmes which have shaped the key issues and scope of the assessment (note plans and programmes highlighted in bold in the table have been taken forward for further consideration for potential cumulative effects with the draft Framework Plan in Table 8.8).

[18] In accordance with Annex I of the SEA Directive, the "effects" to be considered should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects.

Table 6.5 – Summary of the key issues and scope for the Strategic Environmental Assessment

SEA topic	Key Policies Plans and Programmes	Key issues	Scope of the assessment
Population, economy, tourism and recreation, and human health	• Ireland 2040: Our Plan, National Planning Framework • National Spatial Strategy for Ireland 2002-2020 (Department of the Environment and Local Government, 2002) • Regional Spatial and Economic Strategies • Healthy Ireland Framework • Food Wise 2025 • Food Harvest 2020 • City and County Development Plans	• Population and economic growth will increase the demand for water within Ireland. • Inward investment in Ireland, industrial growth and growth in the agricultural sector will increase the demand for water within Ireland. • Age structure, household sizes, growth in education and employment in particular business sectors may also influence water requirements within Ireland. • Growth in the tourism industry and the continued number of international tourists coming into the country will influence the demand for water within Ireland, and increasing security of supply of water will aid development of the tourism industry. • The location of important tourist attractions and recreational areas will influence the location of water resource options. • The construction of water resource options may cause temporary disruption to tourist attractions or recreational areas in the form of, for example, disruption to services/utilities and traffic (this will include noise disturbance). • Potential for loss/gain of public amenity as a result of development. • Health risks associated	**Scoped in**: Population, economy, tourism and recreation, and human health (including temporary construction air quality dust nuisance and noise disturbance[19])

[19] Noise has been scoped out of the assessment, however, construction of NWRP options will likely result in short term noise disturbance during construction. Since these impacts are unlikely to be significant they will be assessed as an impact to human health in terms of disturbance to local communities rather than under an individual noise heading.

SEA topic	Key Policies Plans and Programmes	Key issues	Scope of the assessment
		with the inability to provide clean and safe drinking water. • Patterns for settlement and economic growth will influence the demand for water and, in turn, the location of water resource options. • The construction of water resource options may cause temporary disruption to the local community in the form of, for example, dust, disruption to services/utilities and traffic (this will include temporary noise disturbance during construction). • Some water resource options may be associated with loss of public amenity or property value.	
Water environment	• WFD (2000/60/EC) • RBMP (April 2018) • Irish Water - Water Services Strategic Plan 2015 • Irish Water - National Wastewater Sludge Management Plan • Irish Water - Lead in Drinking Water Mitigation Plan • Catchment Flood Risk Management (CFRAM) Programme • Flood Risk Management Plans	• Potential to affect or impede the WFD objectives from the construction and operation of water resource options. • Potential for climate change and the effects of climate change, such as increased flooding and drought, to affect Irish Water's ability to meet water supply requirements. • Combined effects on water resources taking account of other non-Irish Water abstractions	**Scoped in:** Surface water quality, groundwater quality, abstraction/ discharge issues, flood risk
Biodiversity (including flora and fauna)	• EU Biodiversity Strategy, 2011 • The Habitats Directive (92/43/EEC) • The Birds Directive (2009/147/EC) • Fish Directive (2006/44/EC) • European Communities (Birds and Natural Habitats) Regulations 2011 as amended (S.I. No. 477/2011) • Other National Biodiversity	• Potential to affect protected areas, including European sites (SAC, SPA and RAMSAR), national sites (NHAs and pNHAs) and other sites of regional or local importance (National Heritage Sites, Wildlife Reserves). • Potential for protected sites to pose constraints	**Scoped in:** Habitats and species that are water dependent, invasive species, protected sites.

SEA topic	Key Policies Plans and Programmes	Key issues	Scope of the assessment
	related regulations • National Biodiversity Action Plan • County and City Heritage Plans	to planning of water resource options. • Potential to impact biodiversity in non-designated areas. • Potential to spread invasive species during construction and operation.	
Material assets	• Infrastructure and Capital Investment Plan 2016-2021 • Waste Management Acts 1996 – 2005 • Forestry Programme 2014-2020 • Regional/County based waste management strategies and mineral plans	• Economic growth and development is likely to increase the demand for water within Ireland, particularly within urban populations. • Strain on existing water services infrastructure to support greater water demand. • Building materials used, their manufacture and management and/or disposal of waste generated from Irish Water's activities. • Effects of construction of specific plan options on current infrastructure such as road/rail/waterway networks. • Temporary or permanent loss of valuable agricultural land during construction and/or operation of specific options. • Effects of other infrastructure development (not related to the Framework Plan) on water quality in Ireland will present a risk/challenge for Irish Water. • Effects on other water abstractors.	**Scoped in**: Material assets such as commercial forests and protected woodland areas, forest parks, valuable agricultural land, existing infrastructure important for the day-to-day life of an area.
Landscape and visual amenity	• National Landscape Strategy for Ireland 2015-2025 • County Landscape Character Assessments	• Potential for permanent infrastructure to impact landscape and visual amenity temporarily during construction or permanently throughout operation. • Potential for water	**Scoped in**: Landscape character and quality

SEA topic	Key Policies Plans and Programmes	Key issues	Scope of the assessment
		resource options to be constrained by the need to protect the landscape character and local visual amenity.	
Air Quality	• Ambient Air Quality Directive (2008/50/EC) • Industrial Emissions Directive (2010/75/EU)	• The Framework Plan is unlikely to have a significant impact on air quality, so this topic area is scoped out of further assessment.	**Scoped out**[20]: Air Quality
Noise	• Noise Directive (2002/49/EC)	• The Framework Plan is unlikely to cause significant noise pollution, so this topic area is scoped out of further assessment.	Scoped out[18]: Noise
Climate change	• EU Energy and Climate (2020) Package 2009 • The Climate Action and Low Carbon Development Act 2015 • NCCAF • Ireland's National Policy Position on Climate Action and Low Carbon Development (2014) • National Mitigation Plan	• Increased pressure on the environment and water resources as a result of increased temperatures and reduction in the availability of water as a result of decrease in rainfall; and increase in the incidence of extreme weather events. • Effect on land valuable for climate change adaptation and carbon offsetting; such as peatlands, grasslands and/or forests. • Carbon emission from energy use and requirement of energy efficiency. • Water quality impacts as a result of increased flooding or droughts.	**Scoped in**: Climate change and its effects on the water environment and catchments and carbon cost of options.
Cultural heritage (including archaeological and architectural)	• Planning and Development Acts • National Monuments Act • Architectural Heritage and Historic Monuments Act • County Heritage Plans	• Potential for the construction of options to permanently or temporarily damage archaeological and architectural heritage monuments/sites. • Potential for permanent structures to impact the	**Scoped in**: Cultural heritage (including archaeology and architecture)

[20] Short-term construction disturbance to local communities in terms of dust and noise will be considered as part of the Population, Economy, Tourism and Recreation and Human Health assessment and in the Biodiversity assessment.

SEA topic	Key Policies Plans and Programmes	Key issues	Scope of the assessment
		setting of heritage sites/monuments. • Water resource options could be constrained by the need to protect the character of areas. • Potential to uncover (and/or damage) unknown, undesignated archaeological remains, including underwater archaeology.	
Geology and soils	• Planning and Development Act • Action Plan for Rural Development	• Potential for water resource options to be constrained by future NHA/IGH sites. • Potential for impacts on geological resources/soil resources. • Potential to impact vulnerable soils or unearth contaminated material.	**Scoped in**: Geology, soils, contaminated land, mineral resources and IGH sites, and geological pNHAs
Transboundary effects	• Planning Act (NI) 2011 • Regional Development Strategy: Building a Better Future, 2035 • Northern Ireland Climate Change Adaptation Programme • The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009 • Water Abstraction and Impoundment (Licensing) (Amendment) Regulations (Northern Ireland) 2007 • The Water Supply (Water Quality) Regulations (NI) 2007, as amended (2015) • NI Water (2014) Our Strategy for NI Water • NI Water (2020) Water Resource and Supply Resilience Plan	• Some of the above effects could be experienced in Northern Ireland.	**Scoped in**: Transboundary effects

6.13 Strategic Environmental Assessment topic interactions

In accordance with the SEA Directive, it is a requirement to recognise the interrelationships between environmental topics, as changes to one environmental aspect can directly or indirectly influence others. Table 6.6 below details the potential interrelationships between SEA topics.

Table 6.6 – Interrelationship between Strategic Environmental Assessment topics for the draft Framework Plan

	Population, local economy, tourism and recreation, and human health	Water environment	Biodiversity (including flora and fauna)	Material assets	Landscape and visual amenity	Air quality and noise*	Climate change	Cultural heritage (including architectural and archaeological)
Water environment	■							
Biodiversity, (including flora and fauna)	■	■						
Material assets	■	■	■					
Landscape and visual amenity	■	■	■	■				
Air quality and noise*	■		■					
Climate change	■	■	■	■	■			
Cultural heritage (including architectural and archaeological)	■	■	■	■	■		■	
Geology and soils	■	■	■	■	■		■	

*Note air quality and noise are scoped out of this plan level assessment but short term disturbance impacts from noise and air pollution during construction are addressed for receptors in population, recreation and human health and biodiversity topics.

The potential interrelationships between the SEA topics have been considered in relation to the assessment of potential types of options listed in Table 2.4, which might be identified through the implementation of the Framework Plan to address water supply or water demand. This assessment is set out in Table 8.6.

On illustration of interrelated impacts from water supply options is where a new groundwater abstraction causes drawdown of water in an aquifer affecting nearby river baseflow, causing low flow conditions with impacts on biodiversity in the river and use of the river for recreation; additionally, low flows can reduce visual amenity. The abstraction effects on water dependent habitats and species could also reduce environmental resilience to the effects of long-term trends associated with climate change.

Another example is a storage reservoir with a pumped abstraction from a nearby river which provides a facility to take and store water when river flow is high. The storage capacity means that water can be supplied from the reservoir, and not directly from the river, during low river flow conditions. This

can contribute to a water supply that is both more resilient to weather patterns and demand peaks and also puts less pressure on a river ecosystem during low flow conditions. The reservoir could result in habitat and agricultural land loss but provide new habitats and recreational amenity with wellbeing benefits.

7

SEA Assessment Methodology

7.1 Introduction

This SEA Environmental Report has considered the Framework Plan in three key ways. These being:

- Assessment of the Framework Plan, including comparison of the Framework Plan against a 'Without Plan' scenario, taking account of the overall approach of the plan proposals for implementation (Chapter 8);
- Assessment of potential types of water supply and demand management options which could be used to address supply demand deficits (Chapter 8); and
- Recommendations for integrating environmental and sustainability considerations into the actions identified for implementing the Framework Plan in the Regional Plans, including integrating SEA objectives into the options development and appraisal methodology (Chapter 9).

7.2 Strategic Environmental Assessment objectives

The set of SEA objectives developed at the scoping stage has been refined and finalised following consultation. These have been influenced by the plans, policies and programmes review, the baseline trends and pressures identified, and the scope of the assessment as defined in Table 6.5.

At least one high-level SEA objective has been assigned to each of the SEA topic areas. The objectives provide the direction of change desired in that environmental area. The SEA objectives are illustrated in Table 7.1 below.

Table 7.1 – SEA objectives

Strategic Environmental Assessment topic	SEA Objective
Population, economy, tourism and recreation, and human health	Protect and, where possible, contribute to enhancement of human health and wellbeing and to prevent restrictions to recreation and amenity facilities in undertaking water services.
Water environment	Water quality and resources Prevent deterioration of the WFD status of waterbodies, with regard to quality and quantity due to Irish Water's activities and contribute towards the "no deterioration" WFD condition and, where possible, to the improvement of waterbody status for rivers, lakes, transitional and coastal waters and groundwater to meet their WFD objectives.
	Flood risk Protect and, where possible, reduce risk from flooding as a result of Irish Water activities.

Strategic Environmental Assessment topic	SEA Objective
Biodiversity	Protect and, where possible, enhance terrestrial, aquatic and soil biodiversity; particularly European sites and protected species in undertaking water services.
Material assets	Minimise resource use and waste generation from new or upgraded existing water services infrastructure and management of residuals from drinking water treatment - to protect human health and the ecological status of waterbodies. Minimise impacts on other material assets and existing water abstractions.
Landscape and visual amenity	Protect and, where possible, enhance designated landscapes in undertaking water services.
Climate change	Climate change mitigation Minimise contributions to climate change emissions to air (including greenhouse gas emissions) as a result of Irish Water's activities.
	Climate change adaptation Promote the resilience of the environment, water supply and treatment infrastructure to the effects of climate change.
Cultural heritage	Protect and, where possible, enhance cultural heritage resources in undertaking water services.
Geology and soils	Protect soils and geological heritage sites and where possible contribute towards the appropriate management of soil quality and quantity.

These high-level SEA objectives are used as the framework for the assessment of potential significant effects from the draft Framework Plan compared to 'without plan' alternatives and also for each of the potential water supply and demand options (construction and operational phases). The potential for mitigation of effects during plan implementation and for the different option types are considered.

7.3 SEA Assessment Criteria

The draft Framework Plan and the possible solutions based around the main types of water supply and demand investment options have been assessed against the SEA objectives in line with the criteria outlined in Table 7.2. The assessment criteria were presented in the SEA Scoping Report for public consultation and refined in response to comments provided. Irish Water undertook the assessment taking account of potential standard mitigation measures (mitigation as set out in Table 8.5) which are expected to be part of future development.

Table 7.2 – SEA criteria

Description of Likely Significant Effect	
Likely to have a positive effect	+
Likely to have a negative effect	-
Effects are uncertain or not applicable	? or N/A
Likely to have a neutral effect	0
Likely to have a mixed positive and negative effect	+/-
Likely to have mixed neutral and negative effect	0/-
Likely to have mixed neutral and positive effect	0/+

7.4 Alternative plan assessment

Article 5(1) of the SEA Directive 2001/42/EC requires that, "*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, evaluated*". Annex I (h) requires Irish Water to provide "*an outline of the reasons for selecting the alternatives dealt with*" (Annex I (h)).

The EPA's guidance document 'Developing and Assessing Alternatives in Strategic Environmental Assessment' defines alternatives as "*different ways to deliver a plan's or programme's objectives which addressing issues identified during scoping*" (EPA, 2015).

The reason for assessing alternatives to the plan is to determine if the significant adverse effects of the proposed plan can be reduced or avoided. Therefore, the alternatives should be "reasonable". The term reasonable is not defined in the Directive. However, taking into account the EPA guidance, for an alternative to be considered reasonable for the purposes of this SEA it must meet the objectives of the NWRP, which is to provide a safe, secure, sustainable and reliable supply of water for the next 25 years. The NWRP must also meet the requirements of the Water Services Act 2013 and be in line with the WSSP.

The reasons for selecting (a) the alternatives and (b) the preferred plan must be documented, together with a description of how this assessment of alternatives was undertaken. A water resources management plan typically recommends a combination of options which address the supply demand deficit. In water resource management planning, the alternatives assessment considers both alternative individual options and alternative plan recommendations.

7.4.1 Alternative methodologies considered during the development of the draft Framework Plan

Irish Water has considered alternative methodologies for developing the Framework Plan and Regional Plans. This section outline the reasons Irish Water selected a water resource planning methodology based on the methodology approved by the UK's Water Services Regulation Authority (OFWAT) out of the available alternatives.

Irish Water reviewed the resource planning methodologies used in other jurisdictions, including the United Kingdom, France, Italy, Spain, Germany, Australia, New Zealand and the United States. There is large variability in methods for water service provision across the countries, as summarised in Table 7.3 below. Within the European Union, there is a common Legislative Framework across all countries, governed primarily by the Drinking Water Directive (98/83/EC), as amended, and the Water Framework Directive (2000/60/EC), as amended.

The regulation of water service providers varies considerably across the countries; however, the process is similar in Ireland and England & Wales. Whereby, providers of water services are supervised by independent regulators for quality, environmental and financial regulation; namely the Environment Authority and OFWAT in the UK, and the EPA and Commission for the Regulation of Utilities in Ireland.

In most countries water service provision is fragmented, with large urban supplies managed separately to rural supplies or regionalised where a utility provides water services for urban and rural settlements within a defined geographical region. Irish Water is a single national water utility, however, in terms of population and scale, the supply is of similar size to regional supplies in larger countries such as the UK or Italy.

Although the WFD and associated RBMPs, require cross jurisdiction collaboration and planning in relation to the environmental health of the natural raw water environment, most water service providers in the countries assessed do not have uniform prescribed guidelines or fully Integrated Water Resources Planning due to the fragmented nature of their supplies. However, in order to be able to ensure resilience and react to external risks such as climate change, financial constraints and an aging asset base, it is likely that there will be an increased focus on water resource planning in all countries over the coming years. Recently the Organisation for Economic Co-operation and Development has recognised the need for its member countries to undertake strategic water supply planning to address the financial and environmental constraints on the provision of water services into the future[21]

As Irish Water is the single National Utility for Water Services, they must take a proactive approach to strategic planning, and they have committed to developing a Water Resource Plan within the primary business objectives; as set out in their WSSP.

In considering which form of Integrated Water Resource Planning to adopt, Irish Water looked at what factors they had in common with the countries in the Table 7.3 below. Cells marked with an "x" indicate that there are significant similarities between the countries in respect of that factor.

[21] 2019 OECD Challenges in Financing Water Supply, Sanitation and Flood Protection – Challenges in EU Member States and Policy options

Table 7.3 – Integrated Water Resource Planning factor comparison between countries

	Republic Of Ireland	France	Germany	Spain	Italy	United Kingdom	Australia	New Zealand	Canada	United States
Legislative Framework										
- Quality	x	x	x	x	x	x				
- Environment	x	x	x	x	x	x				
Regulation of Water Service Providers	x					x				
Provision - Local (fragmented), Regional, National	N	F	F	F	F	R	F	R	R	F
Prescribed Process for Integrated Water Resource Planning						x	x	x		
Climate	x					x				
Technical Standards										
- Treatment Types	x	x	x	x	x	x	x	x	x	x
- Distribution	x					x				
- Domestic	x					x				

As water services provision in the Republic of Ireland is similar to that in the United Kingdom, Irish Water has used the *"Final Water Resources Planning Guidelines 2016",* developed by the Environment Agency and Natural Resources Wales in England and Wales as the starting point for their NWRP.

As summarised in Table 7.3, the main reasons for this decision are:

- Ireland's legislative framework for water services is similar to that in England and Wales (and the UK);
- Ireland's national population is similar to the population of the UK's water resources planning catchments;
- Ireland's natural climatic conditions are more similar to the UK than the other countries considered;
- Irish Water's water asset base is technically comparable in terms of treatment, distribution and domestic plumbing arrangements (for example in Ireland and the UK, domestic plumbing systems utilise storage tanks in attics, as opposed to the pressurised systems more frequently used elsewhere in Europe. As these tanks can fill at night time, they need to be accounted for in minimum night flow calculations, and therefore impact leakage and demand estimation;
- Irish Water's water supply asset base, particularly supplies in the large urban centres, have been developed in parallel to those in the UK with the same design philosophy, distribution process, and materials used; and

- The regulatory framework for water services is similar, including the separation of responsibility for water services provision, environmental regulation and economic regulation.

However, it must be noted that water resource planning has been undertaken in the UK for nearly 25 years and its processes and methodologies have been modified and improved over time. As this is Ireland's first NWRP, and because it differs in some aspects to the UK guidelines, the first stage will be to develop a draft Framework Plan. The draft Framework Plan will describe the process by which Irish Water develop their NWRP, the inclusions within the plan, the methodologies Irish Water use to identify need and develop solutions, and a summary of identified need across the water supply asset base.

The key differences between Irish Water's NWRP and a typical water resources plan in England and Wales, are set out in the draft Framework Plan and are as follows:

- **Licencing:** In general, water abstractions in other jurisdictions are licenced and environmental considerations have been factored into the long-term viability and planning for water sources. Historically in Ireland there has been limited regulation of abstraction of water from the natural environment for the purposes of public water supply. Within Irish Water existing asset base some abstractions may not be able to provide the supply of water to meet the demand required particularly during dry weather periods. As demand increases over time, this issue will become more evident and therefore needs to be given more consideration in Irish Water's Plan.
- **Quality:** Chapter 5 of the draft Framework Plan, describes how Irish Water monitors water quality in line with the requirements of the Drinking Water Regulations, and how drinking water compliance across public water supplies has remained high since Irish Water assumed responsibility for the public water supply. It also described how Irish Water assesses the capability of its current water supply asset base to deal with existing and future potential risks identified through the Drinking Water Safety Plans (DWSPs). This assessment, referred to as the Barrier Assessment, allows Irish Water to:

    - Understand the scale of potential "Quality and Reliability" need and the associated long-term investments they will need to plan for, in order to meet the asset capability standards that they have set for themselves; and
    - Transform the water supply asset base over time through the NWRP and the future capital investment cycles.

    As pointed out in the Chapter, the Barrier Assessment is not a measure of compliance with the Drinking Water Regulations, however it is an assessment of the existing water supply asset capability to meet the asset standards that Irish Water has set for itself.
    As summarised in Chapter 6 of the Draft Framework Plan, in some cases the current asset capability does not meet the standards specified and therefore, significant capital investment may be required in over future regulated investment cycles. As set out in the draft Framework Plan, where significant risks to safe and secure supplies are identified through the DWSPs, these may need to be addressed urgently. In some cases, Irish Water may need to commit investment into supplies that may not be viable in the medium to long term. Irish Water must consider quality as well as quantity issues and allow for interim steps to improve their water supplies in terms of quality, quantity, sustainability and reliability.
- **Asset Performance:** Due to historic under investment in capital maintenance, Irish Water's asset base is in poor condition compared to those in England and Wales. This manifest itself in high leakage rates across their networks and low levels of service to their customers. These deficits require sustained long term investments and actions across many areas that will deliver gradual improvements over multiple investment cycles. Therefore, asset performance and reliability needs must be considered within Irish Water's Plan.

- **Data:** Water Resources Planning in UK utilities follows a well-defined process that has been developed over a 25 year period and is built off prescribed operational data for both supply and demand. At present, Irish Water information systems were not designed for the purposes of water resources planning and do not capture all of the required data sets. Therefore, within the draft Framework Plan Irish Water had to use a combination of best available data and surrogate data from other jurisdictions where necessary.
- **WRZs:** The national public water supply in Ireland has significantly more WRZs than a typical UK utility, which is reflective of the dispersed population in Ireland and the way that water services have developed over time. This adds a level of complexity to Irish Water's resources plan, due to the extent of identified need they must address. To mitigate against this, Irish Water will develop their Preferred Approaches (solutions) for each water supply within four Regional Water Resources Plans.

In summary, when identifying need as part of their Water Resources Plan, Irish Water need to consider quantity, quality and asset performance. This process enables Irish Water to identify the need, and then develop solutions that allow them to balance the immediate needs across their water supplies with the longer term need to reconfigure their supplies.

7.4.2 Alternatives to the draft Framework Plan considered within this SEA

The draft Framework Plan is focused on understanding the challenges for water supply and demand management in terms of improving levels of service, meeting new regulatory requirements as well as taking account of climate change and identifying the SDB across the WRZ. The plan therefore proposes methodologies and actions for finding solutions, addressing uncertainty and improving operations rather than identifying the specific investment proposals for addressing supply demand deficits.

Alternatives for the draft Framework Plan have been considered through the following:

- Considering the likely evolution of the baseline without the implementation of the Framework Plan on a topic by topic basis (Chapter 6, 'Future trends and evolution of the baseline without the Plan' sections); and
- Assessment of 'With Plan' and 'Without Plan' scenarios against SEA objectives (Chapter 8.2).

The draft Framework Plan also facilitates the robust consideration of alternatives in the Regional Water Resources Plan as follows:

- Assessing the main types of investment option that will be taken forward to the options development process to address predicted supply demand deficits (Chapter 8.3);
- Considering water resource planning practice and methodology in other jurisdictions;
- Recommendations for integrating environmental considerations in actions for taking the plan forward – these actions will provide a good foundation for identifying potential requirements and alternatives for consideration for investment in the future (Chapter 8.7); and
- Recommendations for the methodology for assessing options and selecting combinations of options for WRZs, Study Areas and regions as part of the plan implementation (Chapter 9) – this methodology will provide a transparent process for considering alternative approaches and environmental effects in the selection of preferred solutions.

The draft Framework Plan has been developed over a period of time to allow consultation and analysis of the current situation. Initially, the developing plan was reliant on the WRZ/Study Area options development process to address deficits. The draft Framework Plan now identifies:

- Water resource need - through the Supply Demand Balance assessment over a 25-year period from 2019 to 2044;

- Water quality, reliability and sustainability issues;
- Solutions based on the Three Pillar Approach: Lose Less, Use Less and Supply Smarter to be implemented by building on current and future activities to meet the Plan objectives of providing safe, secure, reliable and sustainable sources of supply for customers; and
- Methodology that will be used to develop short, medium and long term solutions to address the risks to supplies (in terms of quantity, quality and reliability), from a range of types of interventions such as critical maintenance investments, leakage reduction, new supply interventions, and operational interventions which will help deliver more from Irish Water's existing asset base. This includes the Options Assessment and Preferred Approach Methodology which will be applied through the development of the Regional Plans to consider alternatives and identify preferred solutions for each area of supply.

As a result, no other alternative plan scenarios were identified as a reasonable way to achieve the objectives of the draft Framework Plan; WSSP and Water Services Act 2013 (discussed in Chapter 0**)** at this stage.

7.5 Cumulative assessment for the National Water Resources Plan

Article 3(5) of the SEA Directive states that it should be determined "*whether plans or programmes … are likely to have significant environmental effects*". Annex II (2) details the criteria for determining the likely significance of effects referred to in Article 3(5), including the need to take into consideration "*the cumulative nature of the effects*".

Cumulative effects include secondary and synergistic effects. The EPA (2017) Guidelines on the Information to be contained in Environmental Impact Assessment Reports[22] identifies the different types of cumulative effects:

- **Indirect or secondary effects**: effects that are not a direct result of the plan but occur away from the original effect or as a result of a complex pathway. An example of an indirect effect would be the deterioration of water quality due to soil erosion following tree clearance for a reservoir development on a woodland site. In this case, the tree removal is a direct impact and the effects of the erosion are indirect impacts.
- **Cumulative effects**: the addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects. Therefore, effects that arise, for instance, where several developments (such as multiple options) each have insignificant effects but together have a significant effect; or where several individual effects of the plan (for example noise, dust and visual) have a combined effect (in-combination effects).
- **Synergistic effects**: "*Where the resultant effect is of greater significance than the sum of its constituents*." Synergistic effects often happen as habitats, resources or human communities get close to capacity. For instance, a wildlife habitat can become progressively fragmented with limited effects on a particular species until the last fragmentation makes the areas too small to support the species.

A cumulative effects assessment for a water resource management plan should include:

- Effects of measures/options proposed within a plan or programme; and

[22] EPA (2017). Guidelines on the Information to be contained in Environmental Impact Assessment Reports (DRAFT, August 2017). Available at: https://www.epa.ie/pubs/advice/ea/EPA%20EIAR%20Guidelines.pdf

- Effects between the measures/options proposed within the plan or programme and other projects, plans and programmes.

Given the high level and methodology-based approach of the draft Framework Plan, it is not possible to predict the cumulative effects of the measures/options proposed within the plan or the effects of such options with other projects.

As such, the cumulative effects assessment provided in this report focuses on identifying possible interrelationships at a strategic level, mainly in terms of identifying areas where there may be potential for combined effects with the implementation of the draft Framework Plan and indicating whether these effects are considered likely to be positive, negative or mixed positive and negative with respect to the SEA objectives. Key plans and programmes are considered in terms of how they support the achievement of the SEA objectives and how the Framework Plan could support high-level environmental protection objectives in other plans or programmes. The assessment of interactions with other plans and programmes is outlined in Chapter 8.4.

The cumulative effects of the draft Framework Plan will be become apparent as it is implemented through the Regional Plans, which will themselves be subject to SEA. The proposed approach to the assessment of cumulative effects for the Regional Plans is set in Chapter 9.11.3 to Chapter 9.11.5 which show how cumulative effects assessment has been built into the methodology for the options development and assessment process aimed at finding solutions for supply demand deficits to ensure that combined effects are considered in the selection process. Chapter 10.3 outlines that Irish Water is committed to continuous monitoring of the Regional Plans, allowing environmental impacts to be measured and quantified and information gained from monitoring utilised to inform forward water resource planning including variations to Regional Plans where required.

The types of cumulative effects that will need to be considered include additional or total combined effects covering proposed actions or measures covering:

- Proximity and coincident timing leading to combined effects on receptors;
- Pathways for effects with potential for combined effects on receptors;
- Water resource use or quality implications within the same catchment or water body from combined effects; and
- Total combined effects on aspects such as loss or disturbance such as total sum of effects on specific habitat types, land use, or from total combined carbon emissions.

The cumulative effects assessment will include identification of additional mitigation measures to those identified for individual options.

Table 7.4 – Potential for cumulative effects within SEA topics

Strategic Environmental Assessment topic	Potential for Cumulative effects from combinations of options proposed at WRZ/Study Area – examples of types of issues to be considered (beneficial and adverse)	
SEA Objective	**Construction**	**Operation**
Population, economy, tourism and recreation, and human health		
Protect and, where possible, contribute to enhancement of human health and wellbeing and to prevent restrictions to recreation and amenity facilities in undertaking water services.	Proximity and timing - combined effects Such as noise/traffic disturbance on same receptors	Level of service or amenity benefits Such as combined benefits for supply resilience

Strategic Environmental Assessment topic	Potential for Cumulative effects from combinations of options proposed at WRZ/Study Area – examples of types of issues to be considered (beneficial and adverse)	
SEA Objective	**Construction**	**Operation**
	Combined effects on traffic disruption	
Water environment		
Water quality and resources Prevent deterioration of the WFD status of waterbodies with regard to quality and quantity due to Irish Water's activities and contribute towards the "no deterioration" WFD condition and, where possible, to the improvement of waterbody status for rivers, lakes, transitional and coastal waters and groundwater to at least "Good" status.	Pathways to a common receptor Increased pollution risk from combined construction activities	Catchment/waterbody resource/quality – combined effects Such as more than one abstraction within the same catchment or waterbody
Flood risk Protect and, where possible, reduce risk from flooding as a result of Irish Water activities.	Combined drainage impacts during construction	Combined total loss of flood plain in a catchment
Biodiversity		
Protect and, where possible, enhance terrestrial, aquatic and soil biodiversity, particularly European sites and protected species in undertaking water services.	Proximity and timing from disturbance or pathways to receptor Combined loss or reduced condition of habitat types	Combined abstraction and linked water quality effects on biodiversity with same catchment or waterbody
Material assets		
Minimise resource use and waste generation from new or upgraded existing water services infrastructure and management of residuals from drinking water treatment - to protect human health and the ecological status of waterbodies. Minimise impacts on other material assets and existing water abstractions.	Total resource use or waste production from construction	Total additional waste from drinking water treatment and disposal route Total change to land use
Landscape and visual amenity		
Protect and, where possible, enhance designated landscapes in undertaking water services.	Proximity and timing combining to increase visual amenity effects from construction	Additional landscape and visual effects of above ground structures affecting sensitive landscape and viewpoints
Climate change		
Climate change mitigation Minimise contributions to climate change emissions to air (including greenhouse gas emissions) as a result of Irish Water's activities.	Total carbon emissions for construction	Total additional carbon emissions for operation

Strategic Environmental Assessment topic	Potential for Cumulative effects from combinations of options proposed at WRZ/Study Area – examples of types of issues to be considered (beneficial and adverse)	
SEA Objective	**Construction**	**Operation**
Climate change adaptation Promote the resilience of the environment, water supply and treatment infrastructure to the effects of climate change.	Combined construction effects increasing vulnerability for example to soil erosion	Combination of effects either adding to stress on the environment and vulnerability to climate change effects or options/actions combining to relieve pressure on the environment
Cultural heritage		
Protect and, where possible, enhance cultural heritage resources in undertaking water services.	Total effects on cultural heritage and archaeological assets	Potential combined effects on setting of cultural heritage assets or sites from above ground structures
Geology and soils		
Protect soils and geological heritage sites and where possible contribute towards the appropriate management of soil quality and quantity.	Total disturbance and displacement or loss of soils during construction	Combined effects to conserve soils and reduce pollution and improve water quality

7.6 Appropriate Assessment

The approach for AA of the draft Framework Plan is outlined in the NIS and has been undertaken in accordance with Irish and EU statutory requirements and the following guidance documents:

- AA of Plans and Projects in Ireland: Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010);
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission, 2001);
- Communication from the Commission on the Precautionary Principle (European Commission, 2000);
- Guidance Document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the concepts of: Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission (European Commission, 2007);
- Marine Natura Impacts Statements in Irish Special Areas of Conservation. A working Document (Department of Arts, Heritage and the Gaeltacht, 2012); and
- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (European Commission, 2018).

The NIS identifies all the European sites potentially affected and the methodology for determining whether adverse effects on the integrity of European sites can be excluded, including consideration of the relevant zone of influence, conservation objectives and qualifying habitats and species and pathways for effects. The option types identified in the draft Framework Plan are considered in terms of their potential for such adverse effects.

The approach recognises the high-level nature of the current draft Framework Plan and the aim to incorporate AA into the option and approach assessment for the Regional Plans.

7.6.1 Guiding Principles and Case Law

A number of cases have been brought to both the national and European courts in relation to AA. Irish guidance in relation to AA was published 10 years ago. Therefore, recent case law has, in many cases, superseded this guidance. Relevant case law, ECJ rulings and EC publications (EC, 2018) have been considered in the preparation of the AA for the draft Framework Plan.

7.7 Limitations and Assumptions

The plan covers a large geographical area and the baseline summarised in this report is a high level review of conditions, pressures and trends.

The assessments undertaken as part of the SEA at this stage are high-level and desk-based and considered to be appropriate to the draft Framework Plan and the objectives, types of solutions or options and methodology proposed in the Plan.

Data relating to population forecasts and trends are based on information gathered before the Covid 19 Pandemic and it is recognised that the NWRP will need to align to relevant updates in the National Planning Framework.

Further environment assessment will follow through the separate SEAs to be undertaken for the Regional Plans.

Environmental impacts and costings will be further reviewed where options identified in the Regional Plans are taken forward and developed as projects. No statutory consent or funding consent is conferred through the draft Framework Plan. Any projects that are progressed following the Framework and Regional Plans will require further study including feasibility studies and design development. Individual environmental assessments will also be required in support of planning applications (where a project requires planning permission) or in support of licensing applications (for example, for new abstractions).

8

Assessment of the draft Framework Plan (Phase 1)

8.1 Introduction

The draft Framework Plan provides:

- The principles and methodologies that Irish Water will use to move towards a sustainable, secure and reliable drinking water supply for everyone over the next 25 years whilst safeguarding the environment;
- The baseline SDB and Barrier scores for all WRZs in the country;
- The basis for estimating hydrological yields and potential allowable abstractions, taking account of the likely impact of pending abstraction licensing legislation and WFD obligations;
- The high level objectives for the Regional Plans including the Use less, Lose Less and Supply Smarter pillars and a range of option types that could provide sustainable, reliable sources of water or reduce demand for water for consideration in the next plan;
- A robust Options Assessment Methodology for the analysis of WRZs, the sources within them and identification of option types and option combinations to meet the predicted supply-demand deficit over the plan period within a range of water planning scenarios and taking account of the effects of climate change.

Over the next couple of years, Irish Water will be working on collating data from local authorities to enable them to develop options for water resource management in Ireland. At this point, Irish Water have developed a list of potential option types which will be considered further to identify the most resilient, sustainable, deliverable and cost-effective approaches to balance predicted supply and demand over the 25-year planning period.

This SEA therefore assesses the:

- 'Without plan' scenario in terms of the SEA objectives (the 'with plan' scenario will be assessed through SEA of the Regional Plans);
- Potential types of water supply and demand options for investment within the 'lose less', 'use less' and 'supply smarter' categories covering the potential environmental effects, mitigation and enhancement measures and opportunities associated with each potential option type for the construction and operational phase; and
- Analysis of interactions between the plan implementation and other plans and programmes of national/regional significance.

In addition to the above, the SEA process has also influenced the development of a methodology for integrating environmental and sustainability considerations across the Regional Plans, including the development of an option development process which will be used to identify and select options and combined approaches for investment, drought planning and abstraction risk prioritisation (these aspects are covered in Chapter 9). The results from applying this methodology will be reported in the SEA for the Regional Plans.

8.2 'Without' and 'With' Plan scenarios

Alternative plan approaches to maintaining supply and demand in Ireland which have been assessed are:

- **Without Plan:** No implementation of the Framework Plan (continuation of the existing approach); and
- **With Plan:** Based on the high level objectives and provisions in the draft Framework Plan (note that the proposed methodology to identify and assess options and compare and assessment potential approaches meeting plan objectives will be further assessed in the Regional Plans).

8.2.1 'Without' Plan

Existing Scenario

Irish Water operate 749 WTPs which feed into 539 areas known as WRZs. These range in size, serving populations of less than 30 people (small rural areas) up to 1.7 million people (Greater Dublin Area (GDA). The SDB has been calculated for each WRZ and shows that the level of service[23] varies across the country with approximately 50% of WRZs having a level of service worse than 1 in 50 years (see Figure 8.1).

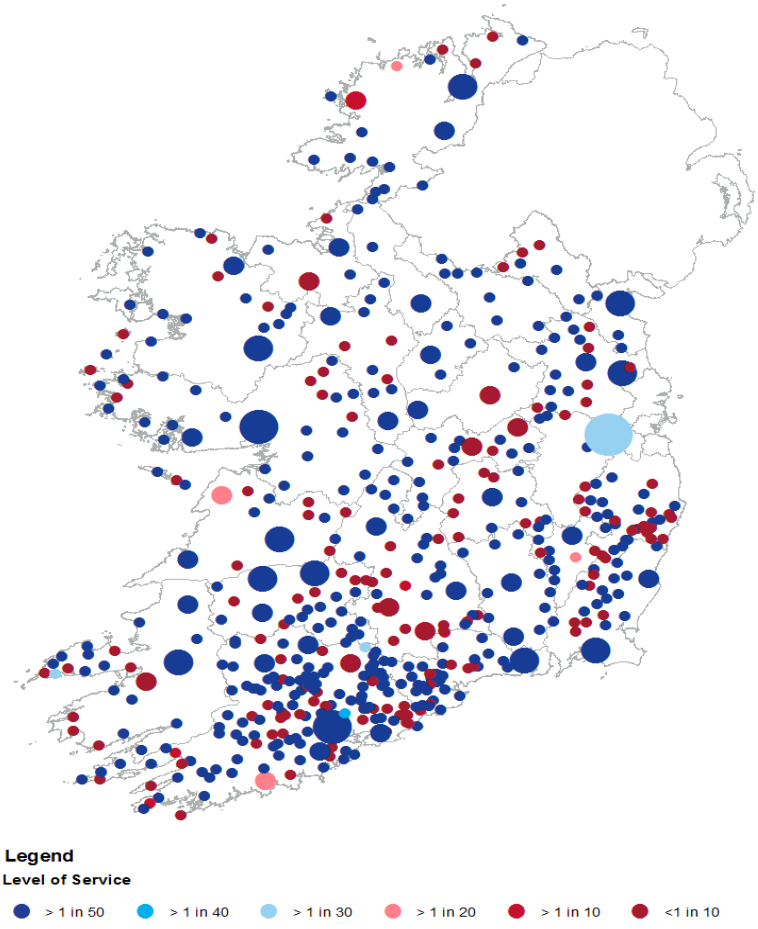


Figure 8.1 – Level of service in each WRZ for a normal year (NYAA)

23 Level of Service refers to the reliability of supplies customers can expect from us and is expressed as a frequency or return period. For example, if the Level of Service is described as 1 in 30, as a customer you should only ever expect to experience an outage or severe limitations to your supply once every 30 years.

The ‘without plan’ scenario is defined as a continuation of the current approach and in the short-term, is represented by the existing business plan (2016-2021). Figure 8.2 illustrates ‘Where Irish Water would be without the Plan’.

The ‘without plan’ approach can be summarised as follows:

- Currently a Service Measure Framework is used to understand the underlying level of risk associated with WTPs, WwTPs, Irish Water network and other infrastructure required to deliver water services. This allows forecasts on how these assets will perform into the future to achieve their objectives. This approach is focused on analysing the condition of assets, how they are performing and identifying the risk to services, the improvements needed, the costs for reducing the risk and the development of an investment case (see Figure 8.1 identifying Level of Service for water supply for each WRZ). Essentially, this is a reactive approach to identifying issues, which are, for example - driven by issues in drinking water quality, the Drinking Water Safety Plans (DWSPs), Irish Water’s Barrier assessments, and/or the Remedial Action List, or existing water availability issues or infrastructure adequacy;
- Investment planning does not currently use the water resource planning approach of predicting SDB for Level of Service across different dry year or winter critical scenarios;
- Investment solutions are focused at local level rather than considering potential inter-zonal, regional or inter-regional solutions used in water resource planning; and
- There is no strategic level options appraisal as used in water resource planning, incorporating aspects such as resilience, sustainability and progressability into early level option decision making with environmental issues addressed at the project level through Environmental Impact Assessment and planning consenting where these are required.

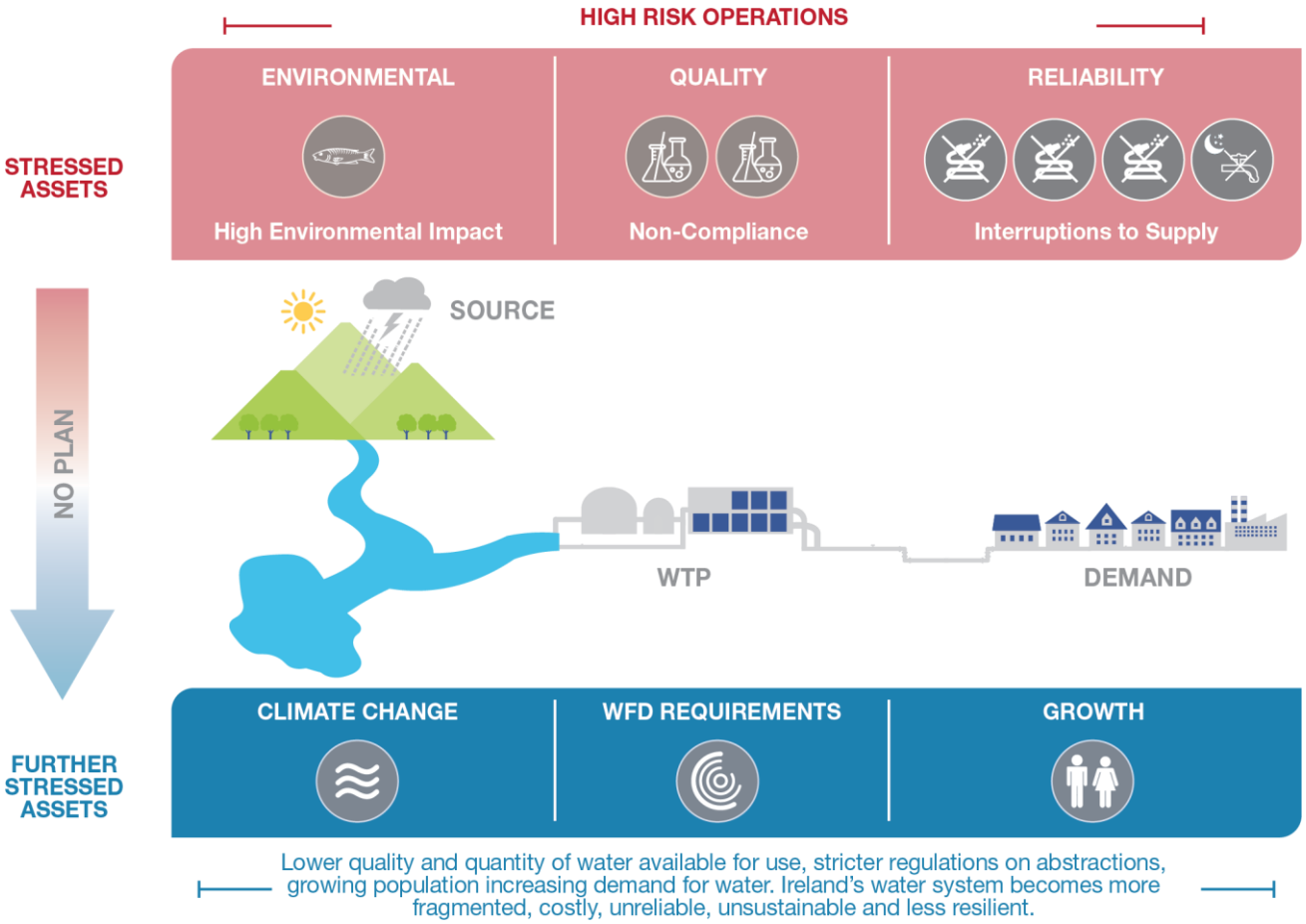


Figure 8.2 – Where Irish Water would be Without the National Water Resources Plan

Figure 8.3 and Table 8.1 show the national summary of the net surplus or deficit across Ireland's Weather Planning Scenarios for 2019 and 2044.

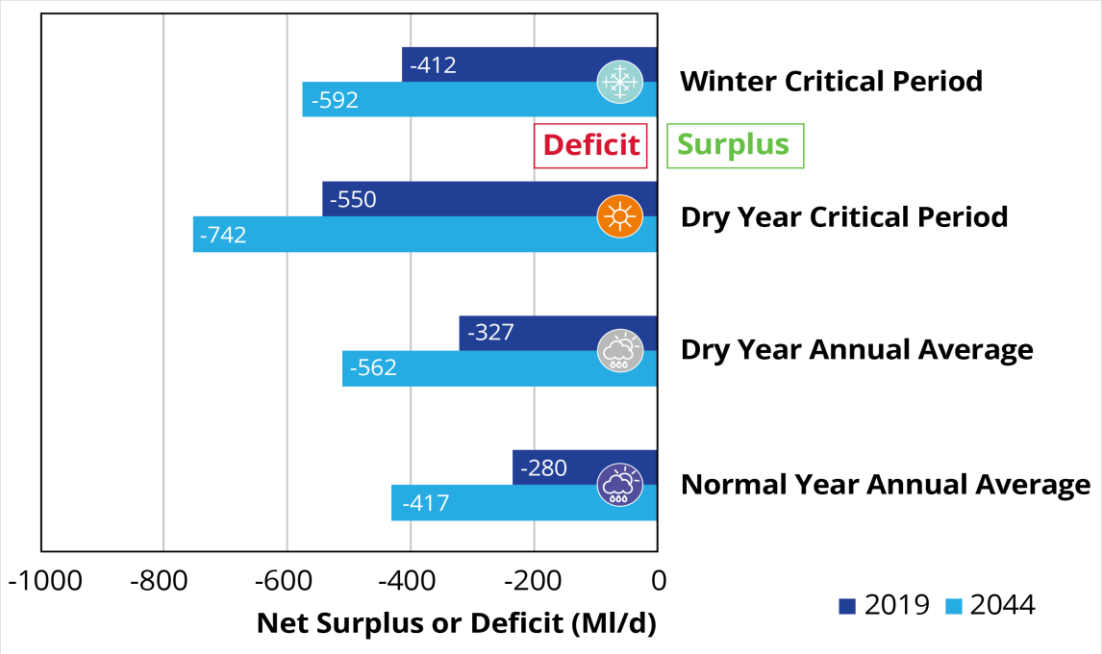


Figure 8.3 – National Summary of the SDB for 2019 to 2044

Table 8.1 – National SDB Summary

Weather Planning Scenario	SDB (Ml/d)		Change	
	2019	2044	Total (Ml/d)	(%)
NYAA	-280	-417	137 ↑	91% ↑
DYAA	-327	-562	236 ↑	60% ↑
DYCP	-550	-742	192 ↑	39% ↑
WCP	-412	-591	180 ↑	51% ↑

↑ = Increased Deficit[24]

At present, Total Demand exceeds the Water Available for all Weather Event Planning Scenarios.

The largest deficit in the SDB is for the DYCP, with a net deficit nationally of 550Ml/d. This is because raw water sources are impacted during extreme warm periods such as drought which typically coincides with increases in demand.

The net deficit nationally for the WCP is 412Ml/d. There are normally no restrictions to the amount of water Irish Water can abstract during the WCP. This deficit is predominantly driven by the ability of the water treatment plants and distribution networks to cater for the increased demand during this Weather Event Planning Scenario.

[24] The national deficit is not equal to the total WAFU – Demand as this would assume all WRZ's are interconnected. The national deficit is the sum of all the individual deficits per WRZ.

By 2044, the SDB deficit will increase across all Weather Planning Scenarios. This is primarily due to a growth in demand, combined with a forecast reduction in water availability due to climate change.

The SDB does not include the impacts of the pending abstraction regulations and reform. When implemented, these new Regulations will have the potential to significantly increase the deficits by reducing the amount of water, which can be abstracted from the sources.

Figure 8.4 and Table 8.2 show the national summary of the net surplus or deficit across Ireland's Weather Planning Scenarios for 2019 and 2044.

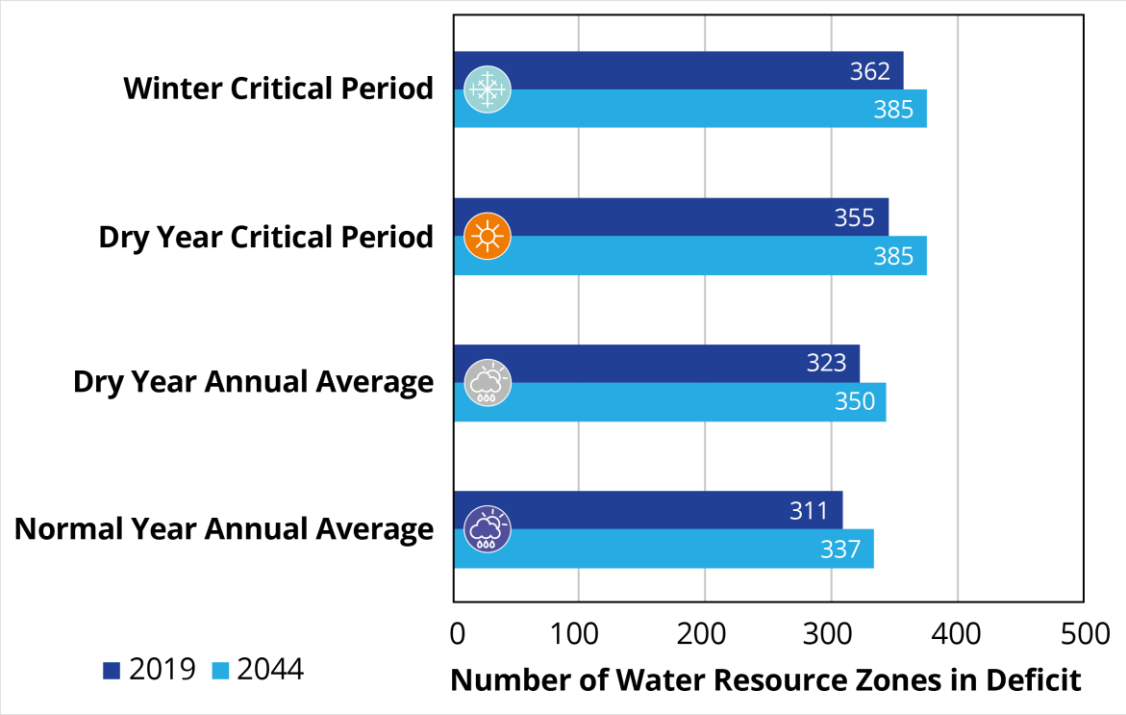


Figure 8.4 – Number of Water Resources on Deficit 2019 - 2044

Table 8.2 – Number of WRZs in Deficit in 2019 and 2044

Planning Scenario	Number of WRZs in Deficit		Change from 2019 to 2044	
	2019	2044	Count	(%)
NYAA	307	332	25	8%
DYAA	317	343	26	8%
DYCP	421	438	17	4%
WCP	356	376	20	6%

The key findings from the SDB assessment are as follows:

- The Water Available For Use from existing supplies is not sufficient to balance the current demand for water, across all weather event planning scenarios whilst ensuring the correct levels of service to customers;
- This situation will deteriorate over time, because of climate change, leading to an increased frequency of prolonged droughts lowering river and lake levels;
- Changes to legislation and the regulatory process around abstractions has the potential to significantly impact water availability at Irish Water existing supplies;

- Although population and economic growth are forecast the Supply Demand Balance deficit is not expected to increase significantly at a national level, although there may be some WRZs with significant demand increase;
- 58% of Irish Water WRZs are in deficit at present and do not provide the correct reliability to their customers in normal conditions. During the Dry Year Critical Peak (equivalent to a summer drought), 66% of the WRZs are currently in deficit.

The ‘Without Plan’ scenario assessment against the SEA objectives is provided in Table 8.3 below.

Table 8.3 – Without the National Water Resources Plan assessment

Plan alternative	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
Without the Plan (continuation of the current regime): • highly fragmented system which has been developed in a piecemeal manner • approximately 50% of WRZs with a level of service worse than 1 in 50 years • reactive approach (investment needs a proactive approach) to identifying issues - driven by issues in drinking water quality, Drinking Water Safety Plans (DWSPs) and/or Remedial Action List, or existing water availability issues or infrastructure adequacy • water resource planning not taking into account different dry year or winter critical scenarios; • local level focus to solutions rather than considering inter-zonal, regional or national solutions used in water resource planning • no strategic level multi-criteria options appraisal process used to incorporate aspects such as resilience, sustainability and progressibility into early level option and Study Area approach decision making taking and therefore leaving environmental issues to be addressed at the project level only, through Environmental Impact Assessment and planning consenting.	-	-	0	+/-	-	0	0	-	0	0
Assessment Justification										

Plan alternative	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
The continuation of the current regime could result in negative impacts on human health and wellbeing due to risks to maintaining levels of security of supply and access to water, as well as climate change resilience. Currently levels of service range between a 1 in 10-year probability of water supply failure to 1 in 50 years, depending on location. Without considering the dry year or winter critical period scenarios the risk of water supply failure is greater. Projects are likely to be smaller-scale schemes due to the local focus and the absence of strategic level appraisal. Water assets will therefore remain stressed, relying on smaller, and in some cases unsustainable sources or unreliable infrastructure rather than pursuing the potential to develop a more flexible and resilient system using sources sustainably. Under the 'Without Plan' scenario there is also reduced potential to identify mitigation requirements early on and to influence selection of solutions with reduced environmental impacts and potentially wider benefits.										

8.2.2 'With' Plan

The proposed "With Plan" approach includes:

- Predicting the SDB for the next 25 years and developing SDB profiles for different extreme event scenarios allowing for uncertainty and climate change;
- Taking a national level approach and including all WRZs, which allows solutions to be found at different geographical scales. For example, previously, problems and solutions would be considered at local authority scale and could fail to identify transfers/connections from other local authorities;
- Applying the three pillars of Lose Less (including leakage reduction targets), Use Less (water efficiency improvements) and Supply Smarter (improving assets and water resource availability);
- Across the three pillars, the high-level options types all have strengths and weaknesses for addressing deficits in certain situations. The draft Framework Plan proposes a methodology to help select the best option, or cluster of options in each area;
- Given the scale of the challenge in assessing so many WRZs, Study Areas for the WRZs will be identified and will be assessed through the Regional Plan programme. Each Study Area will develop an approach based on all three pillars, phasing-in different activities over time; and
- The draft Framework Plan sets out a systematic and consistent methodology for this process which will start with an exhaustive list of options for each Study Area for addressing the resource and quality needs. Irish Water will compare solutions based on the following five criteria:
    - Resilience;
    - Deliverability and Flexibility;
    - Progressability;
    - Sustainability (Environmental and Social Impacts); and
    - Cost.

Therefore, environmental considerations are started at a very early stage. The process allows consideration of the mitigation measures required to reduce potential impacts and also additional benefits an option can potentially bring to meet environmental objectives such as enhancement to amenity or biodiversity. This would not have been considered so early in the option development previously.

The draft Framework Plan includes an approach to consider residuals from WTPs so that when implementing measures to improve the supply from their assets Irish Water will also look at the management of WTP residuals and seek to reduce the impact of this waste on the environment.

Irish Water have made a commitment to developing the Plan within the WSSP, which was a requirement under Section 33 of the Water Services Act 2013. Irish Water will be required to make investments and improvements in water supply in order to meet demand in line with the requirements of the European Union (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014) and the WFD (2000/60/EC). The SDB forecasts within the draft Framework Plan have predicted that 376 WRZs in Ireland will be in deficit by 2044 in the winter critical period, an increase of 6% from 2019.

The 'With Plan' scenario assessment against the SEA objectives is provided in Table 8.4 below.

Table 8.4 – Assessment of the 'With' the Plan Scenario

Plan alternative	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
With the Plan • Focus on the three pillars of using less, losing less, and supplying smarter and a planned rather than a reactive approach • Planning a resilient system with more reliable sources • Improving understanding of future risks, including climate change and efficient water use • Integrating SDB with other key drivers including ongoing Irish Water projects and programmes • Increasing routine monitoring and operational planning allowing Irish Water to proactively manage and forecast resourcing and operational trends • Developing drought actions and curves involving development of drought indicators and drought management actions	+	+/-	0	+/-	+	+/-	+/-	+	0/-	0

Plan alternative	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
Assessment Justification										
The draft Framework Plan includes a commitment to work to a 1:50 year level of service across all locations and actions in place to achieve this target. The draft Framework Plan will provide the basis for developing an investment programme providing greater security of supply and a more resilient supply since options will address the SDB over extreme weather planning scenarios. The process may identify more strategic inter-zonal and regional schemes which can have both positive and negative potential effects on the water environment, biodiversity and landscape and visual amenity. Therefore, mitigation measures and a monitoring framework shall be developed alongside recommended developments. In the long-term the plan will bring benefits in terms of greater security of water supply to the population, tourism industry and recreational amenity, human health and the economy. Additionally, the newer, or upgraded, more reliable assets within the system will result in it being more adaptable to the impacts of climate change. The SEA of the plan will allow environmental considerations to be embedded into the plan making a process and setting a framework for identifying mitigation and monitoring so that these can be part of decision-making and inform early option design and costing.										

The draft Framework Plan sets out proposals for a methodology providing a framework for water resource planning which can contribute to meeting SEA objectives. No significant effects are identified for the methodology itself and the application of the methodology to identify Preferred Approaches for investment will be assessed through the Regional Plan SEAs.

8.3 Assessment of option types

The potential investment options for meeting the SDB outlined within the draft Framework Plan have been assessed against the SEA objectives outlined in Table 7.1 in terms of identifying potential for significant effects using the scoring approach set out in Table 7.2.

Table 8.5 below summarises the assessment for each general option type and the potential for significant effects along with a justification for the assessment score.

In line with recommendations made in the UKWIR (UK Water Industry Research) SEA Guidance (UKWIR 2012), the SEA options assessment assumes the implementation of standard mitigation measures, such as operation of water sources in line with regulatory requirements and the use of good construction practice. Examples of standard measures expected to be embedded in the design and development of infrastructure options are listed in Table 8.5.

Table 8.5 – Examples of Construction Mitigation Assumptions

Mitigation assumptions
Studies and surveys
Feasibility and scheme option studies including detailed pipeline routing, siting and technology options to avoid effects on designated sites and species.
Studies, surveys and consultation on environmental effects of proposed development following relevant good practice guidance to inform design, identify relevant mitigation and to support appropriate planning permission and licencing processes.
Investigation, monitoring and modelling studies for groundwater and surface water abstractions to be agreed where relevant in context of schemes meeting WFD no deterioration requirements and RBMP objectives.
Short term/construction impacts
Ensuring safe access along routes for pedestrians, cyclists and equestrians, providing diversions where necessary.
Implementation of traffic management measures to minimise disruption to minor roads, including, where possible, limitation of works within peak periods or times.
Use of construction techniques that avoid or minimise disruption to major infrastructure (rail and strategic road networks) and river crossings such as directional drilling (where appropriate).
Any disruption to the road to be agreed in advance with transport authorities and traffic management plans to be used where needed.
No works to take place within curtilage of designated cultural heritage sites without necessary consents in place. Directional drilling where needed. Archaeological watching briefs during ground works where agreed as needed to address risk with planning authorities.
No works to take place within or in close proximity to designated sites without necessary consents in place. Impacts to be avoided through detailed routing and trenchless construction approaches or timing to avoid disturbance where appropriate.
Appropriate permissions and consents to be obtained for all works which may affect a European protected species or nationally protected species.
A suitably qualified and experienced ecological clerk of works (ECoW) to carry out site supervision works during activities that affect sensitive habitats and species, ensure that site specific mitigation identified following surveys is undertaken.
Appropriate watercourse consents and environmental permits to be obtained for construction activities in or near water.
Consent for noisy works to be obtained and noise barriers used where required.
Best practice measures to control noise, air and water pollution in accordance with guidance.
Long term mitigation (outside permanent footprints)
Full reinstatement of all footpaths and recreational areas.
Full reinstatement of all habitat types, including hedgerows, and provision of compensation habitat where appropriate.
All river abstraction points to be fitted with fish screens.
Full reinstatement of landscape features, and good management practice for the long term restoration of landscape features.
Full restoration of agricultural land and previously undeveloped land.
Appropriate abstraction licence to be obtained for new, increased or traded licences.
New built infrastructure to incorporate the appropriate flood defence measures.

In addition to the standard mitigation measures described above, additional mitigation measures and further study requirements will be identified for each option. Where options require Environmental Impact Assessment and planning permission mitigation will be identified through this detailed assessment and approval process. For smaller scale development, mitigation would be identified though environmental review and application of good practice guidance. Potential impacts and possible mitigation requirements or opportunities for environmental enhancement are identified for each option type in Table 8.6 below.

Table 8.6 – SEA of general option types

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
Lose Less										
Leakage Reduction	**Definition**: The identification, assessment and repair of pipelines to reduce leakage from their existing network is a priority area for Irish Water. This can involve a range of measures for actively detecting and repairing leaks such as better identifying customer leakage activity through water meters and advanced monitoring tools and techniques to better identify leaks. Leakage reduction will focus on targeted replacement of ageing pipes, pressure management to minimise fluctuations and excessive pressures providing more constant pressures to Irish Water customers whilst reducing bursts and application of different leak repair approaches to minimise cost and disruption.									
	Construction (short term)									
	-	0	0	-	-	0/-	0	0	-	-
	Operation (long term)									
	+	+	0	0	0	0	+	+	0	0
	Assessment: Overall: a reduction in leakage rates will bring greater security of supply to the population in the area by reducing the proportion of water “lost”. However, there will be short-term disturbance where construction works that may be required to undertake network repairs or replacement. For example, in disruption due to traffic, dust and noise during repair and replacement works. Construction: impacts on designated sites, such as cultural heritage sites, geological heritage sites and biodiversity sites, are possible but of low likelihood, as the pipes will generally be replaced within existing infrastructure footprints. Some short-term disturbance during construction may be likely but especially where pipelines are routed along roads or pavements and traffic or access is disrupted. In some cases, pipelines may cross designated sites or be located close to sensitive sites. The existing and replacement pipelines are generally buried, therefore, following good quality re-instatement, there should be no long-term impacts on the landscape or visual amenity of the area. Watercourse crossings, and some protected habitats and species, may be more difficult to avoid where existing routes cross these areas. However, commonly practiced mitigation measures can minimise the effects. Operation: Reduced water leakage will be associated with reduced energy consumption from the pumping and treatment of water and an associated decrease in carbon footprint. This is also associated with lower operational costs, with less wasted water treatment and pumping, and can reduce the amount of water that needs to be abstracted which can also contribute to improving resilience to the impacts of climate change.									
	Mitigation: Application of good construction practices, traffic management and the identification of any works in designated sites or near sensitive receptors to ensure appropriate measures are taken.									

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
Use Less										
Education and Awareness	**Definition:** Water use efficiency improvements to contribute to reducing per capita, household and business water consumption - through a range of educational and awareness raising approaches including Educational Awareness Campaigns and distribution of educational materials and online audits to raise awareness of the potential effects of water shortages and encourage water conservation and efficiency measures.									
	Construction (short term)									
	N/A									
	Operation (long term)									
	+	+	0	0	0	0	+	+	0	0
	Assessment: Overall: education and awareness measures can contribute to improved security of supply through long term water savings. Participation would be voluntary and aimed at reducing inefficient water use. Construction: not relevant Operation: No significant impacts on water, biodiversity, landscape, soils, cultural or geological heritage are anticipated, as the option type does not involve construction. Benefits from improvements to water efficiency are associated with water savings, with reduced pumping and treatment energy consumption also resulting in reduced carbon emissions and contributing to a reduced demand; this also supports supply resilience.									
	Mitigation: Effective communication programmes to optimise effectiveness and take up of water conservation measures.									
Water Efficiency	**Definition**: Water efficiency improvements can involve a range of measures, including the use of water efficient appliances and processes, especially in new and refurbished housing developments, working with building standards improvements for water efficiency measures, encouraging take up of water efficiency measures by domestic and non-domestic customers, such as more efficient appliances, repair of leaking toilets and use of water audits. Partnerships with business customers and industry to develop water efficiency goals. Investigating how to use water within Irish Water's existing assets more efficiently through improved treatment processes and recycling of effluent water for appropriate uses.									
	Construction (short term)									
	0/-	0	0	0	0	0	0	0	0	0
	Operation (long term)									
	+/-	+	0	0	0	0	+	+	0	0

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	Assessment: Overall: water efficiency can contribute to improved security of supply through water savings. Construction: there could be minor disruption to people from application of water efficiency measures or installation of appliances however participation is assumed to be voluntary. No significant impacts on environment in terms of water, biodiversity, landscape, soils, cultural or geological heritage are likely, as the measures do not usually involve construction works. Waste may be generated due to replacement of inefficient appliances. Operation: benefits would occur in terms of water savings as associated reductions in pumping and treatment energy and carbon. Water savings can also contribute to supply resilience. Not all social groups will be equally able to take advantage of schemes on offer.									
	Mitigation: Linkage to education and awareness raising can encourage uptake and consideration given to those measures being accessible across all social groups.									
Recycling and Re-Use	**Definition**: The recycling of treated wastewater or grey water can provide a supplementary water source for non-potable activities, therefore, alleviating stress on primary water sources. Grey water refers to the relatively clean wastewater from baths, sinks, washing machines, and other kitchen appliances. In periods of drought, in comparison to potable water which can be in short supply, wastewater and grey water can be an abundant and valuable water source for activities such as agricultural and landscape irrigation, industrial process, and toilet flushing.									
	Construction (short term)									
	0/-	0	0	0	0/-	0	0	+/-	0	0
	Operation (long term)									
	+/-	+	0	0	0	0	+	+	0	0
	Discussion: Overall: grey water use can be valuable replacement for potable water use and contribute to water savings. Construction: potential minor disruption for installation of systems if not part of new build or refurbishment but assumed to be voluntary schemes. Operation: the public health and safety issues with respect to recycling and reusing are well known, particularly that recycled water can contain *E.coli* or other harmful bacteria, so the appropriate use of the recycled water is important, and safeguards may be required. The benefits are through contributions to improving water efficiency reducing water demand pressure, especially at critical periods, thereby contributing to resilience and also to decreased carbon emissions through water savings.									
	Mitigation: Public and operative health and safety risks and hygiene requirements need to be considered as appropriate for each scheme.									

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
Metering	**Definition**: Building a better understanding of water use and network pressures through water metering to improve water efficiency and, therefore, improve water security and identify leaks. Water meters with advanced analytics to undertake flow balances across the network can allow Irish Water to gain a better understanding of the whole network from the abstraction point to the customers.									
	Construction (short term)									
	-	0	0	0	0	0	0	0	0	0
	Operation (long term)									
	+/-	+	0	0	0	0	+	+	0	0
	Assessment : Overall: information from metering can support more efficient use of water and contribute to improved security of supply through water savings. Construction: minor disruption to people from installation of meters. No impacts anticipated in terms of water, biodiversity, landscape, soils, cultural or geological heritage Operation: benefits in terms of supporting water conservation practices leading to water savings and with associated reduced demand and improved supply resilience. Water savings are associated with reduced carbon emissions.									
	Mitigation: Provision of information on installation and linkage to educational and awareness raising and water conservation measures.									
Supply Smarter										
Surface Water										
Surface Water **Abstractions**	**Definition**: Increasing the abstraction at an existing river or lake source or developing a new river or lake source from which water can be sustainably abstracted. These options would be subject to abstraction licencing.									
	Construction (short term)									
	-	-	0	-		0	-	-	-	-
	Operation (long term)									
	+	-	0	-	-	0	-	-	0	0

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	Assessment: Overall: new or increased surface water sources can cause some short disruption during construction but in the long-term will contribute to improving available water supply resources and, therefore, can contribute to maintaining or improving security of supply and access to water, with associated resilience benefits as part of a wider resource plan. Construction: new sources generally require construction of new infrastructure to support the abstraction, such as new intakes on the river, transfer pipelines and new or expanded WTPs and service reservoirs. New intakes can affect bank side habitats and channel geomorphology. Pipeline construction and WTPs can cause temporary impacts on traffic and access. Increases to existing abstractions generally have the advantage of making use of existing infrastructure, including pipelines and WTPs; although, additional pipeline reinforcement or new pipelines and WTP expansion may be required depending on the increase in abstraction. Associated new infrastructure should avoid designated sites through appropriate siting/routing but they can result in disturbance of archaeological assets. Impacts on biodiversity, landscape and soils will depend on the quality of construction management and reinstatement. Operation: new or increased abstractions could result in impacts on water resources and potentially water quality where dilution of pollutants is reduced. However, the significance of the effect will depend on the water availability for each specific river or lough source and the sensitivity of the water source (as represented by the WFD status), nature conservation designations, and the aquatic species, including fisheries supported and the value for recreation linked to these. Increased abstraction has the potential to reduce water levels, increase the risk of low flow conditions and change river flow and channel characteristics and also impact water quality by reducing the dilution and assimilation capacity of pollutants. Changes to river flow characteristics can affect fish migration. Surface water abstractions can reduce resilience to climate change with associated sensitive aquatic species and water dependent habitats becoming more vulnerable to other environmental pressures. New or increased surface water abstractions will require hydrological assessment to determine the long-term impacts and the sustainable levels of abstraction allowed to ensure long-term impacts are avoided or mitigated; also taking into account wider environmental and recreation uses in climate change effects. Operational rules can be applied to avoid abstraction beyond specific flow limits. New supporting infrastructure such as new pipelines can involve significant energy usage for treatment and pumping. These impacts are likely to be less significant for increases to existing abstractions where the infrastructure is in place and increased energy use is likely to be proportional to additional water volume.								
	Mitigation: Environmental flow linked abstraction limits to minimise impact on summer low flows or fish migration periods. Long-term monitoring and adaptive management/operational approaches to river management to minimise ecological and amenity impacts from abstraction. Catchment management to improve water quality can also reduce treatment issues with wider environmental benefits.									
Groundwater										
Groundwater Abstraction	**Definition**: Increasing the abstraction at an existing groundwater source or developing a new groundwater source from which water can be sustainably abstracted. These options would be subject to an abstraction licence.									

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	Construction (short term)									
	-	-	0	-	-	0	-	0	-	-
	Operation (long term)									
	+	-	0	-	0	0	0	0/-	0	0
	Assessment: Overall: new and increased groundwater abstractions can contribute to security of water supply as part of a plan. Construction: groundwater abstractions can require new supporting infrastructure such as new boreholes, pipelines and pumping stations (see pipeline transfers) and WTP expansion (see WTPs). Increased groundwater abstractions can often make use of existing infrastructure. Boreholes siting usually provides some flexibility to avoid sensitive sites. Operation: groundwater abstractions can have negative impacts on groundwater resources due to local drawdown and by reducing the volume of water held within the aquifer; hence, there is the potential for reduced contaminant dilution. Abstraction from unconfined aquifers with connectivity to nearby or lower catchment rivers and wetlands can affect the flow and quality of linked surface waterbodies and water dependent ecosystems, with potential for adverse impacts on amenity, recreation and biodiversity. Where an abstraction causes drying out of wetlands this can also affect associated archaeological remains. Abstraction from confined aquifers can often avoid impacts on surface waterbodies. New and increased abstractions will require detailed hydrogeological assessment to determine sustainable levels of abstraction and potential connections to rivers, water dependent habitats and potentially archaeological assets.									
	Mitigation: Detailed studies required to determine abstraction regime that will not result in significant negative impacts on groundwater waterbody WFD status, associated surface waterbodies and water dependent habitats and species. This may include rainfall linked abstraction limits to minimise the impact on groundwater resources and on low flows in associated surface waterbodies.									
Aquifer Storage Recovery	**Definition**: Storage of treated or raw water in suitable aquifers. During times of plentiful water, excess water withdrawn from a river, lake or another groundwater source is injected and stored within an aquifer. This supplementary stored water can be extracted from the aquifer during periods of dry weather and/or increased demand when the primary supply sources are running low. This requires aquifers with suitable characteristics to be available as risks of losses can be high.									
	Construction (short term)									
	-	-	0	-	-	0	-	-	0	-
	Operation (long term)									

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	+/-	+/-	+/-	+/-	0	0	+/-	0	0	0
	Assessment: Overall: aquifer storage recovery options can contribute to security of supply as part of a plan. However, construction of the required boreholes and other infrastructure generates dust, noise and traffic which could temporarily affect access and amenity for local residents. Construction: aquifer storage and recovery can require new supporting infrastructure such as pipelines and pumping stations (see pipeline transfers) and WTP expansion (see WTPs). Operation: abstraction for aquifer storage can have negative impacts on surface water courses, groundwater dependent ecosystems (as covered for groundwater and surface water), although, as for storage reservoirs, the aquifer storage can reduce the need for abstraction from nearby surface water sources in low flow conditions. There could be negative impacts on the water quality of the storage aquifer (and any linked surface waterbodies, habitats and soils) if the injected waters differ in chemical or microbiological properties to that of the storage aquifer. This would depend on the quality of the source water and the transmissivity and potential for attenuation and any treatment. The pumping involved in aquifer storage and recovery can be energy intensive in comparison to other water supply options. Conversely, there is also the potential to improve the groundwater status of the storage aquifer, and recharges can help support baseflows of connected rivers during dry months (although this might also be a loss to supply), with consequent beneficial impacts on linked surface waterbody status and ecosystems. In theory, this aquifer storage and recovery can help support supply resilience by storing “excess” water captured during winter months for use during drier periods, but there is usually considerable uncertainty over how a scheme will work in practice and the potential to recover injected water and how the water will move within an aquifer. There is also potential for concerns over increased flood risk.									
	Mitigation: Understanding of the aquifer through detailed study is required. Careful management of the timing and location of the abstraction and location of injection sites can minimise impacts.									
Reservoirs										
Storage Reservoirs	**Definition**: Provision of storage reservoirs which can be filled with untreated water abstracted from surface waters during high flow conditions to be drawn on for supply during low flow periods or to provide additional resilience during droughts as a back-up supply source.									
	Construction (short term)									
	-	-	0	-	-	-	-	0	-	-
	Operation (long term)									
	+	+/-	+/-	+/-	0	-	-	+	-	0

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	Assessment: Overall: a new reservoir or extensions to existing reservoirs can play an important role in improving security of water supply and supply resilience as part of a plan. Storage reservoirs can be either bunded or impoundment. In general, positive and negative impacts can be similar, although, the visual impact of impounded reservoirs can be relatively less than bunded reservoirs, as they do not typically require bunding of the same scale. However, the impacts on aquatic biodiversity may be greater if the reservoir is online within an existing watercourse, and disturbances to downstream flow regime and upstream in terms of fish migration may be greater. Fish passes are likely to be required to minimise impacts on fish migration. Construction: there is likely to be a loss of habitat, disturbance to wildlife, loss of soils and local landscape and cultural heritage impacts as a result of the loss of land to reservoir construction. These impacts would occur within the reservoir construction footprint. However, there may be some short-term disturbance in terms of dust, noise and traffic disruption during construction that could affect nearby residents. Storage reservoirs can involve large scale infrastructure, therefore the energy costs and carbon emissions associated with construction are relatively high. Operation: potential abstraction impacts will be similar to the new surface water abstraction option (see above), although reservoir storage can provide the benefit of using only high flows for filling and therefore can avoid pressures during low flows. Where there is potential to reduce stress or augment low flows, reservoirs can support environmental resilience. Bunded reservoirs in particular can be visually intrusive and can have a negative impact on local landscapes and on the setting of nearby heritage features. However, reservoirs can also provide the potential for significant habitat creation and opportunities for new or additional land and water based recreational activities. Reservoir operations can involve transfers of large volumes of water and can have high operational energy and carbon depending on pumping and water transfer requirements.									
	Mitigation: Detailed hydrological and ecological studies to determine an abstraction regime that will not result in significant negative impacts on waterbody WFD status or downstream and upstream ecological receptors. Fish passes and intake screens should be part of design. Mitigation may include flow linked abstraction limits to minimise impact on summer low flows or fish migration periods, operating rules to include compensatory releases to support or augment downstream flows, detailed siting of reservoir and associated infrastructure to minimise permanent impacts on important features and land uses, design of reservoir and surrounding land to optimise benefits, and potential to use renewable energy sources for pumping and water treatment.									
Catchment Management	**Definition**: Activities such as agriculture, forestry, industry and waste management all have an impact on the retention of water in the catchment and the quality of the water within rivers and loughs. Pollutants in the water can lead to ecological deterioration, increased flood risk and can also create issues for water treatment. There may be scope for changes to land management through working in partnership with landowners, farmers and regulators to develop agreements and share information and resources to provide long term improvements.									
	Construction (short term)									

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	N/A									
	Operation (long term)									
	+	+	+	+	0	0	+	+	0	+
	Assessment: Overall: catchment management can provide long-term benefits to water supply and environment, mainly through improving water quality. Construction - not relevant as catchment management measures do not typically require construction of new infrastructure as they are more about how land is managed. Operation: catchment management measures aim to protect existing water sources as an environmental resource through improvements to water quality and, in some cases, also to flow characteristics. These can include restoration of wetland habitats, restoring flood plain function, improvements to forestry and agricultural management to reduce erosion and runoff with high sediment, fertiliser and pesticide concentrations. Water quality improvements can provide benefits in terms of: • Addressing water quality issues which are not fully removed through some treatment processes, resulting in either improved availability of water or reduced treatment costs • Improved water quality in surface waterbodies with biodiversity and recreational benefits In some cases, catchment management can lead to improved retention of water in upper catchments, which can reduce flood risk, reduce low flows, and can improve soil quality of benefit to the farming industry and for biodiversity.									
	Mitigation: Key actions that can support effective programmes, including, studies of systems linked to the specific water quality or resource issue, to prioritise and focus efforts along with suitable monitoring, effective communication with land managers and stakeholders, and the provision of incentives are important for achieving benefits.									
Effluent Reuse										
Effluent Reuse	**Definition**: Additional treatment of effluent from waste WTPs can produce a new supply source from wastewater which is otherwise discharged to rivers or the sea. This involves treating wastewater to a sufficiently high standard to meet supply standards relevant for the intended use. For example, for agricultural/horticulture/industry or for release to rivers upstream supporting river flow before water supply abstraction downstream.									
	Construction (short term)									
	-	-	0	-	0	0	-	0	-	-
	Operation (long term)									

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	+/-	+/-	+/-	+/-	+/-	+/-	-	+	0	0
	Assessment: Overall: the potential public health and safety and water quality issues regarding conventional effluent reuse are well documented. However, where Reverse Osmosis (RO) is incorporated within the wastewater treatment process, the risks to water quality from effluent reuse are substantially reduced. Construction: effluent reuse treatment plants may be located close to the source WwTP, but some will also require new supporting infrastructure, such as long pipelines, to transfer treated water upstream for river discharge (see pipeline transfers) and WTP expansion (see WTPs). The excavation of soil and site clearance during construction can impact waterbodies, habitats and species and archaeology. Operation: adequately treated effluent discharges can help support river flows and water quality during dry periods, with beneficial impacts on water-based recreation and aquatic ecology. However, returning additional water into the watercourse can increase flows and cause negative impacts on water quality and aquatic ecosystems; especially if the chemical composition, temperature or pH of the of the discharged effluent differs from the receiving water. In addition, RO produces a brine waste effluent which can have negative impacts on water quality and aquatic ecology around the point of discharge – this waste is normally designed to be discharged to the marine environment, and impacts will depend on the sensitivity of the location and the dispersion and dilution of the effluent. RO is an energy intensive process and is usually associated with high carbon emissions. However, as for desalination, the use of effluent reuse can be limited to peak demand periods so could be used to reduce pressure on other sources. Given this potential use and the nature of the source, effluent reuse is considered to support climate change resilience.									
	Mitigation: Use of treatment and dispersal technologies appropriate to the source effluent and receiving waters can minimise water quality and aquatic biodiversity impacts and risks to drinking water quality. Appropriate timing of use could avoid discharge which increases flood risk, and there is potential for the mitigation of carbon emissions by sourcing renewable energy supply. For RO treatment design of brine effluent disposal to either use existing sea outfall or new pipeline routing, dilution and dispersal technology to minimise impacts on the marine environment.									
Desalination										
Desalination Coastal / Brackish	**Definition**: This involves the process of removing salt and other minerals from seawater or brackish water river estuaries to make it suitable for human consumption and/or industrial use. The process is energy consumptive and requires the discharge of highly saline effluent back into the environment. The level of treatment required is related to the salt concentration of the water.									
	Construction (short term)									
	-	-	0	-	+/-	-	-	0	-	0
	Operation (long term)									

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	+/-	-	-	-	+/-	-	-	+	0	0
	Assessment: Overall: desalination can contribute to supply security as part of a plan. This option type requires a relatively high level of new infrastructure construction. Intakes from coastal waterbodies can cause disruption to recreation/economic activity on the coast, depending on location. Construction: significant impacts to geology and soils are unlikely but the built infrastructure could have potential impacts on the landscape and cultural heritage, depending on the location of plant and pipelines. There may be scoped to minimise these types of impacts by siting within or close to existing industrial development Operation: desalination is an energy intensive process. Abstraction from estuarine waterbodies could have negative impacts on water quality and flow, with resultant impacts on biodiversity. In addition, the desalination process generates brine waste which is usually designed to be discharged to the marine environment and, depending on the dispersion and dilution of the effluent, can have negative impacts on water quality and biodiversity; this is also dependent on the location of the discharge outfall. Intakes can cause significant entrainment effects affecting a zone around the intake. Sea water as a source provides greater resilience and reduced impacts compared to estuarine sources.									
	Mitigation: Potential mitigation of carbon emissions reducing energy use or by sourcing renewable energy supply, for example, the use of biogas energy. Mitigation can include long sea outfalls and dispersal technology for brine discharge.									
Water Transfers										
Transfers	**Definition**: A water transfer is the physical movement of water from one area to another, usually via pipelines, although other means such as the use of canals or aqueducts can be used. These generally refer to the transfer of treated water and can vary considerably in scale; in terms of size and length from local transfers from one WRZ to another to regional transfers and inter-company transfers (from Northern Ireland).									
	Construction (short term)									
	-	-	0	-	-	-	-	0	-	-
	Operation (long term)									
	+	0	0	0	0	0	-	+	0	0

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	Assessment: Overall: water transfers can contribute to security of supply as part of a plan, but long transfers can involve significant pumping energy and carbon costs, and construction can cause short term disruption to traffic and disturbance to land use. Construction: construction of transfer infrastructure along road routes can cause disruption to traffic, dust and noise. Most impacts on designated sites can be avoided through detailed routing studies, particularly for habitats and features that are difficult to reinstate and especially cultural heritage, archaeological and geological heritage sites. Watercourse crossings and protected habitats may be difficult to avoid completely. However, commonly practiced mitigation measures can minimise the effects significantly. Operation: where transfers are gravity-based they can have minimal energy requirements but often water transfers involve significant energy for pumping water over long distances with associated carbon emissions. Water transfers can contribute to network flexibility and through this provide potential for supply resilience. This flexibility allows water to be transferred from areas with greater water availability to those under more stress and can contribute to environmental climate change resilience. This depends on how the transfers are operated. The pipelines will normally be buried and with good reinstatement there can be minimal long term impacts on, for example, agricultural land, habitats, landscape or visual amenity.									
	Mitigation: Where possible, pipeline routing can avoid direct impacts on existing built infrastructure (residential and commercial), cultural heritage features and designated sites (biodiversity and geological heritage sites). However, there is potential for long term effects on designated wetland sites where drainage could be permanently affected, and on habitats that are difficult to reinstate. Directional drilling and other trenchless methods can be used for where sensitive sites cannot be avoided and for river crossings; unless WFD studies indicate other methods would be suitable. Mitigation measures for routing, design and construction management should be adopted as identified through site-specific surveys, for example, ecological (habitat and species), arboricultural, cultural heritage, landscape and visual, contaminated land, flood risk and drainage surveys, traffic/access. Use of standard good construction management measures to minimise disruption from noise, dust, traffic and access for local communities. Minimise spread of INNS through good biosecurity practices along pipeline construction area. Good quality reinstatement of habitats and landscape features – provide enhancements, for example, through habitat creation. Development of soil and waste management plans.									
Tankering	**Definition**: Delivery of treated water to customers via road tanker to alleviate temporary short-term water shortages for certain localised situations.									
	Construction (short term)									
	N/A									
	Operation (long term)									
	+/-	0	0	0	0	0	-	-	0	0

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	Assessment: Options of this type would provide a source of water in drought or supply failures. However, they are not considered to be a secure and reliable supply of water. This option is usually a temporary measure. Tankering provides flexibility for taking available treated water to the areas required. However, there are carbon, practicality and logistic issues where large quantities are required over a longer period.									
	Mitigation: None identified but more suitable for temporary, small-scale or emergency uses.									
Other Network Improvements										
Expansion of Service Reservoirs (Bankside)	**Definition**: Service reservoirs store treated water. They are used to balance out the steady supply of treated water they receive from WTPs and the fluctuating variations in customer demand during a 24-hour period. They can also be used to store a backup supply in low flows events but for a limited period of time.									
	Construction (short term)									
	0	-	0	-	-	-	-	0	-	-
	Operation (long term)									
	+	0	0	0	+/-	-	+/-	+	0	0
	Assessment: In general, positive and negative impacts would be as described above for storage reservoirs but the reservoirs are usually much smaller scale and can be constructed underground. This gives more flexibility to locate them avoiding significant environmental constraints. They are used to store treated water so can provide additional supply resilience to the network and are not associated with direct impacts on the aquatic environment. Minor visual and landscape effects as a result of expansion.									
	Mitigation: See Storage Reservoirs.									
WTP Expansion and Process Losses	**Definition**: Expansion of existing WTPs to facilitate the treatment of a higher volume of water. There can be opportunities to improve efficiency through the upgrading and installation of more complex treatment processes to reduce process losses and therefore increase the water available for use.									
	Construction (short term)									
	0	0/-	0	0/-	-	0/-	-	0	0/-	0/-
	Operation (long term)									
	+	+/-	0	0	+/-	0	0	+	0	0

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	Assessment: (See surface water or groundwater abstraction options for impacts associated with any increased abstraction supporting WTP expansion) WTP expansion and works to reduce process loss will result in greater security of supply by allowing the plant to treat and deliver more water with benefits to security of supply. The works are often located within an existing operational site or adjacent to a site. Depending on the proximity of receptors there could be some short-term disturbance and disruption in relation to traffic, noise and dust during the construction phase. Expanded WTP are unlikely to result in significant additional landscape effects but where undeveloped land is used there could be potential for cultural heritage, biodiversity or habitats impacts. However, these are likely to be small scale and mitigated through design and good construction practices. The increased operational output of a plant will involve associated increases in the consumption of energy and carbon emissions. However, WTP expansion can contribute to a more secure supply network and improve resilience to climate change. Process loss reduction can improve the efficiency of the WTP and reduce discharge of wastewater. However, no significant impacts on the environment in terms of landscape, biodiversity, cultural heritage, geology and soils are likely, as improvement works are usually limited to the updating of existing infrastructure within the site footprint									
	Mitigation: Potential to adjust design and size of WTP to avoid impacts on important features and mitigate local construction effects on nearby receptors. There is also the potential to apply a residuals management strategy to identify opportunities to improve management of wastes and minimise pollution risk.									
General Network Improvements	**Definition**: Network improvement involves infrastructural improvements, such as upgrade, replacement or operational improvements. They are undertaken to facilitate better water distribution and avoid network limitations. Therefore, strategic network reinforcement improving connections between different sources and customer supply can significantly improve supply security and resilience.									
	Construction (short term)									
	-	-	0	-	-	0	0	0	-	-
	Operation (long term)									
	+	+	0	0	0	0	0	+	0	0

Option type sub-category	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
	Assessment: Network replacements and improvements will bring greater security of supply to the population in the area. However, there can be short-term disturbance in terms of disruption due to traffic, dust and noise during the construction works. Impacts on designated sites, such as cultural heritage sites, geological heritage sites and biodiversity sites, are unlikely, as the infrastructure will be replaced within the existing footprints. The majority of improvements will be on infrastructure that is underground. Therefore, following re-instatement there should be no impact on the landscape or visual amenity of the area. Watercourse crossings and some protected habitats and species may be more difficult to avoid where existing infrastructure crossed these areas. However, commonly practiced mitigation measures can minimise adverse effects. Where improvements reduce leakage, there should be a decrease in the carbon footprint and operational costs. Some improvements will be aimed at increasing capacity.									
	Mitigation: Application of good construction practices and identification of any works in designated sites or near sensitive receptors to ensure appropriate measures are taken.									

8.4 Interaction between the draft Framework Plan and other plans and programmes

To meet the requirements of the SEA Directive, Irish Water has considered the potential for cumulative effects of the draft Framework Plan with other relevant plans or programmes. In undertaking the cumulative assessment, Irish Water has considered the interaction between other plans and programmes with the draft Framework Plan. Legislation and policies relevant to the plan have been reviewed as part of the review of plans, policies and programmes in Chapter 1 and Appendix A to shape the scope of the assessment. This section concerns the cumulative effects with other plans and programmes as a result of implementation of the draft Framework Plan.

The potential areas for interactions between the NWRP and other plans and programmes which may result in cumulative effects are summarised in Table 8.7.

Table 8.7 – Interrelated plans and programmes

Plan or programme	Description of interrelationship
Ireland 2040: Our Plan, National Planning Framework (Government of Ireland, 2018)	The National Planning Framework has replaced the National Spatial Strategy 2002-2020. It outlines how the country will grow and develop with the necessary funding for infrastructure and services. The plan outlines that Ireland could have an additional one million people by 2040 and one of the key needs identified is that "*clean water will be needed for homes, farms, and industry*". The plan seeks to achieve ten strategic outcomes, one of which is "*Sustainable Management of Water and other Environmental Resources*". The draft Framework Plan has used the National Planning Framework's population projections at a national and regional level to predict demand when calculating the SDB for the plan period (25 years). The draft Framework Plan aims and objectives mirror the National Planning Framework strategic outcome mentioned above in that it aims to ensure a safe and reliable supply of water to meet the national domestic and business customer expectations and support social and economic growth, by assessing: • Water available for supply to customers; • Current and future demand; • Climate change impacts on water availability and demands; • SDB and the scale of potential deficits; • Identification and assessment of options to meet deficits; • Environmental impact of the options; and • Option selection and recommendations.
National Development Plan 2018-2027 (Government of Ireland, 2018)	Sets out the investment priorities that will underpin the successful implementation of the National Planning Framework. The draft Framework Plan and future Framework Plans will outline investment in water services and infrastructure throughout a similar period in order to achieve the strategic aim of "Sustainable Management of Water and other Environmental Resources". The National Development Plan details €8.8 billion investment in water infrastructure and makes note of example water supply developments that future iterations of the Framework Plan may recommend.
Capital Investment Plan (2016–2021) (Department of Public Expenditure and Reform, 2017)	The Capital Investment Plan sets out a six-year framework for substantial infrastructural investment in Ireland until 2021. The Capital Investment Plan takes into account projects planned by Irish Water, including the €4 billion investment that Irish Water will make

Plan or programme	Description of interrelationship
	during 2016–2021.
National Mitigation Plan (Department of Communications, Climate Action and Environment, 2017)	On 31 July 2020, the Supreme Court quashed the National Mitigation Plan. However, this Framework Plan will ensure that carbon emissions associated with the construction and operation of potential water resources, residuals management and drought measures are managed as far as reasonably possible, and that carbon emissions and carbon costs are factored into the decision-making process.
National Adaptation Framework: Planning for a Climate Resilient Ireland (2018)	The NAF specifies the national strategy for applying adaptation measures in different sectors. The Framework Plan will assess the effectiveness of water resource options in relation to its resilience against climate change and extreme weather events. The NAF encourages similar measures to that of the NWRP, for example, using scarce sources more efficiently. The Framework Plan will look at sustainable use of water as a resource, demand management options and raising awareness for the need to conserve and protect water as an environmental resource.
National Landscape Strategy for Ireland 2015-2025 (Department of Arts, Heritage and the Gaeltacht, 2015)	There is potential for future options such as reservoirs or WTPs to affect the landscape of an area. An objective of the National Landscape Strategy is to "*establish and embed a public process of gathering, sharing and interpreting scientific, technical and cultural information in order to carry out evidence based identification and description of the character, resources and processes of the landscape*". The draft Framework Plan Multi-Criteria Analysis (MCA) methodology will take into account the impact on landscape when screening options.
National Biodiversity Action Plan (2017-2021)	There is potential for effects on biodiversity features from network improvements or new water resource infrastructure which will be recommended in future iterations of the plan. Protection of biodiversity features have been incorporated into the SEA objectives and MCA assessment methodology in order to influence the Framework Plan. BFF01 states, "*Protect and where possible, enhance terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species resulting from Irish Water's activities*".
RBMP (2018 – 2021) (Department of Housing, Planning, Community and Local Government, 2017)	The RBMP summarizes the waterbodies that may not meet the environmental objectives of the WFD during the plan period. The RBMP identifies the pressures which may result in environmental objectives not being achieved. The RBMP has identified WFD risks and pressures to waterbodies across the country. The plan has outlined that, of all waterbodies (river and lake waterbodies) assessed to date by the EPA, at least 30% are "At Risk" of not meeting their environmental objective of "Good" or "High" status. The key pressures leading to these risks have been identified in Chapter 6.3, in which water abstraction has been named as a significant pressure. Therefore, the impacts of new sources on the WFD objectives of each waterbody have been incorporated into the draft Framework Plan methodologies. The draft Framework Plan MCA has been developed to ensure that the potential impact to RBMP and WFD objectives is considered when assessing all proposed options.
Regional Spatial and Economic Strategies; Northern and Western Region	The objective of Regional Spatial and Economic Strategies shall be to support the implementation of the National Planning Framework and will replace the existing Regional Planning Guidelines. The

Plan or programme	Description of interrelationship
	RSES's will soon be the main framework for identifying key areas of priority investment in infrastructure and services, including water. Therefore, investment decisions made in future iterations of the NWRP will need to be in line with the new regional spatial and economic strategy recommendations for the area. The RSES's support the economic policies and objectives of the Government by providing a long-term planning and economic strategy for the development of the region. The Northern and Western Regional Assembly covers the county councils of Cavan, Donegal, Leitrim, Galway, Mayo, Monaghan, Roscommon, Sligo and the city council of Galway.
Regional Spatial and Economic Strategies; Eastern and Midland Region	The Eastern and Midland Regional Assembly covers the county councils of Dun-Laoghaire-Rathdown, Fingal, Kildare, Laois, Longford, Louth, Meath, Offaly, South Dublin, Westmeath, Wicklow and the city council of Dublin.
Regional Spatial and Economic Strategies; Southern Region	The Southern Regional Assembly covers the county councils of Carlow, Clare, Cork, Kerry, Kilkenny, Tipperary, Wexford, the city council of Cork, and the city and county councils of Limerick and Waterford.
County and City Development Plans	Planning Authorities are legally required to make County and City Development Plans which sets an agenda for development to make adequate provision for the scale of population growth projected. The draft Framework Plan will assess demand for each WRZ based on National Planning Framework population growth projections, and future Framework Plan iterations will propose water resource options to supply that projected demand.
Local Area Plans	A LAP is a legal or statutory document prepared in accordance with Part II, Section 20 of the Planning and Development Act 2000 as amended. These must set out objectives for the proper planning and sustainable development of a specific area. These objectives must be relevant to the local area and consistent with the provisions of the County or City Development Plan. There is potential for the Framework Plan proposals and water resource options that are developed under the plan to relate to the Local Area Plan objectives.
County Landscape Character Assessments	There is potential for future options such as reservoirs or WTPs to affect the landscape of an area. The draft Framework Plan MCA methodology will take into account the impact on landscape when screening options. An SEA objective on landscape has been developed, "Protect and, where possible, enhance designated landscapes resulting from Irish Water's activities" which has influenced the development of the screening methodology.
City and County Heritage Plans	City and county councils are responsible for making a Heritage Plan which sets out the aims and objectives for protecting built and natural heritage. These have been taken into consideration when drafting the cultural heritage SEA objective and will be taken into consideration when gathering data and information for the assessment of future options against the cultural heritage objectives.
Water Services Strategic Plan (WSSP)	The WSSP's objectives are to (WS2) Manage the availability and reliability of water supply now and into the future; and (EN1) Ensure that Irish Water services are delivered in a sustainable manner that contributes to the protection of the environment. There are a total of 68 strategies, 17 of which are to ensure a safe and reliable water

Plan or programme	Description of interrelationship
	supply and ten of which are to protect and enhance the environment.
Catchment Flood Risk Management (CFRAM) Programme (2011 onwards)	The CFRAM Programme identifies measures and options for managing the flood risks for localised high-risk areas within catchments as a whole and prepares a strategic Flood Risk Management Plan. There is potential for cumulative effects if water resource management options and flood relief measures are proposed within proximity of the same receptors, such as watercourses, habitats and cultural heritage sites. In the next iterations of the draft Framework Plan, when location-specific options are recommended, a cumulative impacts assessment will be conducted on all options in relation to options or measures proposed in other plans. This would take into consideration flood relief measures proposed near a proposed water resource management option.
Flood Risk Management Plans (2016)	The details of the flood risk and proposed feasible measures for each of the 300 studied communities is set out in 29 Flood Risk Management Plans, one for each river basin. There is potential for cumulative effects if water resource management options and flood relief measures are proposed within proximity of the same receptors, such as watercourses, habitats and cultural heritage sites. In the next iterations of the draft Framework Plan, when location-specific options are recommended, a cumulative impacts assessment will be conducted on all options in relation to options or measures proposed in other plans. This would take into consideration flood relief measures proposed near a proposed water resource management option.
Regional Development Strategy: Building a Better Future 2035	The NWRP should consider the impacts to the aims and objectives of the Regional Development Strategy for Northern Ireland. Which, similarly to the National Planning Framework for Ireland, aims for balanced sub-regional growth and recognises the importance of key settlements as centres for growth and investment, dealing with climate change as a key environmental and economic driver, and the importance of rural communities. It aims to maximise the use of existing infrastructure and services.
NI Water (2020) Our Strategy 2021-2046	Since the environment, particularly the water environment of Ireland and Northern Ireland are linked, the Framework Plan will need to identify proposals where there could be potential interaction with strategy or plan proposals and will need to follow transboundary consultation requirements. The NI strategy document includes aims for NI Water strategy measures to: • Continue to aim for sustainable levels of abstraction; • Recognise the challenges posed by climate change; • Protect conservation sites that depend on water; • Safeguard water resources through effective catchment management, considering the interaction between quality and quantity; • Promote water efficiency measures, with water companies contributing to water efficiency commitment; • Reduce leakage further; and • Incentivise efficient use of water.

Plan or programme	Description of interrelationship
NI Water (2020) Water Resource and Supply Resilience Plan	As identified above, the environment (and particularly water environment) of Ireland and Northern Ireland are linked. With respect to the WRRP, potential interactions could occur between those options included within the WRRP which lie within NI Water's South West and South WRZs on the border of Northern Ireland and Ireland and options included within Regional Groups 1 and 4 if and where catchments are shared. Potential cumulative effects would likely be limited to effects on water quality and quantity or flood risk but may also include biodiversity receptors.

Plans and programmes identified within Table 8.7 which are considered most likely to generate significant cumulative effects against one of more of the SEA objectives for the draft Framework Plan based on the high level assessment of different option types provided in Table 8.6. Table 8.8 also indicates the likely nature (positive, negative or mixed positive and negative) of the identified potential cumulative effect. As shown in Table 8.8 key cumulative effects would relate to water quality and quantity, climate change adaptation and also biodiversity. At Stage 2 during completion of the SEAs for the Regional Plans the exact nature and magnitude of cumulative effects with other plans and programmes (including developments) will be confirmed and mitigation for significant negative effects identified where practicable, in accordance with the methodology outlined in Chapter 9.

Table 8.8 – Potential cumulative effects against SEA objectives

Plan or programme	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
Ireland 2040: Our Plan, National Planning Framework (Government of Ireland, 2018)	+									
National Adaptation Framework: Planning for a Climate Resilient Ireland (2018)		+/-					+/-	+		
RBMP (2018 – 2021) (Department of Housing, Planning, Community and Local Government, 2017)		+/-	+/-					+/-		
Water Services Strategic Plan (WSSP)		+	+					+		
Catchment Flood Risk Management (CFRAM) Programme (2011 onwards)			+/-							
Flood Risk Management Plans (2016)			+/-							
NI Water (2020) Water Resource and Supply Resilience Plan		+/-		+/-						

8.5 Transboundary

Northern Ireland Water recently published a 25-year plan for managing supply and demand in Northern Ireland (Water Resource and Supply Resilience Plan (WR&SR Plan), March 2020). The plan recommends a number of options, including trunk main transfers and demand management.

There are river and groundwater catchments in Ireland that are shared with Northern Ireland. In the event that the Regional Plans involve, for example, an option which could cause impacts to waterbodies within any of these catchments, there is potential for transboundary effects. In such a case, impacts on these areas would need to be assessed, including cumulative impacts with the Northern Ireland WRS&R Plan, and consultation will be required. The assessment would need to address the potential for associated impacts on environmental designations, such as SACs, SPAs, Ramsar sites, WFD waterbodies and other environmental receptors.

8.6 SEA recommendations for implementing the draft Framework Plan

This section identifies recommendations for actions or measures to include with the implementation of the draft Framework Plan to mitigate potential environmental risks and impacts and contribute to achieving SEA and plan objectives. The recommendations address the approach set out in the draft Framework Plan for identifying the need for water resources and drinking water quality and developing solutions covering current and future actions based around the Three Pillars (Lose Less, Use Less and Supply Smarter). The SEA recommendations are taken forward as part of the Environmental Action Plan in Chapter 10 and their implementation is committed to within the draft Framework Plan (see Chapter 8.3.8.2).

8.6.1 Identifying the need – quantity, quality and reliability

Quantity – supply demand balance

Abstractions and supply side yield assessments

Irish Water is reviewing the sources they operate, taking into account the estimates of their hydrological yields and potential allowable abstractions they have developed for this plan. More stringent environmental standards may mean that abstractions that were once regarded as acceptable may now be considered to be unsustainable, particularly in dry weather conditions, in the context of new legislation. These abstractions may in the future be subject to modifications to meet the requirements of the WFD. Irish Water have assessed existing abstractions and taken a precautionary approach based on their current understanding of how abstraction legislation might be applied. This suggests certain schemes may be subject to reduction in abstraction. As the objective of the NWRP is to achieve, safe, secure, reliable and sustainable supplies, all new abstractions developed by Irish Water as part of the Regional Water Resources Plans will be based on conservative assessments of sustainable abstraction (Chapter 3.7.2 of the draft Framework Plan)

Surface Water Yield estimates used in the draft Framework Plan are desktop calculations. For strategic and sensitive sites or where significant infrastructure investment is planned under the Supply Smarter pillar, actual field measurement will be required to confirm the estimated yields. Flow and water level data were collected at 140 abstractions during low flow conditions in summer 2018 and these have been extremely useful in defining yields. However more site data will permit improved understanding of abstraction during all weather conditions over time. Surface Water Yield is a key component of the SDB. Irish Water will continue to work with the EPA to further develop a targeted flow gauging programme to increase the confidence in their yield estimates.

The Second Cycle RBMP identified approximately 250 water bodies sensitive to increased abstractions. Irish Water will work with the relevant organisations to scope and conduct the required investigations to determine the degree of sensitivity of these water bodies to abstractions. This may lead to abstraction reductions at some sites, potentially increasing a Supply Demand deficit (see Chapter 7.3.4 of the Draft Framework Plan).

EAP1 Environmental Recommendations
Information collection and actions to improve supply resilience and levels of service and reduce pressure on sensitive sources are supportive to SEA objectives.
EAP1.1 Link investigation on supply risks to environmental resilience and avoiding damage to vulnerable habitats and protected areas; especially European designated sites, and threats to WFD water body objectives.

Demand side data improvements: planning for future developments

The draft Framework Plan identifies that demand forecasts include projections set out in the NPF 'Project Ireland 2040 - Our Plan' and information from the subsequent Regional Assemblies. These demand growth forecasts are recognised as high level but based on government policy appropriate for the 25-year Plan. The plan identifies that as the Regional Water Resources Plans are developed in phase 2, Irish Water will work with Local Authority partners to refine short-term demand projections based on committed development and local area plans where available.

The need to collect additional data on non domestic demand to understand water useage trends from different industry sectors is identified.

Water efficiency is expected to play a significant role in future demand and the need to understand the likely effectiveness of potential efficiency measures is identified with proposals to undertake a series of pilot studies so that applicable approaches on water efficiency can be factored into future iterations of the Plan (see Chapter 7.3.4 of the Draft Framework Plan).

EAP2 Environmental Recommendations
Improved water demand forecasting and WRZ configuration can improve supply flexibility and reduce the need to find new water sources. Information on non-domestic water demand and potential for water efficiency measures to provide savings can also provide a basis for future initiatives and measures that can reduce need for new water sources.
EAP2.1 Reviews of WRZ configuration can consider potential environmental benefits from rationalisation opportunities to improve operational efficiency for waste and energy use and also reduce need for developing new sources.
EAP2.1 Feed information on potential for water efficiency improvements to provide savings into future options identification

Drinking water quality and reliability

The draft Plan identifies ongoing programmes addressing risks to water quality driven need. Due to the range of treatment Barrier issues across Irish Water's asset base, water quality issues will be considered as part of water resources planning, alongside supply demand balance issues. Where Irish Water are investing in water treatment works, they will ensure these are suitably sized to meet the target level of service and can operate sustainably. However, due to the condition of the existing asset base and the large number of sites to be addressed, it may take several investment cycles before the appropriate risk controls is in place across all supplies (Chapter 5.10 of the draft Framework Plan).

EAP3 Environmental Recommendations
Identifying raw water quality and reliability issues and linking to resource planning and potential actions such as WTP/network rationalisation or catchment management can support SEA objectives.
EAP3.1 Understanding causes of water quality issues for drinking water can support catchment management actions. Link clean water element (RC3) on water quality compliance and ongoing programmes on improving drinking water quality to potential for long term solutions through to long term catchment management opportunities to reduce pollution in groundwater and surface waters and water treatment issues.
EAP3.2 Link Drinking Water Safety Plans to scoping of Study Areas, prioritisation and options development process including consideration of catchment management opportunities.
EAP3.3 Link ongoing projects with the supply demand assessments, scoping area studies and prioritisation for new investment. Consider as part of investment proposals for water treatment works – wider rationalisation opportunities with opportunities to reduce abstraction pressure on stressed sources and potential for improvements to residuals management (see also EAP 11.1)
EAP3.4 Value environmental and social benefits as well as costs in options development process (using environmental economics tools) to value long term solutions such as catchment management.

8.6.2 Delivering solutions – approach

The draft Framework Plan identifies the Three Pillars approach underpinning current actions for Lose Less, Use Less and Supply Smarter and cross pillar actions as a basis for improving data collection and inform future decision making.

Climate change

As part of the commitment to building resilience in their water supply system, Irish Water have recently completed the Climate Sensitive Catchments Project with the Irish Climate Analysis and Research Unit (ICARUS) in Maynooth University. This project has identified the catchments in Ireland which are most sensitive to climate change and has developed and applied an innovative assessment methodology considering water resources and drought propensity.

The project output identifies those catchments most sensitive to climate change including an assessment of their sensitivity to drought. It considers water quantity and temperature change impacts both on flow regimes and to water quality.

The next step in order to use this data, is the development of an application process for the research outputs into their Hydrological Yield assessments. As this work is happening in parallel with this draft Framework Plan, Irish Water will seek to bring the findings from the Climate Sensitive Catchments Project into future SDB calculations as they are updated over the coming years (draft Framework Plan Chapter 7.3.4).

EAP4 Environmental Recommendations
Identifying catchments/sources sensitive to climate change can lead to actions supporting SEA objectives.
EAP4.1 Take account of effects of climate change effects on protected areas and WFD objectives as well as water supply.
EAP4.2 Results completed, and ongoing climate change studies should be used to inform future scoping of Study Areas/WRZs and the types of solutions considered and prioritisation for investment.
EAP4.3 Long term actions to improve water retention in upper catchments as well as catchment wide water quality initiatives could be considered as responses.

Lose less: leakage reduction

The National Leakage Reduction Programme targets a net saving of 50 million litres per day by the end of 2021, which are included in the Supply-Demand Balance forecasts. In line with best practice, the draft Framework identifies that the long-term objective will be to reduce leakage nationally to the Sustainable Economic Level of Leakage. The initial objective is to achieve Sustainable Economic Levels of Leakage in the Greater Dublin Area where the current need is the greatest (see draft Framework Plan Chapter 7.3.1 and Appendix H SELL Report).

EAP5 Environmental Recommendations
Reducing leakage has benefits from reducing pressure to find new sources and provides energy and carbon savings and is supportive to SEA objectives
EAP 5.1 Take forward studies and actions supporting meeting leakage targets and include consideration of reliving pressure on existing deficit areas and abstractions with sustainability issue and drought risks

Use less: water conservation

Irish Water continuously review all relevant available data to develop their understanding of customer behaviours and household water usage and the draft Framework Plan recognises that further studies will be required to improve understanding of the extent to which water conservation can influence the SDB.

Irish Water will continue to actively promote water conservation in schools, businesses and communities through activities including:

- National and Local Media Campaigns;
- Targeted Sectoral campaigns;
- Green Schools;
- Water Stewardship Scheme; and
- First Fix Free Scheme.

Water conservation public information campaigns continue to be an important part of Irish Water's overall communications approach and the draft Framework Plan recognises that these will require continued sustained research, investment and stakeholder engagement. Due to limitations in data, savings from these activities are not included the demand forecasts.

The draft Framework Plan identifies the need to review all relevant available data to develop understanding of customer behaviours and household water usage. Further studies will be required to improve the understanding of the extent to which water conservation can influence the SDB (Chapter 7.3.2 of the draft Framework Plan).

EAP6 Environmental Recommendations
Promoting water conservation supports SEA objectives.
EAP6.1 Link to raising awareness on environmental benefits of water conservation.
EAP6.2 Consider customer research on the water supply and demand management including water efficiency options development along with local community and stakeholder views.
EAP6.3 As data is developed to support understanding on water conservation, develop water conservation /water efficiency options to be considered as part of the Options Assessment Methodology for future plan cycles.

Supply smarter: capital investment and improved questions

Irish Water are currently implementing an investment programme in water supply infrastructure which includes water treatment plant upgrades to improve the Level of Service to customers (see Chapter 7.3.3 of the draft Framework Plan). See Environmental Recommendations EAP3, 4 and 5 in relation to linking ongoing programmes and future water resource planning.

Drought planning

Information for assessing drought risks

Within the draft Framework Plan, Irish Water stated that they would like to provide a reliable supply of water to customers with a Level of Service of 98% (equivalent to allowing water supply failures one year in every 50 on average). They have identified the challenges predicted in doing this over the next 25 years. At present these actions may be triggered far more frequently than the Level of Service, a reflection of the lack of robustness of their existing assets. An important aspect of drought planning and management is identifying emerging droughts and ensuring suitable steps are taken to manage the impacts. This requires routine monitoring against indicators which, as trigger levels are passed, denote the drought stage reached, and the actions required. A number of indicators are required to represent the different source types, including rivers, reservoirs, and groundwater (See draft Framework Plan Appendix E Drought Planning).

EAP7 Environmental Recommendations
Drought management and planning can help to make the system more resilient to extreme weather events such as freeze/thaw, storms and droughts and reduce effects on customers and the environment.
EAP7.1 Identify the risks from potential drought actions for water sources designated for nature conservation value and supporting protected species - include lessons learned from the 2018 drought.

Key factors in identifying environmental risk include the potential to impact on the following environmental sites:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) – European protected areas;
- Ramsar sites (most 41/46 are covered in SACs or SPAs) – internationally protected sites;
- Natural Heritage Areas (NHAs) – national protected sites;
- Proposed NHAs – nationally protected sites;
- Flora and Fauna protected under the Wildlife Act, 1976 as amended – national legislation for species protection; and
- European protected species.

Environmental mitigation of drought measures

Demand management measures for drought are generally not expected to have significant environmental impacts. Awareness raising information campaigns to encourage voluntary consumer savings, when introduced early enough, can reduce or delay the need for some of the supply management measures. Recent examples are the extensive national and intergrated public awareness campaign during the drought of 2018, also in spring 2020 Ireland experienced an historically dry spring, some of the more vulnerable supplies started to come under stress. Therefore a public information campaign on water conservation began earlier than in previous years. During this same period the impact of changed water use due to Covid-19 was also significant, with an increase in domestic water consumption due to increased home hygiene and hand washing.

More extreme droughts requiring enforced customer restrictions, while rare, could have disproportionate effects on some customers; especially vulnerable groups or businesses dependent on water use.

Some supply-side drought measures have the potential to affect the environment, either through the associated construction to allow additional abstraction or as a consequence of the additional water taken. Furthermore, wastewater discharges with less dilution available during drought periods of low flow have the potential to cause pollution incidents. The 2018 drought highlighted a number of areas where routine operations have created the potential for environmental stress requiring mitigation.

In some areas, it may not be possible to deliver a drought response that does not include a temporary environmental impact, and the acceptability of that impact must be judged against:

- Degree of risk to supplies;
- Potential recovery post-drought; and
- Possible impacts in the drought situation without interventions.

Environmental assessments will be required for sources identified at risk, the environmental assessments will include, as a minimum:

- Likely changes in flow/level regime, due to implementing the drought management action;
- Features that are sensitive to these changes;
- Likely impacts on sensitive features;
- Mitigation that may be required to prevent or reduce impacts on sensitive features;
- Monitoring proposals; and
- Appropriate Assessment (AA) may be required where the sources affect European protected areas.

Mitigation measures may be possible on a temporary basis which could limit the nature of the impact or aid recovery post-drought. The mitigation will be site-specific and time-specific and will be developed in consultation with stakeholders. The following are generic mitigation measures that Irish Water will consider:

- Fish rescues;
- Fish ladders regularly checked;
- Increased presence to restrict poaching and protect spawning areas;
- Habitat restoration;
- Reductions of abstractions, with increases at less sensitive abstractions if possible;
- Freshet releases;
- Flow augmentation structures to enhance water depth/flow velocity; and
- Ensuring adequate post-drought monitoring.

The environmental assessments for at risk sources will need to be prepared in advance of drought measures being needed.

Implementation of the draft Framework Plan will provide an opportunity to identify potential for long term measures to avoid the need for temporary drought measures where these can have significant adverse effects on the environment. (See draft Framework Plan Appendix E Drought Planning).

EAP8 Environmental Recommendations
Demand management measures for more severe droughts involving restrictions on water use could have impacts on customers; especially vulnerable groups or areas of economic activity. Drought measures related to increasing abstraction at sources can cause damage to protected sites and species.
EAP8.1 Assess potential impacts of drought restrictions on customers, especially vulnerable groups, to identify both communication requirements and exemptions on restrictions relevant for each management area.
EAP8.2 Develop drought communication plans and identify approaches to avoid impacts on vulnerable water users, for example, through exemptions – plan to provide customers with information early so that voluntary measures can be effective in avoiding the need for additional measures in most cases, and taking forward the approaches from the 2018 summer drought and 2020 spring drought.
EAP8.3 Prepare environmental assessments (including AA) for sensitive water sources at risk from drought management actions. These should be available in advance of measures being needed. They should include consultation on the assessments with environmental authorities and identify specific monitoring or mitigation measures.

Residuals approach

Irish Water's existing WTP infrastructure produces waste which is generated during the chemical and physical treatment processes, called residuals. When implementing measures to improve the supply from their assets, Irish Water will also look at the management of the residual and seek to reduce the impact of this waste on the environment (see draft Framework Plan Appendix L Residuals).

The environmental impacts from residuals management will be considered as part of the options assessment process, for example, where rationalisation or enhancement of WTPs is proposed. The existing risk issues will also be identified in Study Area scoping.

EAP9 Environmental Recommendations
Improvements to residuals management can contribute to SEA objectives to minimise risk from discharges to waterbodies and through good practice waste management addressing additional solid waste.
EAP9.1 Include consideration of residuals management in the options development process involving WTPs or rationalisation opportunities
EAP9.2 Apply the waste management hierarchy with any solid waste disposal limited to appropriate licensed sites.

8.6.3 Delivering solutions: options and approach assessment methodology

Integration of environmental and sustainability considerations

Implementation of the proposed methodology for integrating environmental and sustainability considerations into the options and approach development process, as outlined in Chapter 9 provides a basis for finding sustainable solutions for balancing future water supply and demand.

EAP10 Environmental Recommendations
Integration of environmental and sustainability considerations in the selection of Preferred Approaches for each Study Area can contribute to meeting SEA objectives. Environmental economics tools, including natural capital accounting and ecosystems services assessments approaches, can provide supportive tools for quantifying costs and benefits to inform the assessment.
EAP10.1 Study Area scoping to include analysis of environmental baseline issues, risks, constraints and opportunities to inform identification of initial options as providing context for the option development process.

EAP10 Environmental Recommendations
EAP10. 2 Further development of the environmental and social impact valuation methodology as a tool for the approach appraisal process, based on ecosystems services assessment/natural capital assessment principles, can support cost benefit analysis and MCA methodologies and provide quantitative information supporting SEA in the future.
EAP10.3 Comparison of combinations of options (or approach) should include assessment of cumulative effects for each Study Area (groups of WRZs) and be considered in determining the best value approach. Justification for the approach selected will need to be provided.

Transboundary issues

The potential for transboundary effects and cumulative effects with key relevant plans in Northern Ireland will be included as part of the options and approach assessment and SEA and the results of these assessments will be identified and consulted on through, where relevant, through the Regional Plans and SEA reporting.

EAP11 Environmental Recommendations
The option development process provides an opportunity to consider potential for transboundary effects early on and to identify scope to avoid or mitigation to minimise these.
EAP11.1 Ensure potential for transboundary impacts are considered during options assessment and early consultation is undertaken to inform the assessment process.

Delivering sustainable solutions

The options development and assessment process undertaken for the Regional Plans provides valuable information to feed into follow-on studies at the start of the project level process. Therefore it is important to link the SEA objectives, mitigation measures and recommendations identified through the options and approach assessment process and the SEA and Appropriate Assessment into Plan implementation, monitoring and feedback.

EAP12 Environmental Recommendations
Application of the options development and assessment process incorporating SEA objectives and the SEA assessment will provide a framework for finding sustainable solutions to balance future demand and supply and inform project level studies and provide a basis for monitoring and feedback.
EAP12.1 Link the options development information and SEA mitigation recommendations into the initial studies and designs for selected project level schemes so that assumptions and mitigation recommendations are taken forward.
EAP12.2 Development of procedures to integrate good practice approaches for avoiding/mitigating environmental impacts and identifying enhancement opportunities in future scheme design and development.
EAP12.3 Ensure environmental mitigation and study requirements are covered in option costing and risk aspects are taken into account in scheme development.

9

SEA Influencing Regional Water Resources Plans (Phase 2)

9.1 Introduction

This chapter outlines how SEA objectives and assessment requirements are integrated into the draft Framework Plan proposed methodology to be applied through each of the four Regional Plans:

- option development and appraisal; and
- approach appraisal and preferred approach selection.

SEA requirements are highlighted in the methodology for:

- assessing reasonable alternatives;
- cumulative effects assessment;
- assessment of the proposed preferred plan and identification of mitigation measures; and
- development of a monitoring plan and feedback.

Key framework assessment matrices for these steps are provided to illustrate how the assessment will be undertaken at each area level, WRZ, Study Area, for the whole Region and covering inter-Regional requirements.

9.2 Options and approach assessment methodology

The Options Assessment Methodology is outlined in Chapter 9 of the draft Framework Plan.

The methodology is based around an option development process which will be rolled out as part of the Regional Plans. The process aligns with the seven standard steps set out in the Department of Public Expenditure and Reform (2019) guidance document "*Public Spending Code: A Guide to Evaluating, Planning and Managing Current Expenditure*". For the NWRP methodology, these steps are identified as:

1. Identifying need - based on SDB and/or Drinking Water Safety Plan Barrier Assessment.
2. Scoping of the Study Area (WRZs) – understanding the Study Area and the existing conditions of assets, supply and demand issues as well as environmental constraints and opportunities.
3. Identifying potential options for consideration relevant to the Study Area.
4. Coarse screening – assess the unconstrained options and eliminate any that will not be viable.
5. Further option definition, information collection and preliminary costing.
6. Fine screening – options assessment and scoring against the key criteria with further removal of options identified as unviable and development of feasible options for costing and scoring assessment update.
7. Approach appraisal – comparison and assessment of combinations of options identified to meet the predicted supply demand deficit to determine the preferred approach.
8. Monitoring and Feedback into Plan – a feedback mechanism to ensure that the Framework Plan continuously adapt to changes such as evolving scientific data, understanding, and policy change in relation to the natural environment.

The SEA process has been applied across each of these steps as identified in Figure 9.1 below. In the description of the methodology in this chapter, key elements of the process relevant for the SEA process and supportive of SEA objectives are identified in green text boxes.

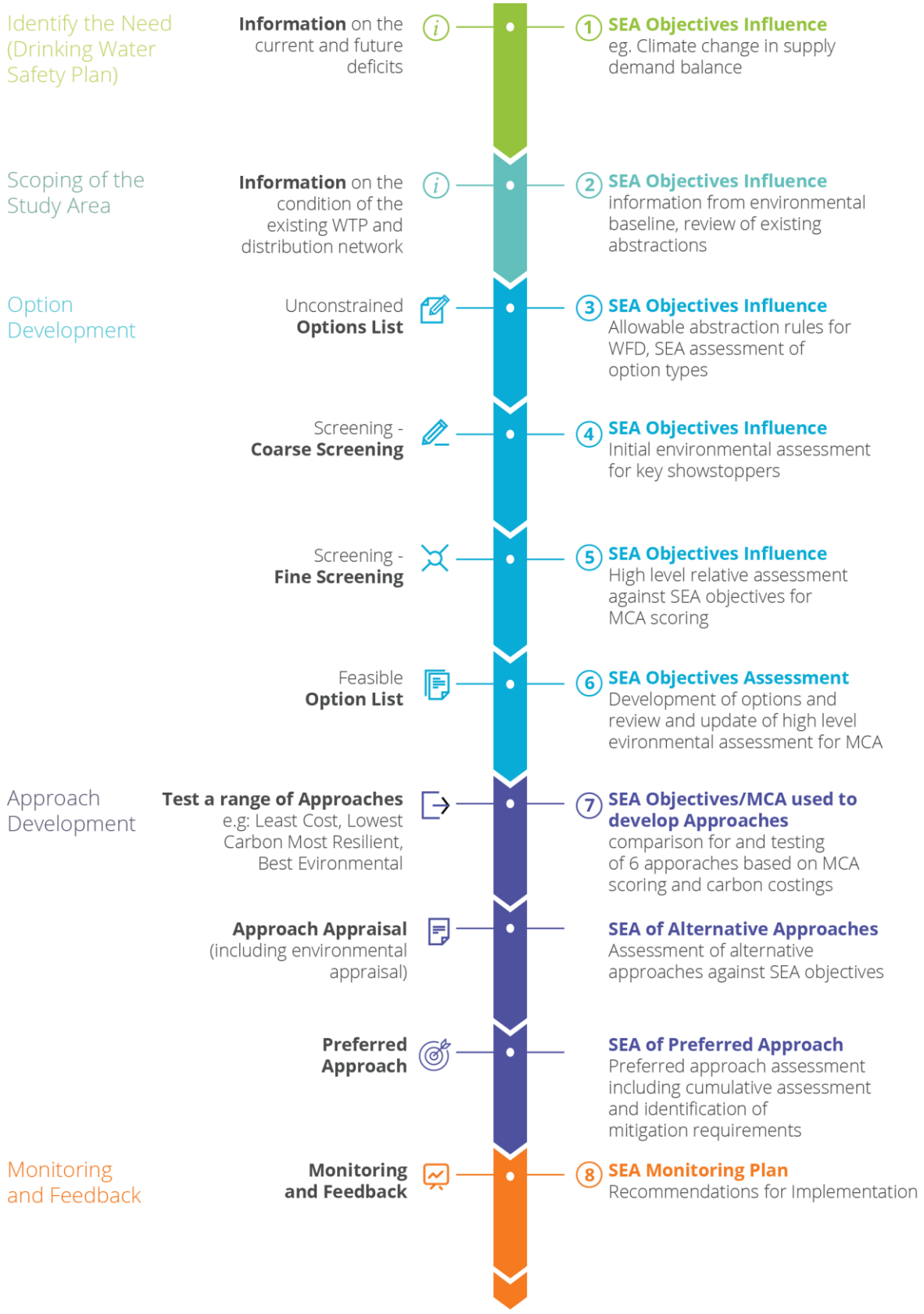


Figure 9.1 – Option and Approach Development Process

The methodology is focused on ensuring that Irish Water promote solutions that are resilient, environmentally sustainable, and flexible to the changing environment and demands. It will help Irish Water to identify the most appropriate individual or combination of options to meet an identified need following their Three Pillar approach to Lose Less, Use Less and Supply Smarter.

This chapter describes the methodology Irish Water use to develop a preferred option or combination of options to meet a need. It sets how Irish Water will have tested a range of options (in isolation and combination) against a range of criteria which reflect the objectives of the NWRP and SEA.

Irish Water proposed Options Assessment Methodology is based around the following five criteria:

- Resilience;
- Deliverability and Flexibility;
- Progressibility;
- Sustainability (Environmental and Social Impacts); and
- Cost.

Key aspects for integration of SEA objectives are outlined for each step in Chapter 9.3 – Chapter 9.10.

Figure 9.2 – Option types

9.3 Stage 1: Identify the Need

The process starts with the needs identification process (both quantity and quality), as described in Chapters 4 to 7 of this report. This provides context for the Options Assessment Process and informs the scale of the solutions required.

SEA Integration:

Environmental aspects related to SEA objectives include:

- climate change affecting future water supply; and
- public health requirements for access to good quality drinking water.

9.4 Stage 2: Scoping of the Study Area

The Study Area boundaries are based on WFD catchments and WRZ location and type. Further details on grouping WRZs into Study Areas are provided below.

9.4.1 Identify needs for the Study Area

A detailed programme of consultation and workshops with Local Authority operators and stakeholders is undertaken at this stage to ensure a full and comprehensive understanding of need across each Study Area.

The first stage of Options Assessment Process is to understand the Study Area and the existing condition of the assets.

SEA Integration:

SEA recommendation is to consider environmental constraints and opportunities as part of this needs study and to link to other initiatives and ongoing projects, such as the climate sensitive catchments, drinking water quality assessments and WTP residuals disposal management.

This stage allows Irish Water to take account of required maintenance or refurbishment work in the options considered for the area. For example, if a WTP in the Study Area is coming to the end of its lifecycle, requiring a complete refurbishment within the next 10 years, this should be allowed for in any proposed option either as a WTP refurbishment or a replacement of the supply from other WTP(s).

9.4.2 Abstraction sustainability

At this stage Irish Water will also consider the status of their existing abstractions as well as identify opportunity to improve abstraction process and water quality. As mentioned in Chapter 1.3 under key issues, current water supplies often come from small local rivers where abstraction may be unsustainable. Irish Water must ensure that their abstractions will not adversely impact the environment over the next 5 to 25 years so that Ireland complies with its obligations under the Water Framework Directive. At this stage, Irish Water will build this information in the SDB to ensure any considered options allow them to plan for a reduction of supply from these sources.

SEA Integration:

This stage includes consideration of abstraction sustainability in relation to identifying level of allowable abstraction (related to SEA objective on water) for new abstraction. WFD water body status and objectives are taken into account through a review of existing abstractions and in the identification of new options. This is applied as a rule so that new options can meet allowable abstraction criteria.

9.5 Stage 3: Unconstrained Options

The need informs the type and scale of options that Irish Water need to consider. These options will be taken from the generic water resource types. Sub-variants of each option type are also provided.

Whilst options are listed individually, an approach to meet a need may be provided from a combination of these options. For example, to meet a deficit of 10 million litres per day, the preferred approach could be achieved by increasing the abstraction from the existing source by 6 million litres per day, reducing leakage by 3 million litres per day and reducing consumption through demand management measures by 1 million litres per day.

A list of options called the “Unconstrained Options” list, is developed from generic option types and then assessed to produce a more refined “Constrained Options” list.

The unconstrained options are all the **possible solutions**, which either fully or partly resolve a water supply deficit, regardless of any cost, environmental or social constraints. In developing the unconstrained list, Irish Water identify options that are applicable to meet the needs of the Study Area. This includes:

- A review of any options identified by Irish Water that have not been committed to in the Investment Plan;
- A review of options previously considered by Local Authorities;
- A review of options identified in other strategy documents, approaches and projects; and

- Ideas generated at workshops with regional operational staff drawing on their knowledge and experience of the supply system and the geographical area.

Irish Water do not generally include options that they know will not be practicable to implement or suitable to meet a need. For example, Irish Water would not include an option to abstract water from a source that they knew would not be sustainable due to limitations on the hydrological yield.

The unconstrained list can include options at a WRZ, Study Area, Regional Group or even inter-regional. Regional and inter-regional options will possibly address deficits in Study Areas comprising multiple WRZs across the country.

9.6 Stage 4: Coarse Screening

The unconstrained options list is refined using a screening assessment, which enables Irish Water to rule out any unviable options. The reduced list is termed the "Constrained Options" list. These options can then be carried forward for detailed evaluation against the key criteria at the Fine Screening stage.

Coarse Screening of the unconstrained options is undertaken to eliminate options that have fundamental issues meaning they are unlikely to ever be delivered. The Fine Screening (Stage 5) which follows is data intensive and requires a further level of analysis of all options. Coarse Screening reduces the number options that need to be considered at the Fine Screening stage, providing robust justification of why certain options are discounted. Coarse Screening also highlights any viable options that have some constraints, which would warrant further assessment at the Fine Screening stage.

The Coarse Screening assessment uses the criteria listed in Table 9.1, with options scored against a red, amber or green (RAG) traffic light system shown in Table 9.2.

Any option which scores "red" against a question has a fundamental issue and is discounted, unless, it is assessed that mitigation measures can be applied. For example, an option that has its abstraction source within a designated European site. In this case, it would need to be confirmed that the abstraction would be within allowable abstraction limits based on the standard rules applied or that more detailed studies have been undertaken to determine that the abstraction would be within allowable limits for the site conservation objectives to be met.

An amber rating across any of the criteria will not rule an option out, however, it will highlight that this option might require mitigation or will be constrained to a certain extent. For example, the construction of an option could result in visual impacts for the local community which could be mitigated through screening of the construction site.

A 'Rejected Options Register' is produced to record and explain all options that receive a red rating. During further iterations of this plan, options which have been eliminated in previous iterations of the plan may be reconsidered where new information changes the previous assessment.

SEA Integration:

Removal of options which are clearly likely to conflict with SEA objectives through coarse screening is supportive of the SEA objective. The environmental grounds for removing options will be clearly recorded.

Table 9.1 – Unconstrained Options Assessment criteria

Criteria	Unconstrained Option Assessment questions		Assessment Score
Resilience	Q1	Does the option address the supply-demand problem?	**Yes / Maybe / No**
Deliverability and Flexibility	Q2	Is the option technically feasible?	**Yes / Maybe / No**
	Q3	Can the risks and uncertainties associated with the option be mitigated to avoid failure of the option?	**Yes / Maybe / No**
Sustainability (Environmental and Social Impacts)	Q4	Can significant impacts on known high level environmental constraints for example European/ international or nationally designated biodiversity, landscape, cultural heritage sites, WFD objectives or community assets, be avoided or minimised? If not, is mitigation likely to be possible?	**Yes / Maybe / No**

Table 9.2 – Red, Amber and Green decision matrix

RAG matrix	Red	Amber	Green
Resilience	Does not address the supply-demand problem at all.	May address part of the supply-demand problem (with due consideration on the size of the deficit).	Fully addresses the supply-demand problem.
Deliverability & Flexibility	Option is not technically feasible. Associated risks and uncertainties are not viable and will result in a failure of the option.	There are some risks and uncertainties associated with the option but are not considered to be insurmountable at this stage.	Option is technically feasible. There are no associated risks or uncertainties which are unviable.
Sustainability (Environmental and Social Impact)	Likely significant impacts on European designated sites or WFD objectives* or important biodiversity, landscape designations, cultural heritage or community assets which cannot be avoided through design or where proposed mitigation is not feasible *options that cannot meet sustainable abstraction limits are removed unless more detailed study information provides a basis for different thresholds.	There are some impacts identified. However, they are not considered to be prohibitive at this stage due to the potential for improved design and/or mitigation.	No major issues or sensitivities identified at this stage.

9.7 Stage 5: Fine Screening

Fine screening involves an analysis of the Constrained Options against a range of detailed criteria, through a process known as Multi-Criteria Analysis (MCA). The objective of the MCA and the fine screening process is to determine the potential benefits and impacts of the options across a range of key criteria. It involves dividing the decision into smaller, more understandable parts and analysing each part before integrating those parts to produce a meaningful assessment.

The MCA process allows a combination of issues to be considered together. This can help indicate if one option will be more: cost effective, environmentally acceptable, sustainable, resilient or feasible when compared to other options. This process requires a more detailed analysis of the options and their potential benefits and impacts against the key criteria. Additional information on the potential benefits and impacts will be collated at this stage. This information may highlight issues with options which were considered to be feasible at the coarse screening stage but now are not considered viable. If Irish Water have a Study Area where there are a significant number of options, the fine screening process allows Irish Water to rule out options which do not perform well over a range of criteria.

The MCA methodology has been tailored to provide a structured and transparent approach to inform the decision-making process and to remove subjectivity, as far as reasonably possible. This also recognises that both monetary and non-monetary objectives may influence decisions.

The MCA approach applies a common set of questions to determine the relative merits of each option across the key criteria. The questions are developed by dividing the criteria from the coarse screening stage into detailed sub-criteria against which options can be assessed. Table 9.3 lists the criteria and sub-criteria environmental questions that are applied at the Fine Screening stage.

SEA Integration:

The SEA topics and objectives are the basis for identifying key questions and developing the criteria for the environmental assessment and for scoring of options in the fine screening/ MCA as listed in Table 9.3.

Table 9.3 – SEA option/approach and Fine Screening environmental questions

SEA theme	SEA objectives and scope of assessment	SEA option/approach assessment questions* (these questions are used to inform assessment against the objectives for individual options combinations of options and at plan level	Fine Screening options questions** (to inform numeric scoring for the MCA)
Population, economy, tourism and recreation, and human health	Protect and, where possible, contribute to enhance human health and wellbeing and to prevent restrictions to recreation and amenity facilities in undertaking water services.	Will the construction and operation of the option/approach impact public health and quality of life in terms of improved supply security or access to water? For example, will the construction or operation of the option/approach cause significant disturbance to sensitive receptors from dust, noise and/or traffic? Or does the option address drinking water quality issues that are identified on the EPA remedial action list?	Will the Option impact public health and quality of life, during construction?
			Will the Option impact public health and quality of life, during operation?
		Will the option/approach result in loss of recreational amenity, footpaths, or access to recreational amenity (including water based recreation and navigation)?	What is the impact on recreational amenities?
		Does the option/approach help to raise public awareness of the need for water conservation?	

SEA theme	SEA objectives and scope of assessment	SEA option/approach assessment questions* (these questions are used to inform assessment against the objectives for individual options combinations of options and at plan level	Fine Screening options questions** (to inform numeric scoring for the MCA)
Water environment	**Water quality and resources**		
	Prevent deterioration of the WFD status of waterbodies with regard to quality and quantity due to Irish Water's activities and contribute towards the "no deterioration" WFD condition and where possible, the improvement of waterbody status for rivers, lakes, transitional and coastal waters and groundwater to at least good status in undertaking water services.	Would the option/approach operation or associated construction activities create the potential for deterioration of waterbody status/quantitative status or conflict with or contribute to potential to achieve RBMP/WFD objectives for achieving good status (groundwater and surface water)? (covering surface water, groundwater and river channel/hydro-morphological aspects) For example, related to impacts from additional abstraction pressure on sources or does the option/approach address risk to the water environment from drinking water treatment residuals?	Would the option or associated construction activities affect WFD Status of water body, in terms of quantity and quality for surface water?
			Would the option or associated construction activities affect WFD Status of water body, in terms of quantity and quality for groundwater?
			Would the option or associated construction activities affect WFD Status of water body, in terms of hydro morphology?
		Would the option/approach reduce pressure on the water environment through water savings or improvements to water quality?	Would this Option reduce pressure on water environment through water savings?
	Flood risk		
	Protect and where possible reduce risk from flooding as a result of Irish Water activities.	Is there a potential for this option/approach to increase flood risk, for example increase base flow or result in loss of flood plain?	Is there a potential for this option to increase flood risk – e.g. increase base flow or result in loss of flood plain?
Biodiversity	Protect and where possible, enhance terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species resulting from Irish Water's activities.	Is there potential for the option/approach to result in significant adverse or beneficial effects on European or nationally designated sites (for example, by undermining the European sites' conservation objectives through direct or indirect effect pathways, including but not limited to direct loss of habitat, changes in hydrology) and/or terrestrial and aquatic populations of European or nationally protected species?	Is there potential to result in adverse effects on the integrity of a European site?
		Is there potential for this option/approach to result in significant adverse or beneficial effects national, county or local, designated sites or biodiversity interest (for example flora and	Is there potential to impact on an Annex species outside designated areas?
			Is there potential to impact on National designated

SEA theme	SEA objectives and scope of assessment	SEA option/approach assessment questions* (these questions are used to inform assessment against the objectives for individual options combinations of options and at plan level	Fine Screening options questions** (to inform numeric scoring for the MCA)
		fauna protected under the Flora Protection Order, Salmonid Regulations, 1988 and/or the Wildlife Act, 1976), for example through loss of significant areas of ecologically valuable habitat (woodlands/hedgerows/wetlands) and in particular irreplaceable habitats (ancient or long-established woodlands) or by undermining biodiversity objectives outlined in the National Biodiversity Action Plan or local county development/biodiversity action plan?	sites?
		Could this option/approach contribute to a significant increased risk in spreading Invasive Non-Native Species (INNS)?	Is there a risk of spreading Invasive Non-Native Species (INNS)?
Material assets	Minimise resource use and waste generation from the provision of new or upgraded existing water services infrastructure and management of residuals from drinking water treatment - to protect human health and the ecological status of waterbodies.	Will this option/approach conflict with critical infrastructure, or does the option conflict with existing business, planned land use or result in the loss of significant area of valuable agricultural land?	Will this Option conflict with critical infrastructure, or does the option conflict with existing business, planned land use or valuable agricultural land?
		Does the option/approach make use of suitable existing assets?	Will the Option make effective use of existing assets?
		Does this option/approach increase resource use and waste production, including waste to landfill, or does it promote waste treatment efficiency and waste reuse, for example improvements to the management of drinking water treatment residuals?	
	Minimise impacts on other material assets and existing water abstractions.	Would this option/approach affect other water users, for example through effects on existing groundwater abstractions*** or navigation?	(see question on navigation in water section above)
Landscape and visual amenity	Protect and, where possible, enhance designated landscapes resulting in undertaking water services.	Could this option impact landscape character areas, townscape character areas or important views – detract or improve?	Could this option impact the landscape character areas, townscape character areas or important views (detract or improve)?
Climate	**Climate change mitigation**		What is the level of

SEA theme	SEA objectives and scope of assessment	SEA option/approach assessment questions* (these questions are used to inform assessment against the objectives for individual options combinations of options and at plan level	Fine Screening options questions** (to inform numeric scoring for the MCA)
change	Minimise contributions to climate change emissions to air (including greenhouse gas emissions) as a result of Irish Water's activities.	What is the level of construction and operational carbon emissions associated with the option/approach – using indicator of level of emissions such as scale of construction or energy use or estimated tonnes?	construction and operational carbon emissions associated with the Option (tonnes)? (Overlaps with information considered for MCA questions on supply resilience)
	Climate change adaptation		
	Promote the resilience of the environment, water supply and treatment infrastructure to the effects of climate change.	Does the option/approach increase climate change vulnerability for the environment or add resilience?	
Cultural heritage	Protect and where possible, enhance cultural heritage interests.	Does this option have potential to damage, or detract from the setting of, designated cultural heritage assets or result in the loss of potential archaeological interest, or does this option contribute to protecting them?	Does this option avoid direct damage to, or detract from the setting of, designated cultural heritage assets, or does this contribute to protecting them?
Geology and soils	Protect soils and geological heritage sites and where possible contribute towards the appropriate management of soil quality and quantity.	Would any designated or non-designated geological features be damaged by an option, or is there a risk to significant areas of valuable soils or are there risks from contaminated land? Or could the option support improvement to soil quality and reduce erosion risks.	Would any designated or non-designated geological features, valuable soils, or contaminated land sites be affected?

*These questions are used in the SEA options and approach assessments against the objectives. All questions can be responded to by recording either negative adverse or positive beneficial effects/risks.

**These questions are used as basis for the MCA scoring - the fine screening assessment can identify additional showstoppers and reasons for removing options. All questions can be responded to by recording either negative adverse or positive beneficial effects/risk.

***Information on non Irish Water abstractions may not be available at strategic level and will need to be considered at project level.

Finally, the scoring guide for the evaluation against the Sustainability (Environmental and Social Impacts) criteria is set out below in Appendix D. The guide aims to support consistency in the assessment across different option types. For an example of how these have been applied as scoring rules see Case Study - Study Area 5 (SA5) Environmental Review document.

SEA Integration:

The fine screening environmental assessment is undertaken against SEA Objectives and sub-criteria as fine screening can be used to identify options for rejected at this stage. These are recorded in the rejection register and any environmental grounds for removal clearly stated.

The general aim is to keep options in for further consideration and to only remove options where there is a clear justification for doing so and to avoid unnecessary further option development and assessment work on unfeasible options. Where there is uncertainty or potential for issues to be addressed through design or mitigation options are retained.

9.8 Stage 6: Feasible Options List – Option Costing

The output of the Fine Screening stage is called the Feasible Options List. An outline design and estimated cost is developed for each option on the list. Summary option dossiers are produced for each feasible option.

SEA Integration:

Environmental performance against the SEA objectives as reflected in the MCA scoring against environmental criteria are reviewed and updated to reflect the option dossier information following outline design and scoring rules updated to reflect the assessment applied.

9.8.1 Environmental and social valuation

In addition to the construction and operational cost estimates and qualitative environmental options assessment, an environmental and social valuation of the option is undertaken to provide monetised values to feed directly into approach appraisal process.

SEA methodology is based primarily on qualitative assessment to consider if potential effects are likely to be significant, but this is informed by quantitative information such as GIS based analysis. In addition, where possible the valuation of environmental and social costs and benefits (including carbon) can be used to inform options appraisal. This involves monetising societal impacts and benefits and can be undertaken through a range of environmental economics tools, including natural capital accounting and ecosystems services assessment methodologies. These approaches are new and are still being developed but are likely to be increasingly used in the future.

The general impact categories that can be considered for valuation include:

- Biodiversity and ecology, including water quality, designated conservation areas and habitats, and agricultural land and carbon sequestration;
- Landscape amenity;
- Construction impacts (congestion costs); and
- Energy and climate change – valuation of greenhouse gas emissions from energy use or embodied in the production of materials and equipment.

The aim of the calculations is to capture and value significant residual impacts in relation to the categories examined for each option and this can be especially valuable for providing information on combinations of options. However, the categories that can be used depend on the option and environmental information available to allow quantification metrics and valuation.

An example approach for valuation of environmental and social costs and benefits applied using information available and based on Natural Capital framework approach is provided in the Case Study

- Study Area 5 (SA5) Environmental Review document. The approach proposed aims to avoid double counting with the qualitative assessment undertaken for the SEA.

9.8.2 Selection of options for the approach appraisal

The screening process provides MCA scores for the options which will or will not progress through for further consideration in the approach appraisal. As with the coarse screening the justification for rejecting options will be recorded and these can be reviewed in the future.

Where there are very large numbers of constrained options covering a range of option types providing sufficient choice for the approach appraisal, screening is useful for identifying the worst performing options. These can be removed or placed on a reserve list and the better performing options taken forward for further consideration in the feasible list. Any options which are discounted at this stage are recorded on the Rejected Options Register. Better performing options are taken forward for further consideration in the feasible list. This method can be appropriate for large WRZs or Study Areas.

For more limited numbers of constrained options within any WRZ or Study Area, screening is best used as a check. This is considered an appropriate method where options are likely to have been identified with some constraints and requirements already considered. Only options identified as clearly unfeasible, unsustainable or unviable will be removed. Where options perform poorly against specific sub-criteria, the potential for design or mitigation to address effects will be considered. If there is any doubt as to whether a particular option should be classified as feasible or not, then that option will be carried forward to the feasible list for further consideration.

Each option is subject to an objective assessment with uniform scoring criteria, based on best publicly available datasets. Options are scored using a seven-point Likert scale, from major adverse scoring -3 through to major beneficial 3, as set out in in the scoring guidance provided in Appendix N – Fine Screening Scoring Criteria.

SEA Integration:

The environmental MCA criteria are based on the SEA objectives from the SEA Scoping Report and consulted on with environmental stakeholders. Some criteria/screening questions may be more relevant to some options types than others.

Habitats Directive considerations have been integrated into the Options Assessment Methodology at a number of points to ensure both robust assessment and protection are integrated into the plan. In particular, this is demonstrated through the MCA/fine screening scoring for the European sites and biodiversity question (see Best AA approach, Table 9.4, Chapter 9.9.1) and again through consideration of mitigation measures to avoid adverse effects that have been identified.

The screening process provides MCA scores for each of the Feasible Options which then pass through to the Approach Appraisal stage for further consideration.

9.8.3 Summary of Options Appraisal and SEA

Summary of how the options appraisal process incorporates consideration of SEA objectives:

Pre-option screening application of allowable abstraction rules to new options to meet WFD requirements for good and high status water bodies. (Note: these are precautionary rules and, in some cases, available hydrological/hydrogeological studies or appropriate assessment may provide more specific information on the relevant thresholds).

Screening out of options considered with reasonable certainty as likely to have significant effects on the environment that are considered unlikely to be mitigatable.

Improving the options by making use of an **iterative process which will allow potential significant environmental issues for an option to be identified** and the potential to **address** these to be considered, **by** for example**:**

- **further option definition to address the concern, such as including information on allowable abstraction limits and operating principles;**
- **highlighting aspects where further design, siting, routing or embedding mitigation measures in design or operation rules is required for the next stage;**
- **identifying further information required to reduce the assessment uncertainty, such as aspects of design, option components, environmental information or information on nearby abstractors; or**
- **providing an opportunity to build mitigation measures and risk issues into option costings.**

These steps provide a valuable process for collecting information on the options and refining both the option design and capturing environmental assessment information which can be built upon in the next stage.

9.9 Stage 7: Approach Development

9.9.1 Test a Range of Approaches

The purpose of the plan is to examine all potential options that could be used to meet the need and then to eliminate those that are not feasible or that have identifiable environmental issues (at a desktop level).

After Fine Screening the Feasible Options are assessed individually or as option combinations forming different potential approaches to identify the preferred option or combination of options to meet the need for each WRZ, Study Area and Regional Group area.

A defined process has been identified to develop the Preferred Approach at the three spatial scales shown in Figure 9.3.

1. Assess the Feasible Options to develop a Preferred Approach for each WRZ. This would typically be expected to result in small local options, that can resolve need solely within all or part of the WRZ.
2. Assess the Feasible Options to see whether any group options are available to meet the need across multiple WRZs. This stage can yield modified Preferred Approaches at the Study Area level.
3. Assess the Feasible Options at the Regional level to see if there are any options that can be applied across the entire Region and, if appropriate, adjust the Preferred Approach accordingly.

4. Final stage is to assess any inter-regional options and potential cumulative or in combination effects and determine if any adjustment is required (this will be addressed sequentially in each of the Regional Plans in turn).

The Feasible Options, individually and in-combination are tested to determine the Preferred Approach to meet the need across the three spatial scales. The options are tested against six approaches which were selected to align the Framework Plan with all relevant Government Policy. The six approaches are summarised in Table 9.4 and discussed in further detail below.

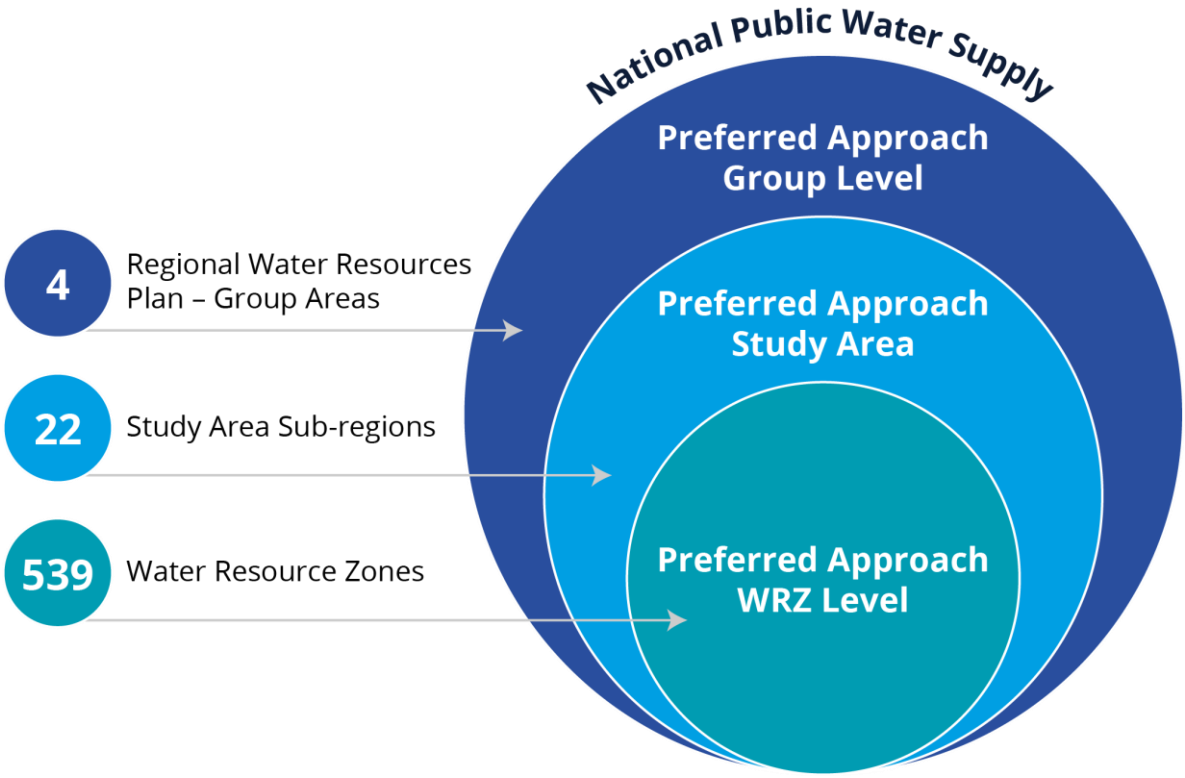


Figure 9.3 – National Water Resources Plan Spatial Scale of Assessment

Table 9.4 – Range of Approaches to Test Feasible Options (Environment led approaches are highlighted green)

Approaches Tested	Description	Policy Driver
Least Cost	Lowest Net Present Value (NPV) cost in terms of Capital, Operational, Environmental and Social, and Carbon Costs.	Public Spending Code
Best Appropriate Assessment (Best AA)	Lowest score against the European Sites (Biodiversity) sub-criteria question based on assessing the option as having either no LSEs, LSEs that can be addressed with general/standard mitigation measures or LSEs that may be more difficult to mitigate. For options scoring -3, potential alternative higher scoring options are sought where possible.	Habitats Directive
Quickest Delivery	Based on an estimate of the time taken to bring an option into operation (including typical feasibility, consent, construction and commissioning durations) as identified at Fine Screening. This is particularly relevant where an option might be required to address an urgent Public Health issue (potential benefit for SEA Objective on population and public health).	Statutory Obligations under the Water Supply Act and Drinking Water Regulations
Best Environmental	This is the option or combination of options with the highest total score across the SEA objective criteria MCA questions. In addition, high risk -3 issues are considered against individual criteria focusing	SEA Directive and WFD

Approaches Tested	Description	Policy Driver
	on long term operational effects.	
Most Resilient	This is the option or combination of options with the highest total score against the resilience criteria. (Link to SEA Objective for climate change adaptation for environment)	National Adaptation Plan
Lowest Carbon	This is the option or combination of options with the lowest embodied and operational carbon cost	Climate Change Strategy

Least Cost Approach

The Least Cost Approach is the option or combination of options with the lowest comparative Net Present Value (NPV) cost, encompassing: Environmental and Social Costs, Carbon Costs, Capital Costs and Operational Costs. Irish Water consider this approach to allow their plan level assessments to align with the requirements of the Public Expenditure Code and the National Adaptation Plan.

Best Appropriate Assessment (Best AA) Approach

The Best AA Approach gives maximum consideration to the options with no potential for impacts (no Likely Significant Effects or LSEs) on European Designated sites or options with LSEs that can be addressed with general/standard mitigation measures at the project level.

SEA Integration:

This approach prioritises the avoidance of impacts on European sites, taking account of options likely to have a higher risk of significant effects and more likely to require mitigation to avoid significant effects.

Options identified as likely to lead to adverse effects on a European Site with limited potential for mitigation will have already been removed at coarse screening stage.

Quickest Delivery Approach

The Quickest Delivery Approach is based on the estimated time for an option to be brought into operation (including typical feasibility, consent, construction and commissioning durations) as identified at Fine Screening. This approach allows Irish Water to potentially optimise the Preferred Approach by minimising the time taken for an option to become operational. This could be appropriate in a WRZ with a critical water quality issue that might impact on public health, as this approach would identify the option that could potentially be delivered in the shortest possible timeframe.

As the Framework Plan does not confer funding or statutory consent for any project, and on a national basis the needs across 539 WRZs must be prioritised, Irish Water would be unlikely to modify an approach based on Quickest Delivery, unless there is a critical driver.

Best Environmental Approach

The Best Environmental Approach is the option or combination of options with the highest total score from the SEA objectives and environmental sub-criteria MCA questions, assessed as part of the Fine Screening assessment described in Stage 5. The purpose of this approach is to consider overall performance across the SEA objectives and potential to minimise overall potential impacts in the options assessment and approach selection process.

SEA Integration:

For each option or combination of options, the MCA includes assessment across all SEA objectives and sub-criteria, using the sum of positive scores and the sum of negative scores separately and avoiding combining positive and negative scores.

The scoring is also reviewed against:

- Individual criteria to identify where high negative or positive scores indicate potential for significant adverse or beneficial effects (for example the number of -3 scores); and

- How the assessment reflects important differences between options focusing on where these related to potential operational or long term effects and also the range of difference in the scoring.

This provides a basis for reviewing each option and the option combinations on a relative performance basis. The potential approaches are also assessed in terms of overall performance against the SEA objectives against a do minimum scenario.

Most Resilient Approach

The Most Resilient Approach is the option or combination of options with the highest scores from the four MCA screening questions relating to Resilience criteria. This approach is aligned to the National Water Resources Plan objective to ensure a safe and secure water supply in the short, medium and long term.

Lowest Carbon Approach

The Lowest Carbon Approach is the option or combination of options with the lowest embodied and operational carbon costs. This approach is aligned with Irish Waters carbon reduction policies and the National Adaptation Plan in relation to climate change.

Approach Assessment Ranking

Depending on the complexity and size of the WRZ or Study Area, the best performing Feasible Options for each of the six approaches are determined using either:

- EBSD (Economics of Balancing Supply and Demand) Lite; or
- EBSD Model.

EBSD Lite

The preferred options to meet the need for each of the six approaches (Least Cost, Best AA, Lowest Carbon etc.) are derived by ranking the options in order of lowest to highest total NPV cost and with regard to their applicable MCA scores for the six approaches.

This approach is generally better suited to smaller WRZs and Study Areas, as it allows for a simple comparison of individual options where the entire need can be met from single options. Where the assessment is required to consider a range of different and more complex combinations of options to meet a need, then the more detailed, full EBSD analysis is required.

EBSD Model

The full EBSD Model evaluates the range of potential approaches comprising single or different combinations of options for a WRZ to reflect the key criteria used in the Fine Screening stage namely: resilience; deliverability and flexibility; progressibility; sustainability (Environmental and Social Impacts) and cost. The full EBSD Model then produces an optimised programme of investment to meet the needs of a WRZ over a defined planning period (25 years in this Plan).

The model does this by evaluating the Fine Screening criteria and determining:

- **Which** options should be selected;
- **When** the option should be implemented; and
- **What** utilisation should be made of the option within the planning period.

For each of the six approaches (Least Cost, Best AA, Lowest Carbon etc.), Irish Water use the EBSD Model to derive an optimum combination of options to address the future need based on the MCA scores (Figure 9.4). The Approach development process is designed to determine the Best Value approach to meet the need and this is then identified as the Preferred Approach. Best value is identified as the approach that provides the best performance overall, balancing across the range of NWRP and SEA objectives.

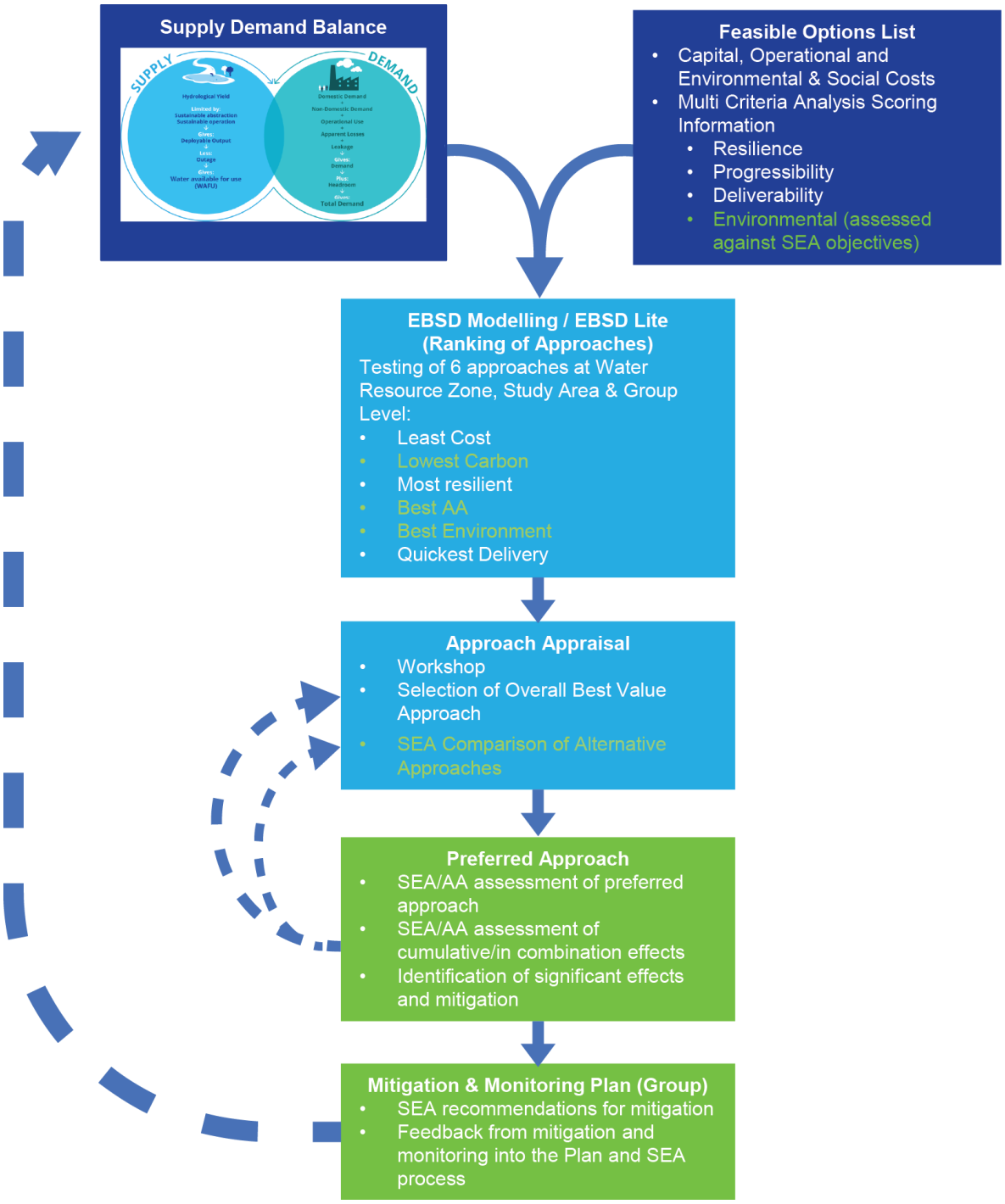


Figure 9.4 – SEA/AA iterative process

9.9.2 Approach Appraisal

Irish Water then compare the options identified for each of the six approaches (Least Cost, Best AA, Lowest Carbon, Best Environmental, Most Resilience and Quickest Delivery) against each other to come up with a Preferred Approach that meets the objectives of the Plan and aligns with all relevant Government Policy.

The Approach Appraisal process involves:

1. Using the ESBD Lite or ESBD Model to identify the option or combination of options that best conform with each of the six approach descriptions, for example, the option or combination of options that would be classified as the Least Carbon, Least Cost, Best AA etc.;

2. Assessing the approaches against each other, following the 7 step Preferred Approach Development Process set out in Figure 9.5 in order to develop a Preferred Approach for each WRZ;
3. Ensuring an alternative option that can meet the plan objectives is available for any option that has an identified a -3 biodiversity in relation to the European Sites (biodiversity) sub-criteria question; and
4. Identifying interim measures that might be required in a WRZ(s) to meet a potential immediate need.

The 7 step Preferred Approach Development Process is summarised in Figure 9.5.

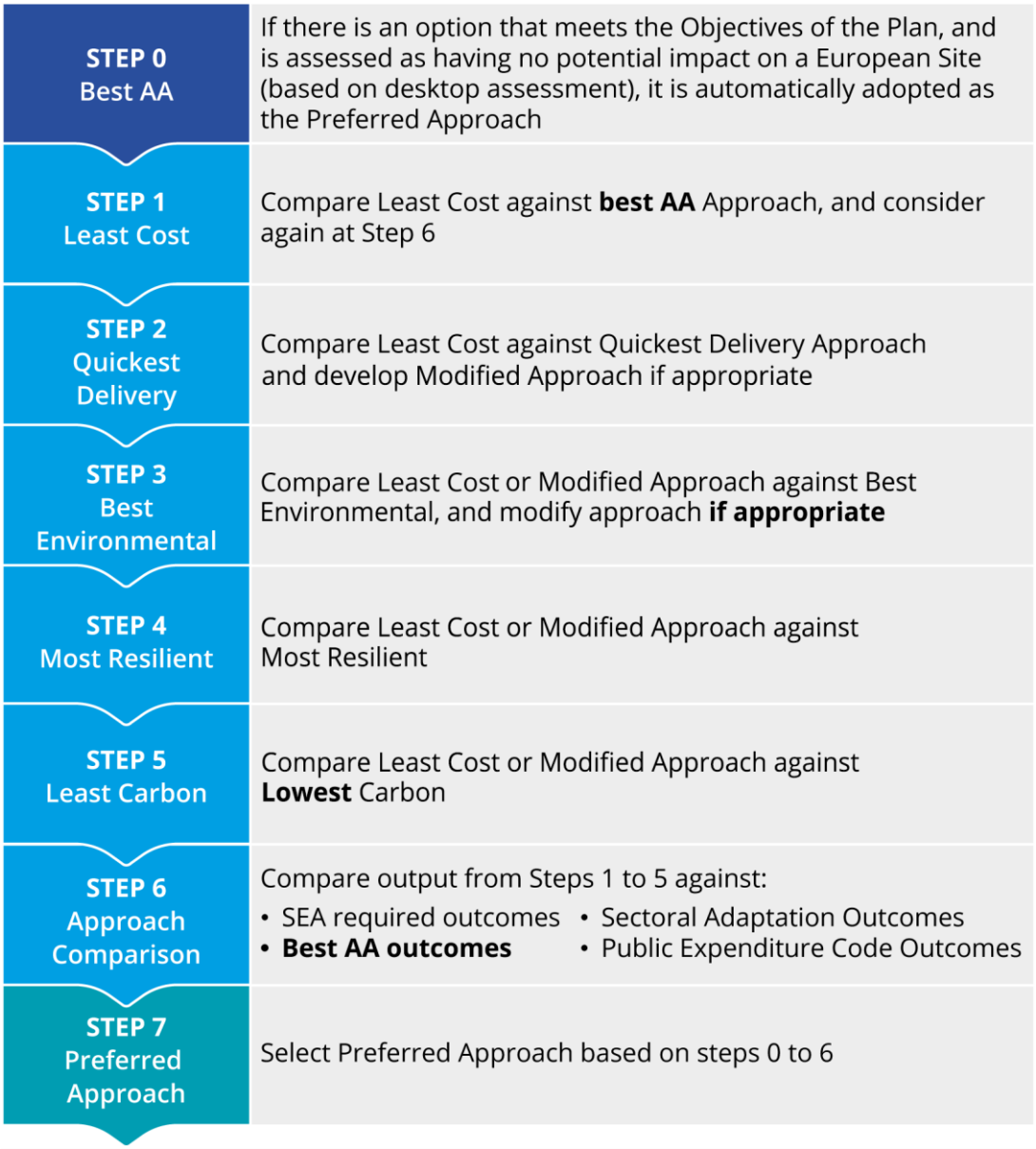


Figure 9.5 – Preferred Approach Development Process

9.9.3 Selection of Preferred Approach

The Preferred Approach to meet the need for each WRZ is identified using the Approach Assessment Process set-out in Figure 9.5. As noted in Figure 9.3, this process is then repeated at the group and regional scales to deliver a fully encompassing national plan.

9.9.4 Sensitivity Analysis

Irish Water supply demand forecast has been developed using the best available information and the application of best practice methods where they have the data to do so. Irish Water has identified areas where they will focus improvements in data to improve the certainty of their forecasts. However, all long-term forecasts are subject to uncertainty.

Therefore, Irish Water will incorporate a sensitivity analysis check in their Approach Assessment Process to allow them to test the sensitivity of the Preferred Approach to a range of futures which could alter the Supply Demand Balance and impact on need. This will ensure that their decision making is robust and that the approaches developed are adaptable. Table 9.5 summarises the types of factors Irish Water will use to test the sensitivity of Preferred Approaches developed in the Regional Water Resources Plans.

Table 9.5 – Summary of Irish Water Sensitivity Assessment

Uncertainty Factor	Likelihood	Impact on SDB	Impact on deficit	Discussion
New abstraction legislation introducing sustainability limits on quantities to be abstracted	High (as Irish Water current abstractions are large compared to the water bodies from which they abstract)	Reduction in DO	Larger SDB deficit.	Although the likelihood of this scenario is highly based on a desktop assessment of their existing abstractions, potential impacts may be mitigated against by optimising their operations on a more environmentally sustainable basis across the range of supplies.
Climate change impacts on supplies are greater than anticipated	Moderate (central climate change estimate used)	Reduction in water availability at certain times of the year	Larger SDB deficit.	Although the likelihood of this scenario is moderate based climate change allowances made in this Plan, potential impacts may be mitigated against by optimising their operations on a more environmentally sustainable basis across the range of supplies.
Domestic demand is lower than expected and/or Non-domestic demand is lower than expected	Low/Moderate (growth has been based on policy)	Growth in demand is lower than forecast	Smaller SDB deficit	The SDB deficit is driven by many factors including limitations in existing supplies, the reliability of the overall supply and assumptions on demand growth. If demand does not growth as significantly as Irish Water forecast there will still be a supply demand deficit in many WRZs. The required intervention to resolve the deficit may be smaller.
Irish Water achieve good levels of effectiveness and efficiency in reducing leakage	Moderate/High (Irish Water is focused on sustainability and aggressive leakage reduction)	Leakage reduces to below SELL within the period of the plan	Smaller SDB deficit	Irish Water will strive to be progressive in leakage reduction plans. However, due to the supply and reliability issues Irish Water have this will not negate the need for other interventions to address the supply demand deficits.
Ability to reduce leakage in accordance with targets, due to,	Moderate (the distribution network is extensive)	Leakage does not reduce to SELL	Larger SDB deficit	Due to the length and condition of the networks, Irish Water could potentially fail to achieve leakage targets in the timeframes set out.

Uncertainty Factor	Likelihood	Impact on SDB	Impact on deficit	Discussion
lengths of networks, access to assets, need to maintain and budget constraints.		within the period of the plan		However, as Irish Water is committed to achieving leakage reductions, the likely scenario would be an extension in the period of time taken to achieve leakage reductions as opposed to accepting lower targets.

In reality a combination of these scenarios may occur together. For example, Irish Water may find growth in demand is lower and they achieve greater leakage reductions at the same time as the abstraction licensing regime limits their water availability. In this case reductions in demand would offset some of the increasing deficit due to abstraction sustainability reductions.

Should an outcome of the Sensitivity Assessment find that a preferred option will not be resilient or adaptable to changing future scenarios, Irish Water will reassess it against the options identified for the six approaches during the Approach Appraisal phase and consider if an alternative should be progressed.

As data and models improve over time Irish Water will incorporate a more extensive approach to sensitivity analysis in the shape of Adaptive Planning. Adaptive Planning provides the flexibility to respond to uncertainty when it occurs (e.g. climate change impact increases).

9.9.5 Interim Solutions

Based on the scale of need across all Irish Water's WRZs, it is likely to take numerous investment cycles, before Irish Water can address all issues with the existing water supplies. Therefore, smaller, localised options may be required on an interim basis to secure priority need in existing supplies until the Preferred Approach can be delivered.

Any projects considered within the interim approach will only be progressed on the basis of urgency or priority need (such as Remedial Action List) to address critical water quality risk and supply reliability. In this case they would be considered to be required irrespective of the medium or long term SDB requirements and would be regarded as "no regrets" infrastructure investment.

The draft Framework Plan does not confer funding availability or statutory consent on any interim solution. If an interim option is deemed necessary, funding approval in addition to all applicable consents would need to be obtained for it to progress.

9.10 Stage 8: Monitoring and Feedback into Plan

The Public Water Supply in Ireland is a live asset base and is subject to continuous change. New assets such as WTPs, storage reservoirs, trunk and distribution mains are continuously developed and upgraded. Knowledge and data relating to assets are improving and operational procedures are being standardised.

External factors can also influence the performance of water supplies, including:

- Changes in legislation and policy that impact the way Irish Water operate their asset base or their interface with the natural environment;
- Reductions in water supply availability due to climate disruption and environmental impacts;
- Growth in demand for water for domestic and non-domestic use; and

- Funding availability and requirements to improve Levels of Service to water users.

All of these factors influence the need in terms of Quality, Quantity, Sustainability and Reliability, therefore the SDB, Barrier Scores in the Plan represent a snapshot in time of live metrics.

Similarly, the development of the Preferred Approaches as part of the forthcoming Regional Plans is influenced by evolving scientific data, understanding, and policy change in relation to the natural environment.

Irish Water must be able to continuously adapt to these changes, which may be minor or material in nature. The Framework Plan therefore commits to undertaking continuous monitoring and ensuring that there is a feedback mechanism within the Framework Plan and Regional Plans. The Regional Plans will be subject to formal review every five years; however, this continuous monitoring process will ensure that material amendments are assessed for significant impacts on the environment.

The SEA Environmental Action Plan and draft Monitoring Plan are provided in Chapter 10. The Monitoring Plan will be finalised for the SEA Statement and implementation of the Monitoring Plan is part of the SEA requirements. These plans will be part of the Framework Plan monitoring and feedback process.

9.10.1 Monitoring and Feedback

The monitoring and feedback process involves:

- Identifying the internal and external factors that may impact the Plan, mapping the areas of the plan that there will be influences;
- Updating needs identification by updating the SDB, Drinking Water Safety Plans (DWSPs) and Barrier scores to reflect these changes;
- Assessing the impact of these changes on the Plan and Preferred Approaches Developed within the Regional Resource Plans; and
- Updating the Need in the Regional Plans where the changes are deemed to be material.

See Chapter 10 for providing the Mitigation and Monitoring Plans which will inform this process on environmental aspects covered by the SEA.

9.11 SEA of Alternative and Preferred Approaches for the Regional Plans

This section focuses on the SEA requirements for the assessment of alternatives and preferred approaches at Regional Plan level as well as cumulative effects which area proposed to be addressed as part of the options and approach development methodology.

9.11.1 SEA process for Regional Plans

As described in chapter 1, each individual Regional Plan will be subject to SEA and also AA in its own right. Figure 9.6 shows how SEA and AA will be integrated with the development of the RWRPs.

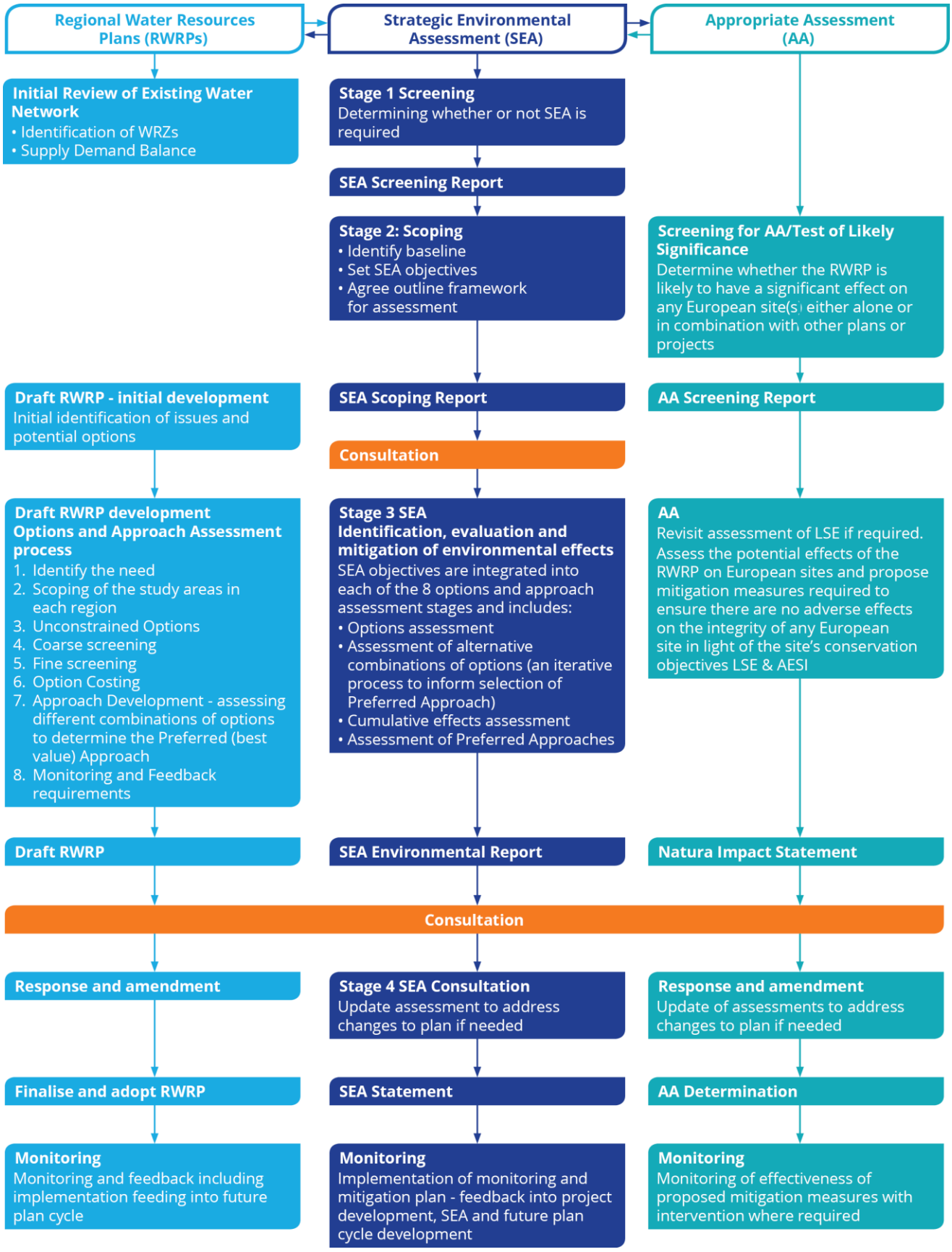


Figure 9.6 – Integration of SEA and AA with development of RWRPs

Part of the scoping process (Stage 2 as shown in Figure 9.6) for each Regional Plan will include development of the baseline, identification of SEA objectives and development of assessment methodology and criteria for assessment of the preferred plan and of alternatives. The Scoping

Report for each Regional Plan would be subject to consultation, and stakeholder comments reflected within the assessment process and Environmental Reports where appropriate.

As mentioned above, the SEA methodology for the Regional Plans would be confirmed through the Scoping process for the SEA for the Regional Plans, however the following subsections provide an outline of the current draft proposals regarding assessment of the assessment of Alternatives and Preferred Approaches (including cumulative effects).

9.11.2 Proposed assessment of Preferred and Alternative Approaches within Regional Plans (including cumulative effects)

For the Regional Plans, environmental assessment will be undertaken of alternative approaches including Best Environmental, Best AA and Lowest Carbon approaches which as explained in the preceding sections are tested on WRZ and Study Area combinations of options to determine the best overall approach. The alternative approaches will be compared in terms of performance against the SEA objectives through the following:

1. MCA scoring and assessment information including feasible options assessment considering construction and operational environmental effects for each SEA topic analysed to provide a relative assessment.
2. Overview assessment of each approach against the SEA Objectives.

The different approaches may include many options in common that are required for addressing Study Area supply demand deficits. Where this is the case, the relative assessment focuses on the options that differ between approaches. The approaches are then also compared with a do minimum scenario against each SEA objective in terms of potential for significant environmental effects at the Study Area level.

An additional high level assessment of alternative approaches at the Regional level is undertaken in terms of contribution or conflict with SEA objectives built up from the more detailed Study Area and option level assessments.

The reasons for selection of the preferred approach at the Study Area and Regional level will be stated, identifying how environmental considerations and the SEA objectives have been taken into account in the plan-making process.

The options level, WRZ/Study Area level and Regional level assessment are explained further below.

Option Level Assessment

Individual options which form part of Study Area preferred approaches will be subject to options assessment as follows:

- All feasible options will be assessed as part of the MCA and scored against SEA objectives and sub criteria using the scoring guide (Appendix D). This is a high level assessment undertaken for each feasible option. Detailed rules on how the scoring guide has been applied are also provided in the case study, see Case Study – Study Area 5 Environmental Review document. The feasible options assessment information is fed into the approach workshop process.
- SEA option assessment summaries will record assessment against SEA objectives (as developed through the SEA scoping process for the Regional Plan SEAs). These will add further assessment building on the MCA to cover both construction and operational phases and will identify mitigation and residual effects. SEA assessment summaries will be provided for all Preferred Approach options for each Study Area and also for any regional level preferred options or alternatives.

Table 9.6 – Option level assessment example

Keys					
Type of effect		**Potential significance of effect**		**Carbon NPV Cost/Tonnes (Lifetime- construction and operational)**	
Long term (>15 years)	L	Major beneficial	+++	Neutral	0
Short term (<5 years)	S	Moderate beneficial	++	Minor	-
Permanent	P	Minor beneficial	+	Moderate	--
Temporary	T	Neutral	0	Major	---
Assessment certainty		Minor adverse	-		
Low		Moderate adverse	--		
Medium		Major adverse	---		
High					
Option ref:		TGX-SAX-XX (TGX = Regional Group Area ref.; SAX = Study Area ref.; XX = Option ref.)			
Option description:		E.g. increase GW abstraction for WRZ to supply deficit.		Schematic/diagram provided here	
Interdependencies/ Assumptions/ Risks					
Standard mitigation implemented:					
Assessment limitations:					
Assessment certainty		Medium			

SEO	**Potential effects (after standard mitigation)**	**SEA mitigation**	**Residual effects**			
			Construction		**Operation**	
1. Protect public health and promote wellbeing			-	(S, T)	+	(P)
2. Protect and where appropriate enhance, built and natural assets and reduce waste			-	(P)	-	(P)
3. Protect and enhance biodiversity and contribute to resilient ecosystems			-	(S, T)	0	(P)
4. To protect landscapes,			-	(S, T)	-	(L)

Keys						
Type of effect	**Potential significance of effect**	**Carbon NPV Cost/Tonnes (Lifetime- construction and operational)**				
townscapes and visual amenity						
5. Reduce greenhouse gas emissions			-	(S, T)	-	(P)
6. Contribute to environmental climate change resilience			0	(S, T)	-	(L)
7. Protect and improve surface water and groundwater status			0	(S, T)	-	(L)
8. Avoid flood risk			0	(S, T)	0	(P)
9. Protect and where appropriate, enhance cultural heritage assets			-	(S, T)	0	(P)
10. Protect quality and function of soils			-	(S, T)	0	(P)

Study Area Level Assessment

A Sample Case Study is provided to illustrate the application of the SEA options and approach assessment at a Study Area level. This is provided in the Case Study Environmental Review accompanying the Case Study Technical Report.

Assessment of the range of approaches in each Study Area including Best Environment, Best AA and Lowest Carbon will be undertaken. The assessment will be based on:

- the MCA assessment and the combined scores and analysis of relative performance of approaches; and
- an overview of the approaches as a whole assessed against the SEA objectives including comparison against the 'Do Minimum'.

In order to understand the approaches under consideration, the individual options within each approach will be identified as shown in Table 9.7. A summary of the components of each approach will also be compiled covering the indicative pipeline lengths, infrastructure required, types of abstraction and storage as shown in Table 9.8. These will be available along with the MCA scoring analysis providing a basis for the relative assessment of the approaches as set out in Table 9.9.

Table 9.7 – Study area approaches example

Options included	Do Minimum	SA Approach 1 (Least Cost	SA Approach 6 (Best Appropriate Assessment)	SA Approach 2 (Quickest Delivery)	SA Approach 3 (Best Environment)	SA Approach 4 (Most resilient)	SA Approach 5 (Lowest Carbon)
Interim measures							
SA grouped options	No options	SA grouped option X TGX-SAX-XX TGX-SAX-XX TGX-SAX-XX	SA grouped option X TGX-SAX-XX TGX-SAX-XX	SA grouped option X TGX-SAX-XX TGX-SAX-XX	SA grouped option X TGX-SAX-XX TGX-SAX-XX	SA grouped option X TGX-SAX-XX TGX-SAX-XX TGX-SAX-XX TGX-SAX-XX	SA grouped option X TGX-SAX-XX TGX-SAX-XX TGX-SAX-XX TGX-SAX-XX
WRZ options	No options	TGX-SAX-01 TGX-SAX-13 TGX-SAX-25 TG4-SA5-33 TG4-SA5-67 TG4-SA5-75 TG4-SA5-80 TG4-SA5-81	TGX-SAX--05 TGX-SAX--20 TGX-SAX--25 TGX-SAX--33 TGX-SAX--37b TGX-SAX--67 TGX-SAX--75 TGX-SAX--80 TGX-SAX--81	TGX-SAX-01 TGX-SAX-20 TGX-SAX-25 TGX-SAX-33 TGX-SAX-37b TGX-SAX-67 TGX-SAX-75 TGX-SAX-80 TGX-SAX--81	TGX-SAX--01 TGX-SAX--20 TGX-SAX--25 TGX-SAX--33 TGX-SAX--37b TGX-SAX--67 TGX-SAX--75 TGX-SAX--80 TGX-SAX--81	TGX-SAX-37b TGX-SAX-80 TGX-SAX-81	

Table 9.8 – Study Area approaches component information (example)

Infrastructure summary	Do Minimum	SA Approach 1 (Least Cost	SA Approach 6 (Best Appropriate Assessment)	SA Approach 2 (Quickest Delivery)	SA Approach 3 (Best Environment)	SA Approach 4 (Most resilient)	SA Approach 5 (Lowest Carbon)
New pipeline network (km)	0	46	22	22	153	42	70
New WTPs	0	1	1	1	0	1	1
Upgrade WTPs	0	13	13	13	5	10	13

Infrastructure summary	Do Minimum	SA Approach 1 (Least Cost	SA Approach 6 (Best Appropriate Assessment)	SA Approach 2 (Quickest Delivery)	SA Approach 3 (Best Environment)	SA Approach 4 (Most resilient)	SA Approach 5 (Lowest Carbon)
New/upgraded abstractions	0	7	8	8	2	5	7
WTPs decommissioned	0	0	0	0	11	0	0
Abstractions abandoned	0	0	0	0	14	0	0
Service reservoirs	0	5	5	5	6	6	5
Storage reservoirs	0	0	0	0	0	0	0

The component information is generated from GIS mapping of the options to provide option combination data supporting individual option mapping against environmental constraints and option assessment.

Table 9.9 – Study area relative comparison of approaches (example)

SEA objectives	Total no. of	SA Approach 1 (Least Cost	SA Approach 6 (Best Appropriate Assessment)	SA Approach 2 (Quickest Delivery)	SA Approach 3 (Best Environment)	SA Approach 4 (Most resilient)	SA Approach 5 (Lowest Carbon)	Range (difference between lowest and highest score)
Population, health, economy and recreation	No. of -3s	No difference						0
	MCA score	Lowest				Highest		-10
Water Environment: quality and resources	No. of -3s	Highest	Highest	Highest	Highest	Lowest		1
	MCA score				Highest	Lowest		-6
Biodiversity, Flora and Fauna	No. of -3s	Lowest		Highest	Highest	Highest		3
	MCA score				Lowest	Highest		-25

SEA objectives	Total no. of	SA Approach 1 (Least Cost	SA Approach 6 (Best Appropriate Assessment)	SA Approach 2 (Quickest Delivery)	SA Approach 3 (Best Environment)	SA Approach 4 (Most resilient)	SA Approach 5 (Lowest Carbon)	Range (difference between lowest and highest score)
Material Assets	No. of -3s	Lowest		Lowest	Lowest	Highest		6
	MCA score	Lowest				Highest	Highest	-14
Landscape and Visual	No. of -3s	No difference						0
	MCA score	Lowest				Highest	Highest	-6
Climate Change*	No. of -3s	No difference						0
	MCA score	No difference						0
Culture, Heritage and Archaeology**	No. of -3s	No difference						0
	MCA score	No difference						0
Geology and Soils	No. of -3s	No difference						0
	MCA score	Lowest		Lowest	Lowest	Highest		-4

Keys

MCA/No. of -3 scores against each criterion

Lowest					Highest

* in the example, approaches are showing similar level of risk on climate change adaptation and therefore represented as no difference. However, carbon mitigation is covered separately based on estimated emissions and carbon cost (NPV). See lowest carbon approach.

** in the example, approaches are showing similar level of risk on culture, heritage and archaeology. Routing and siting is only indicative at this stage. Most options involving new construction include a level of risk to buried unknown archaeology, this would need to be investigated further at the project level.

In addition, an assessment of each approach is undertaken against the SEA objectives including comparison with the 'Do Minimum'. Where the approaches include the same options, these are

combined reducing duplication. For example, best environmental, best AA and most resilient could have the same option combination.

Table 9.10 – Study area level assessment of approaches and 'Do Minimum' (example)

SEA objectives	Phase (Construction (C) / Operation (O))	Do Minimum	SA Preferred Approach	SA Approach 1 (Least Cost)	SA Approach 6 (Best Appropriate Assessment)	SA Approach 2 (Quickest Delivery)	SA Approach 3 (Best Environment)	SA Approach 4 (Most resilient)	SA Approach 5 (Lowest Carbon)
1. Protect public health and promote wellbeing	C	0	-	-	-	--	-	-	-
	O	---	+++	+	+++	-	++	+	-
2. Protect and where appropriate enhance, built and natural assets and reduce waste	C	0	-	--	-	-	-	-	-
	O	+	-	+	-	0	-	-	0
3. Protect and enhance biodiversity and contribute to resilient ecosystems	C	…etc.							
	O								
4. To protect landscapes, townscapes and visual amenity	C								
	O								
5. Reduce greenhouse gas emissions	C								
	O								
6. Contribute to environmental climate change resilience	C								
	O								
7. Protect and improve surface water and groundwater status	C								
	O								
8. Avoid flood risk	C								
	O								
9. Protect and where appropriate, enhance cultural heritage assets	C								
	O								
10. Protect quality and function of soils	C								
	O								

Keys			
Major beneficial	+++	Minor adverse	-
Moderate beneficial	++	Moderate adverse	--
Minor beneficial	+	Major adverse	---
Neutral	0		

Differences between the approaches are explained and justification for the selected Preferred Approach will be set out. Mitigation measures associated with the individual options in the Preferred Approach will be provided.

Table 9.11 – Study Area assessment of the Preferred Approach (example)

Options ID	Option Description	Phase	1. Protect public health and promote wellbeing	2. Protect and where appropriate enhance, built and natural assets and reduce waste	3. Protect and enhance biodiversity and contribute to resilient ecosystems	4. To protect landscapes, townscapes and visual amenity	5. Reduce greenhouse gas emissions	6. Contribute to environmental climate change resilience	7. Protect and improve surface water and groundwater status	8. Avoid flood risk	9. Protect and where appropriate, enhance cultural heritage assets	10. Protect quality and function of soils
TGX-SAX-XX	Increase GW abstraction to supply deficit and WTP upgrade to address WQ issues	Construction	-	-	-	-	0	0	0	0	0	0
		Operation	++	--	0	0	0	--	-	0	0	0
TGX-SAX-XX	No deficit. Upgrade WTP to address WQ issues.	Construction	-	-	0	0	0	+	0	0	0	0
		Operation	+	0	0	0	0	0	0	0	0	0

Keys					
Major beneficial	+++	Neutral	0	Major adverse	---
Moderate beneficial	++	Minor adverse	-		
Minor beneficial	+	Moderate adverse	--		

9.11.3 Study Area Cumulative Effects

At the Study Area level, both cumulative effects 'within plan' and 'with other developments' are considered. For 'within plan', the combined effect of options within the SA Preferred Approach is considered. The assessment considers the cumulative effects across all environmental objectives to identify potential interactions that are likely to generate significant effects, between SA options, SA grouped options or SA combinations.

Table 9.12 – Identifying potential Study Area cumulative effects 'within plan' against each SEA objective (example)

SEA Objective and Impact Phase	
Construction Phase	
Operation Phase	
Construction and Operation	

Group 4 Study Area	Population, Economy, Tourism and Recreation, and Human Health	Water Environment	Biodiversity, Flora and Fauna	Material Assets	Landscape and visual amenity	Climate change	Cultural heritage	Geology and soils
SA1/A								
SA2/B								
SA3/C								
SA4/D								

Typically, cumulative effects assessment will need to consider:

- Proximity and coincident timing leading to combined effects on receptors;
- Pathways for effects with potential for combined effects on receptors;
- Water resource use or quality implications within the same catchment or water body from combined effects; and
- Total combined on aspects such as loss or disturbance base on total sum of effects on specific habitat types, land use, or from total combined carbon emissions.

Given the nature of water resources options, key areas that will need to be addressed include:

- Biodiversity – for example, a cumulative loss of habitats or changes to a habitat quality through changes in water quality or groundwater levels;
- Water environment (surface water and groundwater WFD status) – for example, changes to water flow due to combined abstraction pressure;

- People and health – for example, disruption due to multiple construction works taking place at the same time;
- Landscape and visual – for example, if there are a number of options located close together that could alter the landscape character or views; and
- Climate change – combined carbon emissions for the approach as a whole have been considered through the approach selection process and are also reported here to identify potential requirements for mitigation. Combined effects on climate change adaptation are also considered.

A precautionary approach will be taken for the 'within plan' cumulative effect assessment, which assumes that all options could be constructed at the same time and then all options would be operated at the same time (Table 9.13).

Table 9.13 – Land use/habitat types (Ha) potentially affected by cumulative effects 'within plan' (example)

Study Areas in Regional Plan area X	Land use (Ha) Potentially affected by Preferred Approaches in each Study Area and for Group 4 as a whole (based on indicative routes/sites)				
	Agriculture	Urban	Natural habitats	Forest	Industry
SA X					
SA X					
SA X					

Table 9.14 – Study area cumulative effects 'within plan' (example)

Keys	
Construction Phase	
Operation Phase	
Construction and Operation	

SA Preferred Approach	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX
SA grouped option X							
TGX-SAX-XX							
TGX-SAX-XX							
TGX-SAX-XX							
TGX-SAX-XX							
TGX-SAX-XX							
TGX-SAX-XX							

For cumulative assessment 'with other developments', the Study Area Preferred Approach is assessed alongside other developments that could occur within the plan area.

Table 9.15 – Study area cumulative effects 'with other developments'

Preferred Approach	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	TGX-SAX-XX	SA grouped option X
Name 1 development in the Study Area										
Name 2 development in the Study Area										
Name 3 development in the Study Area										
Name 4 development in the Study Area										

Case Study - Study Area 5 Environmental Review document is provided as an example and include options and approach assessment and Study Area cumulative assessment.

9.11.4 Regional Level Assessment

At the regional level, any additional regional level alternatives are considered, and the cumulative effect assessment considers the combined effects from all of the SA preferred approaches within the region against environmental objectives during construction and operation phases (Table 9.16). The assessment takes account of the SA assessments and provides a summary of performance against the SEA objectives as shown in Table 9.17. A high level assessment is provided for the Regional Plan proposals as a whole in addition to the Study Area assessments using the framework provided in Table 9.17 The assessment criteria will be presented in the SEA Scoping Report for public consultation and refined in response to comments provided.

Table 9.16 – Regional level cumulative effects assessment example

Keys	
Construction Phase	
Operation Phase	
Construction and Operation	

Regional Preferred Approach	SA A/1	SA B/2	SA C/3	SA D/4	SA E/5	SA F/6	SA G/7
SA A/1							
SA B/2							
SA C/3							
SA D/4							
SA E/5							
SA F/6							
SA G/7							

Table 9.17 – Regional plan assessment against SEA objectives example

Plan alternative	Population, economy, tourism and recreation and human health	Water environment (quality and resources)	Water environment (flood risk)	Biodiversity	Material assets	Landscape and visual amenity	Climate change (mitigation)	Climate change (adaptation)	Cultural heritage	Geology and soils
Without Plan (Interim measures only) Continuation of current approach										
Justification for assessment										
Alternative Regional Plan Approach X Study Area approaches and alternative regional proposals										
Justification for assessment										
Alternative Regional Plan Approach X including Study Area and alternative Regional level proposals										
Justification for assessment										

Key			
Likely to have a positive effect	+	Likely to have a mixed positive and negative effect	+/-
Likely to have a negative effect	-	Likely to have mixed neutral and negative effect	0/-
Effects are uncertain or not applicable	? or N/A	Likely to have mixed neutral and positive effect	0/+
Likely to have a neutral effect	0		

9.11.5 Inter-Regional Level Assessment

In addition to the assessing combined effects from options across all the Study Areas within the Preferred Approaches in a Region/Group Area, the Regional Plans will need to consider potential for:

- Inter-regional options such as transfers between regions. These will be part of alternative approaches under consideration in Regional Plans.
- Cumulative effects between Regional/Group Area Preferred Approaches.

Inter-regional options, these will need to be identified as the Regional Plans are prepared and will be addressed through the assessment of alternative approaches.

Where Regional Plans are prepared in parallel, cumulative effects of the preferred approaches can be considered together but where the Regional Plans are prepared sequentially cumulative effects will need to be addressed for any preceding plans and reported in the SEA Environmental Report.

9.12 Transboundary issues

The potential for transboundary effects and cumulative effects with key relevant plans and proposed developments in Northern Ireland will be included as part of the options and approach assessment and results of these assessments will be reported on, where relevant, in the Regional Plans and SEA Environmental Reports.

9.13 Summary of Approach Appraisal and SEA

Approach Appraisal incorporates SEA and AA requirements through:

- **Comparison of the different approaches including three environmentally led approaches, Best AA, Best Environmental and Low Carbon to determine the preferred approach through a structured, transparent and fully recorded process.**
- **Assessment of the alternative approaches including the three environmental approaches, most resilient, least cost and do minimum and quickest delivery approaches using a relative MCA based comparison and overall absolute assessment against SEA objectives.**
- **Process of avoiding high risk European site or WFD options where possible and where needed identification of possible back up options (these are options that could be brought forward if project level studies on preferred options identify that AESI cannot be avoided or WFD water body status deterioration is likely, and time limited derogation is not available).**
- **Assessment of the selected Preferred Approaches through SEA and AA, including individual options assessment of the combined options within each approach (cumulative effects assessment and in combination assessment) within each Study Area and within Regional Plan and also with other proposed plans or developments. Feedback and reconsideration is included in the process if needed and the assessment involves identification of mitigation measures to be taken forward addressing individual option mitigation and mitigation for cumulative and in combination effects.**
- **Overall the process provides an iterative process allowing testing and consideration of environmental performance and mitigation requirement at WRZ, Study Area, Regional and inter-Regional level.**
- **The assessment provides a systematic and tracked process which can be applied consistently across the four Regional Group areas and will facilitate input from internal and external stakeholders.**

9.13.1 Appropriate Assessment

The conclusion of the NIS for the draft Framework Plan is that the protection of European sites has been integrated into the plan development process and the Options Assessment Methodology. The methodology ensures that the potential adverse effects on the integrity of European sites will be identified, the difficulty and complexity of mitigation will be assessed and alternative options with less difficulty and complex mitigation will be identified in order to ensure that the Regional Water

Resources Plans do not propose any projects that will adversely affect the integrity of any European site.

9.13.2 NWRP Phase 2: Regional Plans and SEA

The options development process outlined in this chapter is expected to be rolled forward as part of the implementation of the Framework Plan through the development of the Regional Plans and this approach will support the SEA process and AA required for each Regional Plan.

10

Mitigation and Monitoring Plans

10.1 Introduction

This SEA has made recommendations for the implementation of the draft Framework Plan. This Chapter sets out the recommended actions for mitigation within an Environmental Action Plan (EAP) and provides a draft Monitoring Plan. The monitoring plan is required to meet SEA regulations and will be developed further to take account of the assessments to be undertaken and reported in the Final Framework Plan; it will also provide a basis for developing Monitoring Plans for the Regions.

10.2 Environmental Action Plan

The EAP set out in Table 10.1 summarises the actions for mitigation and areas of further study identified in this Environmental Report. The EAP provides a basis for tracking recommendations from the SEA during the Framework Plan implementation and Regional Plan development.

Table 10.1 – Environmental Action Plan

Ref no	Recommended Action for Mitigation / Further study	Target	Monitoring
Identifying the need – quantity, quality and reliability			
Quantity – supply demand balance			
Abstractions and supply side yield assessments			
EAP1	EAP1.1 Link investigation on supply risks to environmental resilience and avoiding damage to vulnerable habitats and protected areas; especially European designated sites, and threats to WFD water body objectives.	Environmental issues to be included in risk assessments for supply shortages or drinking water quality issues.	Study Area scoping, risk assessments and prioritisation
Demand side data improvements: planning for future developments			
EAP2	EAP2.1 Reviews of WRZ configuration can consider potential environmental benefits from rationalisation opportunities to improve operational efficiency for waste and energy use and also reduce need for developing new sources.	Optimised WRZs/Study Areas	Study Area scoping, risk assessments and prioritisation
	EAP2.1 Feed information on potential for water efficiency improvements to provide savings into future options identification		
Drinking water quality and reliability			
EAP3	EAP3.1 Understanding causes of water quality issues for drinking water can support catchment management actions. Link clean water element (RC3) on water quality compliance and ongoing programmes on improving drinking water quality to potential for long term solutions through to long	Drinking water safety plans linked to the NWRP	Study Area scoping, risk assessments and prioritisation

Ref no	Recommended Action for Mitigation / Further study	Target	Monitoring
	term catchment management opportunities to reduce pollution in groundwater and surface waters and water treatment issues.		
	EAP3.2 Link Drinking Water Safety Plans to scoping of Study Areas, prioritisation and options development process including consideration of catchment management opportunities.		
	EAP3.3 Link ongoing projects with the supply demand assessments, scoping area studies and prioritisation for new investment. Consider as part of investment proposals for water treatment works – wider rationalisation opportunities with opportunities to reduce abstraction pressure on stressed sources and potential for improvements to residuals management (see also EAP 11.1)	Existing programmes and projects coordinated with the NWRP	Study Area scoping, risk assessments, prioritisation and application of options development methodology
	EAP3.4 Value environmental and social benefits as well as costs in options development process (using environmental economics tools) to value long term solutions such as catchment management.	CBA and MCA supported by environmental valuation as well as qualitative assessment	Monitoring Plan
Delivering solutions – approach			
Climate change			
EAP4	EAP4.1 Take account of effects of climate change effects on protected areas and WFD objectives as well as water supply.	Environmental resilience as part of the climate change risk assessment informing long-term solutions.	Study Area scoping, risk assessment and prioritisation.
	EAP4.2 Results completed, and ongoing climate change studies should be used to inform future scoping of Study Areas/WRZs and the types of solutions considered and prioritisation for investment.		
	EAP4.3 Long term actions to improve water retention in upper catchments as well as catchment wide water quality initiatives could be considered as responses.		
Lose less: leakage reduction			
EAP5	EAP 5.1 Take forward studies and actions supporting meeting leakage targets and include consideration of reliving pressure on existing deficit areas and abstractions with sustainability issue and drought risks	Develop information to support and improving leakage reduction	Monitoring Plan
Use less: water conservation			
EAP6	EAP6.1 Link to raising awareness on environmental benefits of water conservation.	Improved awareness of benefits of conserving water (day to day and during extreme events)	Awareness campaigns
	EAP6.2 Consider customer research on the water supply and demand management including water efficiency options development along with local community and stakeholder views.		Customer consultation
	EAP6.3 As data is developed to support		

Ref no	Recommended Action for Mitigation / Further study	Target	Monitoring
	understanding on water conservation, develop water conservation /water efficiency options to be considered as part of the Options Assessment Methodology for future plan cycles.		
Supply smarter: capital investment and improved operations			
See EAP3, 4 and 5 in relation to linking ongoing programmes and future water resource planning and EAP10, 11 and 12 on implementing options and approach assessment methodology.			
Drought planning			
Information for assessing drought risks			
EAP7	EAP7.1 Identify the risks from potential drought actions for water sources designated for nature conservation value and supporting protected species - include lessons learned from the 2018 drought.	Drought - sources at risk identified	Drought management
Environmental mitigation of drought measures			
EAP8	EAP8.1 Assess potential impacts of drought restrictions on customers, especially vulnerable groups, to identify both communication requirements and exemptions on restrictions relevant for each management area. EAP8.2 Develop drought communication plans and identify approaches to avoid impacts on vulnerable water users, for example, through exemptions – plan to provide customers with information early so that voluntary measures can be effective in avoiding the need for additional measures in most cases, and taking forward the approaches from the 2018 summer drought and 2020 spring drought. EAP8.3 Prepare environmental assessments (including AA) for sensitive water sources at risk from drought management actions. These should be available in advance of measures being needed. They should include consultation on the assessments with environmental authorities and identify specific monitoring or mitigation measures.	Drought management avoiding causing temporary or long-term impacts on protected habitats and species as well as minimising restrictions to customers	Drought management - environmental review Communication strategy Environmental assessment of sources at risk
Residuals approach			
EAP9	EAP9.1 Include consideration of residuals management in the options development process involving WTPs or rationalisation opportunities EAP9.2 Apply the waste management hierarchy with any solid waste disposal limited to appropriate licensed sites.	Residuals approach linked to options development process	Monitoring Plan
Delivering solutions: options and approach assessment methodology			
Integration of environmental and sustainability considerations			
EAP10	EAP10.1 Study Area scoping to include analysis of environmental baseline issues, risks, constraints and opportunities to inform identification of initial options as providing context for the option development process.	Context for identifying and assessment options is provided	Study Area scoping, risk assessments and prioritisation

Ref no	Recommended Action for Mitigation / Further study	Target	Monitoring
	EAP10. 2 Further development of the environmental and social impact valuation methodology as a tool for the approach appraisal process, based on ecosystems services assessment/natural capital assessment principles, can support cost benefit analysis and MCA methodologies and provide quantitative information supporting SEA in the future.	CBA and MCA supported by environmental valuation as well as qualitative assessment	Monitoring Plan
	EAP10.3 Comparison of combinations of options (or approach) should include assessment of cumulative effects for each Study Area (groups of WRZs) and be considered in determining the best value approach. Justification for the approach selected will need to be provided.	Best environmental solutions considered in selection of preferred solutions with mitigation built into design and costing. Opportunities for enhancement to contribute to objectives to be considered	Monitoring plan
Transboundary issues			
EAP11	EAP11.1 Ensure potential for transboundary impacts are considered during options assessment and early consultation is undertaken to inform the assessment process.	Avoid transboundary effects	Monitoring Plan
Delivering sustainable solutions			
EAP12	EAP12.1 Link the options development information and SEA mitigation recommendations into the initial studies and designs for selected project level schemes so that assumptions and mitigation recommendations are taken forward.	Future proposed projects to be subject to initial environmental review linking to information from the options development process and to good practice procedures	Monitoring Plan
	EAP12.2 Development of procedures to integrate good practice approaches for avoiding/mitigating environmental impacts and identifying enhancement opportunities in future scheme design and development.		
	EAP12.3 Ensure environmental mitigation and study requirements are covered in option costing and risk aspects are taken into account in scheme development.		

10.3 Monitoring plan

The monitoring plan is a requirement under the SEA regulations to provide a basis of identifying significant environmental effects during the implementation of the plan. This is required to review the predicted impacts of the draft Framework Plan, and the adequacy of the mitigation measures recommended so that additional mitigation can be applied if required. Performance against the monitoring plan targets will also inform the next cycle Framework Plan and SEA process.

The Public Water Supply in Ireland is a live asset base and is subject to continuous change. Similarly, the development of Preferred Approaches, as part of the coming Regional Plans, is influenced by evolving scientific data, understanding, and policy change in relation to the natural environment.

Irish Water must be able to continuously adapt to these changes, which may be minor or material in nature. Therefore, the draft Framework Plan commits to undertaking continuous monitoring and ensuring that there is a feedback mechanism within the Framework Plan and Regional Plans. The Regional Plans are subject to formal review every five years; this continuous monitoring process will ensure that material amendments are assessed for significant impacts on the environment.

As the draft Framework Plan does not involve the recommendation of specific investment options, this monitoring plan is intended to track the progress of implementing the SEA recommendations during Regional Plan implementation.

The monitoring plan covers the integration of environmental and sustainability considerations throughout implementation of the draft Framework Plan and the options development methodology. It also provides a framework for future long-term monitoring. In most cases, more detailed baseline collection and project studies will be required to confirm the significance of environmental effects and ensure appropriate mitigation is included as part of the scheme designs.

In certain circumstances, monitoring and feedback will identify the need for a variation of the Framework Plan or a Regional Plan. Where a variation is required, Irish Water will screen the change against SEA and AA requirements in accordance with its legal obligations.

As part of the screening, Irish Water will consult with the EPA and relevant Government Departments as required by Article 9(5) of the EC (Assessment of Certain Plans and Programmes) Regulations 2004 (SI 435/2004). If, following screening, Irish Water determines that the change is likely to have significant effects on the environment, it will carry out an SEA before adopting the change. Irish Water will also carry out an AA if it determines, following screening, that the change is not directly connected with or necessary to the management of any European site and Irish Water cannot, on the basis of objective scientific information, exclude that the change, individually or in combination with other plans and projects, will have a significant effect on European sites, as required by Article 42(6) of the EC (Birds and Natural Habitats Regulations) 2011 (SI 477/2011).

The draft Monitoring Plan is provided in Table 10.2 and will be updated following consultation on this Environmental Report. It will form part of the SEA statement to be published with the Final Framework Plan.

Table 10.2 – Monitoring plan: indicators and targets

SEA topics	Strategic Environmental Assessment objectives	SEA indicators	SEA targets	Source data
All topics	All objectives	• Application of the options appraisal and plan approach appraisal set out in the draft Framework Plan to integrate environmental, social and sustainability SEA objectives alongside other criteria in the preparation of the next	• Options and plan approach to find sustainable solutions that contribute to environmental objectives	Irish Water

SEA topics	Strategic Environmental Assessment objectives	SEA indicators	SEA targets	Source data
		Framework Plan • Application of methodology for SEA and AA in the comparison and selection of Preferred Approaches for the preparation of the next Framework Plan • Environmental and social valuation methodology developed as a tool • Transparent documentation of the appraisal and selection process		
All topics	All objectives	• Iterative approach to the identification of appropriate options meeting objectives, and mitigation measures incorporated into project costs as part of the development of options for the next Framework Plan • Identification of process for undertaking the relevant options studies and feeding back to the Framework Plan where potential significant environmental effects are identified	• Process implemented for iterative options identification, option design development and mitigation measures and inclusion in project costs • Option development for Preferred Approach options built on the SEA and AA work and incorporating feedback to the next Framework Plan and adequate comparison with alternatives at key points	Irish Water
All topics	All objectives	• Environmental assessment, including AA, for designated international and national sites potentially affected by drought measures • Communication plan for drought/freeze-thaw period actions	• Source-specific environmental assessment and mitigation and monitoring measures agreed, avoiding long-term damage on designated sites and associated species from drought measures	Irish Water
All topics	All objectives	• Monitoring plan data collection implemented (see below for each topic) set up to provide baseline information for the next Framework	• Monitoring plan data compiled for feeding into future Framework Plans	Irish Water

SEA topics	Strategic Environmental Assessment objectives	SEA indicators	SEA targets	Source data
		Plan and the basis for monitoring future Framework Plan implementation		
Population, economy, tourism and recreation, and human health	Protect and reduce risk to human health in undertaking water services	• Level of Service • Frequency and duration of drought orders • Number of days/hours when water supply to people is disrupted due to drought, freeze-thaw or other service/infrastructure issues • Duration of works • Number of complaints received relating to construction works • Programmes and projects improving drinking water quality • Awareness raising programmes on water conservation	• Maintained or improved access to reliable and safe drinking water meeting forecast demand • Minimise extent and period of disruption to traffic related to construction • Minimise access restrictions and noise disturbance to people from construction and operation of schemes • Raised public awareness of actions to take for water conservation	Irish Water
	Protect and, where possible, enhance recreation and amenity facilities resulting from Irish Water's activities	• Number of public rights of way closures/diversions • Length of paths created compared to loss	• No net loss of important recreational amenity • Generation of new recreational facilities	Irish Water
Water environment	**Water quality and resource** Prevent deterioration of the WFD status of waterbodies with regard to quality and quantity due to Irish Water's activities, contribute towards the "no deterioration" WFD condition and, where possible, the improvement of waterbody status for rivers, lakes, transitional and coastal waters and groundwater to at least "Good" status	• Review of potential for catchment management to improve water quality/retain water • Number of investigations and contributions to catchment management schemes • Consider additional water quality and biological monitoring/data collection in addition to WFD monitoring data where needed • Projects undertaken contributing to water savings • Compliance with	• Improved environmental resilience within water resource use catchments • Contribute to the achievement of "No deterioration" in status of waters (WFD objective) • Restoration to "good" status of waters currently at "moderate", "poor" or "bad" status (WFD objective) • Reduced pollution inputs to groundwaters and prevent deterioration (WFD objective)	Irish Water and EPA

SEA topics	Strategic Environmental Assessment objectives	SEA indicators	SEA targets	Source data
		WSSP Strategy Objective to manage water supplies in an efficient and economic manner (WS3). Key indicator – Leakage expressed as a percentage of treated water put into the distribution system	• Achieve sustainable economic level of leakage (SELL) for the Greater Dublin Area as identified in Appendix H of the draft Framework Plan • Test all preferred approaches for sensitivity to leakage reduction targets	
	Flood risk Maintain and enhance flood risk management	• Number of projects where flood risk assessment undertaken, and compensation required, or increase provided	• No net flood plain area lost as a result of the plan, and where possible increase functioning flood plain	Irish Water and EPA
Biodiversity, flora and fauna	Protect and, where possible, enhance terrestrial, aquatic and soil biodiversity; particularly European sites and protected species	• Identification of existing abstractions or drinking water treatment residuals with risks to international or national designations • For designated nature conservation sites potentially affected by water resource options: i. Area of each designated site/type affected and the likely impact ii. Area of site with a recorded change in condition (positive or negative) iii. Plan for enhancement area/length of habitat affected vs restored	• No adverse effects on integrity of European, national or regional level designations and, where feasible, seek to contribute to achieving Favourable Conservation Status • No net loss of priority habitats or habitat connectivity as a result of the works and, where possible, demonstrate habitat enhancement/creation • Reduced invasive species risk	NPWS, EPA and Irish Water
Material assets	Provide new and upgrade existing water services management infrastructure and treatment processes for residuals generated from drinking water treatment to protect human health and the ecological status of waterbodies	• Minimise permanent loss of greenfield land, including agricultural, forestry or other land uses • No disruption to strategic infrastructure/services • Waste management plans used on all new schemes • No drinking water treatment residuals sent to landfill • No reduced abstraction to other users from new	• Minimise permanent loss of greenfield land, including agricultural, forestry or other land uses • Minimise material consumption and waste during construction and operation of schemes • Increase investment in existing and new water treatment and wastewater management	Irish Water, EPA and Local Authorities

SEA topics	Strategic Environmental Assessment objectives	SEA indicators	SEA targets	Source data
		schemes	infrastructure • Tonnes of residuals reused or recycled	
Landscape and visual amenity	Protect and where possible, enhance designated landscapes in undertaking water services	• Total working area of pipelines through designated landscapes and non-designated landscapes • Development of protected landscape strategies to guide work in important and valued landscapes • Land use/landscape features re-established for projects over an appropriate period – areas/km successfully restored to meet requirements	• Improvement or no net change in landscape quality through landscape design and mitigation and enhancement	Irish Water
Climate change	**Mitigation** Minimise contributions to climate change and emissions to air (including greenhouse gas emissions) undertaking water services	• Carbon footprint (total tonnes) of construction • Percentage of energy supply from renewable sources or reduced energy use • Carbon footprint (total tonnes) per year, predicted over plan period, lifetime of schemes and carbon intensity of water resource options (tonnes/Ml/d) • Improved mix of water resource sources or flexibility of system • Reduced frequency of drought orders requiring change to normal abstractions/compensation releases • Operational Carbon Intensity kgsCO2equic/ML • % improvement in energy efficiency	• Benchmarked reduced carbon emissions from construction • Increased contribution of renewable/low carbon energy sources for existing and new schemes • Minimise the annual carbon emissions from operation • Supported carbon offsetting schemes, including upper catchment schemes linked to biodiversity and water and population wellbeing (recreational) objectives • Improve energy efficiency of water services	Irish Water

SEA topics	Strategic Environmental Assessment objectives	SEA indicators	SEA targets	Source data
	Adaptation Contribute to the resilience of the environment to water supply and treatment infrastructure to the effects of climate change	• Lost time to flooding • Lost time to power supply interruptions	• Improved resilience of environment to climate change	
Cultural heritage	Protect and, where possible, enhance cultural heritage resources undertaking water services	• Number of designated sites or other important archaeological or architectural heritage sites and/or their settings adversely affected by water resource options • Number of schemes where options are rerouted to avoid cultural heritage impacts or length • Number of schemes including improvements to access recording of assets or communication/interpretation of interest features	• No unauthorised physical damage or alteration of the context of cultural heritage features due to Irish Water activities • All schemes developed applying best practice approaches for consultation, desk study and investigation and mitigation for cultural heritage and archaeological interest	Irish Water Archaeological Survey of Ireland Sites and Monuments Record
Geology and soils	Protect and, where possible, enhance geological heritage sites and avoid conflicts with, and contribute towards, the appropriate management of soil quality and quantity	• Area of geological site affected by water resource options • Total area of soil removed or reused on schemes • Area of contaminated land restored, or soils removed	• No loss of statutory and non-statutory geological sites of interest • Minimal disturbance or loss of high-quality land as a result of the Framework Work and minimal net loss of soil resources	Irish Water

11

Next Steps

11.1 Next Steps in the Strategic Environmental Assessment process

The draft Framework Plan and accompanying SEA Environmental Report and NIS are available for comment and review during the current consultation period. The process and deadline for submitting observations on the draft Framework Plan, including the SEA, are set out on the Irish Water website.

Following the completion of the consultation period, all comments will be reviewed and considered as part of finalising the Framework Plan. Responses to the consultation comments will be reported in a Consultation Report.

SEA requirements and consultation comments will be taken into account in finalising the Framework Plan. Consultation responses and how the SEA has been taken into account will be reported in the SEA Statement published with the Final Framework Plan.

Following the adoption of the Framework Plan, the four Regional Plans will be developed and subject to the SEA process, including the SEA screening and scoping stages. The Regional Plan assessment processes will implement the integrated options and approach assessment methodology as set out in the Final Framework Plan and SEA Statement. The Regional Plan SEA assessment stage will be described in the SEA Environmental Reports accompanying each draft Regional Plan for consultation. These Environmental Reports will include regional specific updates to the Environmental Action Plan and Monitoring Plan identified in the Framework Plan SEA Statement.

11.2 Further information

For more information, please refer to one or more of the communication channels below:

- NWRP webpage on the Irish Water website in English and Irish;
- Information leaflet available in English and Irish;
- NWRP infographic;
- Press release to national and local media;
- Newspaper advert;
- Hard copies of the draft Framework Plan, environmental reports, Non-technical Summary and consultation leaflet made available at planning counters nationally;
- FAQs;
- Freephone number 1800 46 36 76;
- Social media; and
- Correspondence and briefings to:
    - Elected representatives;
    - Local authorities;
    - Environmental authorities;
    - Interested parties; and
    - Media.

This SEA Environmental Report has been prepared on behalf of Irish Water and is available online at the following website:

https://www.water.ie/nwrp

Further information requests and written submissions or observations can be sent to Irish Water:

By post:

National Water Resources Plan,

Irish Water,

PO Box 13216,

Glenageary,

Co. Dublin.

By email:

nwrp@water.ie

11.3 Glossary and Acronyms

Term	Definition
Abstraction	The process of taking water from any source, including rivers and aquifers
Appropriate Assessment (AA)	An assessment required under the Habitats Directive when a plan or project has the potential to affect a European site
Aquifer	A water-bearing rock that groundwater can be extracted from
Baseline condition	The state of the environment in the absence of the NWRP Framework
Catchment	The total area of land that drains into a watercourse
CFRAM	Catchment Flood Risk Assessment and Management
CRU	Commission for Regulation of Utilities
CSO	Central Statistics Office
Cumulative effect	The combined effects from several plans, programmes or policies
Deficit	The amount of water shortage between supply and demand
Desalination	The process of removing salt from seawater
DHPLG	Department for Housing, Planning, and Local Government
draft Framework Plan	The draft version of the NWRP - Framework Plan published for consultation. The draft Framework Plan will be updated to respond to relevant feedback from the draft Framework Plan and SEA consultation and then published and adopted as a final plan. (Next Framework Plan or future Framework Plans refer to the next plan cycle(s) which will implement the methodology outlined in the draft Framework Plan.
EBSD	Economics of Balancing Supply and Demand
EC	European Commission
Effluent	Liquid waste or sewage discharged into a river or the sea
Environmental Report (SEA Environmental Report)	The SEA report that documents the effects of measures outlined in a plan
EPA	Environmental Protection Agency
GIS	Geographical Information System
Gross Domestic Product (GDP)	Gross Domestic Product is a monetary measure of the market value of all goods and services produced in a period (in this case annually)
GSI	Geological Survey Ireland
IGH	Irish Geological Heritage
Invasive species	Non-native species that out-compete native species to the detriment of an ecosystem
LSEs	Likely Significant Effects
MCA	Multi-Criteria Analysis
Mitigation	The implementation of measures designed to reduce the predicted effects of a plan or project on the environment
Ml/d	Mega litres per day

Term	Definition
NAF	National Adaptation Framework
National Climate Change Adaptation Framework	National Climate Change Adaptation Framework
National Water Resources Plan (NWRP)	A plan developed by water companies to deliver a long-term provision of water to accommodate the impacts of population growth, drought, their environmental obligations and climate change uncertainty in order to balance supply and demand for water. These are produced cyclically, at least every five years, with a minimum 25-year planning horizon.
NHA	National Heritage Area
Natura Impact Statement (NIS)	The statement prepared following AA of European sites as required under the Habitats Directive, which presents information on the assessment and the process of collating data on a project and its potential significant impacts on European sites.
NIAH	National Inventory of Architectural Heritage
NPV	Net Present Value
NPWS	National Parks and Wildlife Service
OPW	Office of Public Works
PCC	Per Capita Consumption
pNHA	Proposed National Heritage Area
Ramsar site	An international designation for an important wetland site under the Ramsar Convention
RSES	Regional Spatial and Economic Strategies
River Basin District	The area of land and sea, made up of one or more neighbouring river basins together with their associated groundwater and coastal waters, which is identified under Article 3(1) as the main unit for management of river basins
River Basin Management Plan (RBMP)	A key element to the WFD, taking an integrated approach to the protection, improvement and sustainable use of the water environment; including all surface water and groundwater bodies
RMP	Record of Monuments and Places
RPS	Record of Protected Structures
Special Area of Conservation (SAC)	An international designation for habitats and/or species under the Habitats Directive
Special Protection Area (SPA)	A site of international importance for birds, designated as required by the Birds Directive
Strategic Environmental Assessment (SEA) Objectives	Methodological measures against which the effects of the NWRP can be tested
Supply Demand Balance (SDB)	The SDB is the deficit or surplus between the supply and demand both now and over the 25-year horizon
UKWIR	UK Water Industry Research
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WFD	Water Framework Directive

Term	Definition
Water resource management	The management of water sources and demands to minimise any deficit between the two
Water Resource Management Plan	A plan designed to identify water deficits and outline measures that can reduce the deficit
Water Resource Zone (WRZ)	The largest possible zone in which all resources, including external transfers, can be shared and all customers experience a similar risk of supply failure from a resource shortfall
WSSP	Water Serves Strategic Plan
Water Supply Zone	The area supplied by an individual water supply scheme. This typically includes one or more abstractions (from a river, lake or groundwater), a treatment plant, storage in reservoirs and the distribution pipe network to deliver the water to each household or business.
WTP	Water Treatment Plant
WwTP(s)	Wastewater Treatment Plant

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Appendix A. SEA Directive Compliance Check

SEA Directive requirements for the Environmental Report		Chapter of this Environmental Report
Article 5: Environmental Report	"(1) 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 this purpose is referred to in Annex I."	Addressed throughout the Environmental Report – more detailed response to the Annex 1 information requirements provided below.
	"(2) The Environmental Report prepared pursuant to paragraph 1 shall include the information that may reasonably be required taking into account current knowledge and methods of assessment, the contents and level of detail in the plan or programme, its stage in the decision-making process and the extent to which certain matters are more appropriately assessed at different levels in that process in order to avoid duplication of the assessment."	• Chapter 2: NWRP – draft Framework Plan provides an outline of the contents and main objectives of the plan; • Chapter 3: SEA Process and Integration with the draft Framework Plan; and • Chapter 7: SEA Assessment Methodology. These chapters detail how the SEA process has applied to the development of the draft Framework Plan and outlines the methods of assessment relevant to the Environmental Report. Reference is also made in the Environmental Report to the implementation of The Framework Plan through the Regional Plans as these will consider potential alternative investments. The Environmental Report also refers to the application of the down the line planning and licensing processes including Environmental Impact Assessments for future project level assessments and consenting procedures.
	"(3) Relevant information available on environmental effects of the plans and programmes and obtained at other levels of decision-making or through other Community legislation may be used for providing the information referred to in Annex I."	Chapter 1: Review of Relevant Plans, Policies and Programmes identifies the other relevant plans or programmes which have been used to inform the SEA or which interact with the NWRP proposals. Chapter 8: Assessment of the draft Framework Plan (Chapter 1.1) assesses the interaction between the draft Framework Plan and other plans, policies and programmes.
	"(4) The authorities referred to in Article 6(3) (i.e. the authorities designated by Ireland to be consulted because of their environmental responsibilities) shall be consulted when deciding on the scope and level of detail of the information which must be included in the Environmental Report."	Chapter 4: Consultation details the consultation process, consultation conducted to date and the process for consultation relevant to the Environmental Report and the draft Framework Plan.

SEA Directive requirements for the Environmental Report		Chapter of this Environmental Report
Annex 1: Information referred to Article 5(1)		
The information to be provided under Article 5(1), subject to Article 5(2) and 5(3), is the following:	"(a) an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes"	Chapter 1: Introduction and Background Chapter 2: NWRP – draft Framework Plan details the contents and main objectives of the Plan. Chapter 1: Review of Relevant Plans, Policies and Programmes and Chapter 1.1 illustrate the relationship and potential interaction between the draft Framework Plan and other plans, policies and programmes.
	"(b) the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme"	Chapter 6: Baseline Environment provides details on the existing environmental situation, key trends and the likely evolution of the baseline without the Plan in place.
	"(c) the environmental characteristics of areas likely to be significantly affected"	Chapter 6: Baseline Environment provides a table summarising the key issues associated with the environmental baseline. This has influenced the development of the SEA objectives detailed in Chapter 7. Chapter 8: Assessment of draft Framework Plan identifies the environmental receptors potentially affected by the plan or option types. Chapter 9: SEA Influencing the Regional Plans identifies the approach for characterising environmental areas as part of scoping issues for the Study Areas within the Regional Plans.
	"(d) any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC"	Chapter 6: Baseline Environment provides a table summarising the key environmental issues relevant to the draft Framework Plan. A NIS has also been published to comply with the provisions of Directive 92/43/EEC.
	"(e) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation"	Chapter 1: Review of Relevant Plans, Policies and Programmes details plans and programmes which were deemed relevant to the development of the draft Framework Plan and the SEA. Appendix B details the aims and objectives of these relevant plans, policies and programmes and Chapter 6 details the key environmental issues. These have influenced the development of the SEA objectives listed in Chapter 8: Assessment of the draft Framework Plan.
	"(f) the likely significant effects (1) on the environment, including on issues such as biodiversity, population, human health, fauna,	Chapter 8: Assessment of the draft Framework Plan identifies the potential significant effects for the Plan as a whole

SEA Directive requirements for the Environmental Report		Chapter of this Environmental Report
	flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors"	and for "option types" included as potential solutions in the draft Framework Plan. Chapter 9: SEA Influencing the Regional Water Resource Plans provides a basis for addressing potential likely significant environmental effects and associated mitigation measures through the options appraisal and approach selection process.
	"(g) the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme"	Chapter 8: Assessment of the draft Framework Plan identifies potential measures to mitigate and enhance potential significant effects for the plan as a whole, for types of options and in terms of general proposals for implementing the draft Framework Plan. Chapter 9: SEA Influencing the Regional Plans identifies types of measures to be applied as part of the Options Assessment Methodology including environmental sustainability in screening options and selecting combinations of options or approaches for each Study Area. Chapter 10: Mitigation and Monitoring Plans provides draft recommendations on methodology and mitigation to be taken forward for the implementation of the draft Framework Plan including actions for the development of the Regional Plans.
	"(h) 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 8 sets out reasons for selecting the proposed approach for the draft Framework Plan and alternatives considered and limitations in the assessment. Chapter 9 sets out the approach proposed for developing and assessing alternative options and combinations of options/approaches to meet supply demand deficits as they are to be addressed in the Regional Plans.
	"(i) a description of the measures envisaged concerning monitoring in accordance with Article 10"	Chapter 10: Mitigation and Monitoring Plans provides draft proposals for SEA monitoring targets and indicators which have been identified for each SEA objective. These will also be developed further in the Regional Plans' SEAs.
	"(j) a non-technical summary of the information provided under the above headings"	Non-Technical Summary: A summary of the content of the Environmental Report in non-technical language is provided as a separate document.
	"(1) These effects should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects."	Chapter 8: Assessment of the draft Framework Plan and Chapter 9: SEA Influencing the Regional Plans. The effects to be considered have

SEA Directive requirements for the Environmental Report		Chapter of this Environmental Report
		included secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects. These are incorporated in the high level assessment of the draft Framework Plan and in the methodology for assessment to be applied in the Regional Plans.

Appendix B. Legislation, Policy Programme and Plan Review

Plan, programme, policy, legislation[25]	Scope
All aspects	
EU Sustainability Policy: • European Union's 7th Environmental Action Plan 2013 • EU Sustainable Development Strategy 2006 • Europe 2020 strategy; for smart, sustainable and inclusive growth	These are current policy documents guiding European environment policy.
United Nations Sustainable Development Goals	Seventeen goals developed by the United Nations in 2017 covering social, environmental and economic development issues including poverty, hunger, health, education, climate change and environment, gender equality, water, sanitation, urbanisation and social justice. These goals and their supporting targets apply to all nations.
Our Sustainable Future, a Framework for Sustainable Development for Ireland (2012)	This is a long-term plan to guide sustainable development and the green economy in Ireland.
Strategic Environmental Assessment (SEA) Directive (2001/42/EC): • European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. No. 435 of 2004) as amended • European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011 (S.I. No. 200 of 2011) as amended	Directive 2001/42/EC (and transposing Irish regulations) on the assessment of the effects of certain plans and programmes on the Environment (the SEA Directive). This Directive established the requirement for SEA as part of high-level decision-making process and the development of plans and programmes.
Environmental Impact Assessment Directive (2014/52/EU): • Irish national legislation expected in 2018	Directive (2014/52/EU) amends the previous Environmental Impact Assessment Directive (2011/92/EU) on the assessment of the effects of certain public and private projects on the environment. It introduces changes in Environmental Impact Assessment requirements across the EU such as the introduction of mandatory "Competent Experts", changes to screening procedures, and mandatory post–Environmental Impact Assessment monitoring.
EC Environmental Liability Directive (2004/35/EC): • The European Communities (Environmental Liability) Regulations, 2008 (S.I. No. 547 of 2008)	Directive 2004/35/EC (and transposing Irish regulations) seeks to prevent and remedy environmental damage – specifically, damage to European protected habitats and species, water resources and land contamination which presents a threat to human health. It is based on the "polluter pays" principle – making operators financially liable for threats of or actual damage.
Water Services Act 2013	This Act transferred the responsibility of water and wastewater

[25] Transposing or supporting Irish legislation included as relevant. However, this is not intended to be an exhaustive list.

Plan, programme, policy, legislation[25]	Scope
	services from the local authorities to Irish Water. Under this Act, Irish Water is responsible for the management of national water assets, maintenance of the water system, investment and planning, managing capital projects and customer care and billing.
Water Services Policy Statement 2018-2025	The strategy defines the key principles by which water services should take place and sets out the Government's objectives for Ireland's water services in the future across the three themes of water quality, conservation and future-proofing. The policy has priority objectives to: Ensure that public and private water services investment decisions are aligned with the broad strategic aims of Ireland 2040: Our Plan, National Planning Framework; and Adapting water services to withstand the impact of climate change and of such weather-related events consistent with the National Adaptation Framework – Planning for a Climate Resilient Ireland, published January 2018.
Ireland 2040: Our Plan, National Planning Framework (Government of Ireland, 2018)	A 20-year strategy identifying strategic development requirements, infrastructure requirements and promoting sustainable strategies for the future.
National Spatial Strategy for Ireland 2002-2020 (Department of the Environment and Local Government, 2002)	A 20-year planning framework for Ireland. Contains water-related provisions for the significant development of water services and infrastructure and protection of the water environment across the country.
County, City and Local Area Plans	Provides detailed and specific plans to allow for the proper planning and sustainable development of an area. Contains policies and objectives related to many environmental aspects including water.
Regional Spatial and Economic Strategies	The Regional Spatial and Economic Strategies support the implementation of the National Spatial Strategy. They cover the three regions: The Southern, the Northern and Western, and the Eastern and Midland Region.
Metropolitan Area Strategic Plans	The National Planning Framework aims to introduce more strategic and co-ordinated planning of cities and large towns. Therefore, in tandem with and as part of the Regional Spatial and Economic Strategy process, Metropolitan Area Strategic Plans will be developed for the five major cities; Dublin, Cork, Limerick, Galway and Waterford. The Metropolitan Area Strategic Plans will be provided with statutory underpinning to act as 12-year strategic planning and investment frameworks for the city metropolitan areas, addressing high-level and long-term strategic development issues, including: • Physical development patterns and strategic growth areas • Strategic infrastructure, particularly in the transportation and water services areas; • Large-scale regeneration and the location of housing and employment; • Metropolitan-scale amenities such as regional parks and walking and cycling networks. Metropolitan Area Strategic Plans will align with and inform national-level sectoral investment plans to guide and coordinate investment within the metropolitan areas,

Plan, programme, policy, legislation[25]	Scope
	coordinating land use planning and strategic infrastructure.
Planning and Development Act 2000 (as amended) and associated planning regulations (not listed here)	This act sets out the detail of regional planning guidelines, development plans and local area plans as well as the basic framework of the development management and consent system. It provides the statutory basis for protecting Ireland's natural and architectural heritage, the carrying out of Environmental Impact Assessment and the provision of social and affordable housing.
Population, economy, tourism and recreation, and human health	
Aarhus Convention (Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters)	This convention grants the public the right to participate in and access all aspects of the decision-making process on environmental planning at local, national and transboundary government level.
EC Drinking Water Directive (1998/83/EC): • European Union (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014)	Directive 1998/83/EC (and transposing Irish regulations) sets out the requirements for drinking water.
Directive 2013/51 Euratom on the protection of the health of the general public with regard to radioactive substances in water intended for human consumption	Sets out the quality standards for drinking water. It sets out the monitoring required against the standards for radioactive substances.
European Union (Radioactive Substances in Drinking Water) Regulations 2016 (S.I. No. 160 of 2016)	The regulations provide for the monitoring of water intended for human consumption to assess compliance with parametric values and, in the event of an exceedance of the parametric values, the undertaking of remedial action to improve the quality of water for the protection of human health from a radiation protection point of view.
World Health Organization, Guidelines for Drinking Water Quality (2011)	The World Health Organization developed guidelines for drinking water standards.
World Health Organization, Water Safety Plan Manual (2006)	The Drinking Water Directive requires that water companies follow the World Health Organization approach for developing Water Safety Plans.
Irish Water, Water Services Strategic Plan: A Plan for the Future of Water Services (2015)	The Water Services Strategic Plan sets out strategic objectives for the delivery of water services over the next 25 years up to 2040. It details current and future challenges which affect the provision of water services and identifies the priorities to be tackled in the short and medium term.
Irish Water National Wastewater Sludge Management Plan (2016)	The National Wastewater Sludge Management Plan outlines the strategy for managing wastewater sludge over the next 25 years.
EU Tourism Policy, 2010	EU policy aims to maintain Europe's standing as a leading destination while maximising the tourism industry's contribution to growth and employment and promoting co-operation between EU countries, particularly through the exchange of good practice. The EU's role in the tourism industry in Ireland is one of support and coordination to supplement the actions of member countries.
Tourism Policy Statement; People, Place and Policy – Growing Tourism to 2025	This is the Tourism Policy Statement for Ireland which aims to grow the industry up to 2025 in terms of revenue and employment.

Plan, programme, policy, legislation[25]	Scope
Tourism Action Plan 2019-2021	The Tourism Action Plan contains 27 Actions which will be carried out in order to help achieve the overall policy objectives in the Government's Tourism Policy Statement 'People, Place and Policy – Growing Tourism to 2025'.
Strategy for the Future Development of National and Regional Greenways	This strategy is to assist in the strategic development of nationally and regionally significant Greenways. It aims to increase the number and geographical spread of Greenways over the next 10 years, with a significant increase in the number of people using Greenways as a visitor experience and as a recreational amenity.
Healthy Ireland Framework, 2013 – 2025 (Department of Health, 2013)	Healthy Ireland is a new national framework for action to improve the health and wellbeing of our country over the coming generation. Based on international evidence, it outlines a new commitment to public health with a considerable emphasis on prevention, while at the same time advocating for stronger health systems. It provides for new arrangements to ensure effective co-operation between the health sector and other areas of Government and public services concerned with social protection, children, business, food safety, education, housing, transport and the environment. It sets out four central goals and outlines actions under six thematic areas, in which all people and all parts of society can participate to achieve these goals. The Framework defines water as one of the key determinants of health.
Food Wise 2025	This strategy sets out a vision for growth within Ireland's agri-food sector over the next ten years, reiterating the importance of the sector to Ireland's economic recovery and identifying areas that require strategic action in order to maximise growth until 2025. It recognises the importance of the agri-food industry in committing to processes that are sustainable – economically, socially and environmentally.
County based recreation strategies (various)	Develops a framework to coordinate the objectives and targets of key stakeholders in a cohesive and integrated plan for the county, ensuring the provision, management and use of quality facilities and services for everyone, including future generations.
Water environment	
Water Framework Directive (2000/60/EC): • Environmental Quality Standards Directive 2008/105/EC (supporting directive) • The Water Policy Regulations (S.I. No. 722 of 2003) • European Union (Water Policy) Regulations 2014 (S.I. No. 350 of 2014) • The Surface Waters Regulations (S.I. No. 272 of 2009) • The Groundwater Regulations (S.I. No. 9 of 2010 • River Basin Management Plans 2015-2021	The Water Framework Directive establishes a standard European strategic approach to managing groundwater, wetlands and surface water bodies to meet common environmental objectives.

Plan, programme, policy, legislation[25]	Scope
Bathing Water Directive (2006/7/EC): • Bathing Water Quality Regulations 2008 (S.I. No. 79 of 2008)	Directive 2006/7/EC (and transposing Irish regulations) sets standards for bathing waters with an emphasis on public health.
The Floods Directive (2007/60/EC): • European Communities (Assessment and Management of Flood Risks) Regulations 2010. (S.I. No. 122 of 2010)	Directive 2007/60/EC (and transposing Irish regulations) requires Ireland to assess flood risk and to take adequate and coordinated measures to reduce this flood risk, including the development of Flood Risk Management Plans.
Nitrates Directive (91/676/EEC): • European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014 (S.I. No. 31 of 2014) (as amended)	The purpose of Directive 91/676/EEC is to both reduce and prevent water pollution caused by nitrates from agricultural land. Further controls on nitrates have been introduced under the Water Framework Directive.
Urban Wastewater Treatment Directive (91/271/EEC): • Urban Waste Water Treatment Regulations 2001 (S.I. No. 254 of 2001) as amended • Waste Water Discharge (Authorisation) Regulations 2007 (S.I. No. 684 of 2007)	Directive 91/271/EEC (and transposing Irish regulations) aims to protect the environment from urban and industrial discharges and covers the collection, treatment and discharge of domestic, mixed and industrial wastewater.
Marine Strategy Framework Directive (2008/56/EC): • European Communities (Marine Strategy Framework) Regulations (S.I. No. 249 of 2011)	Directive (2008/56/EC) (and transposing Irish regulations) establishes a framework within which member states will take measures to maintain or achieve “good environmental status” in the marine environment by 2020.
Groundwater Directive (2006/118/EC): • European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010)	Directive (2006/118/EC) (and transposing Irish regulations) establishes a regime which sets groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater.
• Shellfish Waters Directive (2006/113/EC)	Directive 2006/113/EC aims to protect or improve shellfish waters.
• Fish Directive (2006/44/EC)	Directive 2006/44/EC aims to protect or improve the quality of fresh waters which do or could support fish.
Strategic Integrated Framework Plan for the Shannon Estuary 2013-2020	This is an inter-jurisdictional land and marine based plan, which was the outcome of a successful multi-agency collaboration that included Limerick City and County Council, Clare County Council, Kerry County Council, Shannon Development and the Shannon Foynes Port Company. The Plan has been adopted through the relevant County and City Development Plans and has become planning policy. Local authorities have the primary role of implementing and delivering the aims and objectives of the plan.
National Marine Planning Framework	Irelands first Marine Planning Framework will be a key tool in the decision making process for authorities and policy makers, having regard to the marine plan in the same way that the terrestrial plan is part of the planning process.
Biodiversity, flora and fauna	
International and EU Conventions**:** • United Nations (1992) Convention on	These international and EU conventions related to the protection of biodiversity

Plan, programme, policy, legislation[25]	Scope
Biological Diversity • UNESCO Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat, 1971 • The Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983) • Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)	
EU Biodiversity Strategy, 2011	Strategy to halt the loss of biodiversity and ecosystem services in the EU.
European Commission Green Infrastructure Strategy: Enhancing Europe's National Capital (2013) • Creating Green Infrastructure for Ireland: Enhancing Natural Capital for Human Wellbeing	This strategy aims to promote the deployment of green infrastructure in the EU in urban and rural areas. It aims to ensure that the protection, restoration, creation and enhancement of green infrastructure become an integral part of spatial planning and territorial development whenever it offers a better alternative, or is complementary, to standard grey choices. This document sets out how Green Infrastructure is a network of green spaces that help conserve natural ecosystems and provide benefits to human populations through water purification, flood control, carbon capture, food production and recreation. Such spaces include woodlands, coastlines, flood plains, hedgerows, city parks and street trees. Green spaces can be developed to benefit natural heritage and biodiversity as well as the greater economy and society.
Birds Directive (09/147/EC) and Habitats Directive (92/43/EEC): • European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) • European Communities (Birds and Natural Habitats) (Amendment) Regulations 2015 (S.I. No. 355 of 2015)	Directive 09/147/EC requires all EU member states to take measures to protect all wild birds and their habitats. The Birds Directive aims to protect all of the 500 wild bird species naturally occurring in the European Union. Directive 92/43/EEC requires all EU member states to ensure the conservation of a wide range of rare, threatened or endemic animal and plant species.
Department for Housing, Planning and Local Government, 2006, Draft fourth Nitrates Action Programme	The Nitrates Action Programme gives effect to the Nitrates Directive and EU (Good Agricultural Practice for Protection of Waters) Regulations as amended (S.I. No. 378 of 2006, and Ireland's first Nitrates Action Programme came into operation in 2006. Article 28 of the Good Agricultural Practices Regulations 2006 as amended, in line with the Nitrates Directive, requires a review of the Nitrates Action Programme every four years. Ireland has applied its Nitrates Action Programme on a country-wide basis, thus ensuring 100% territorial coverage compared to an EU average of 45% territorial coverage. In addition, the programme also provides for the control of phosphorus used in agriculture.
Actions for Biodiversity 2011-2016, Ireland's National Biodiversity Plan (Department of Arts, Heritage and the Gaeltacht, 2011)	This plan follows on from the 2002 National Biodiversity Action Plan. The overarching target of the second plan is "That biodiversity loss and degradation of ecosystems are reduced by 2016 and progress is made towards substantial recovery by 2020".

Plan, programme, policy, legislation[25]	Scope
Fisheries (Consolidation) Act, 1959	The Fisheries Consolidation Act 1959 is the Principal Act governing the Inland Fisheries Sector in Ireland. This Act consolidated the Fisheries Acts from 1842 to 1958 into one piece of legislation. This Act provides for the management and conservation of marine and freshwater fisheries in Ireland (use of gear and other restrictions of fishing, trade in fish). It specifies regulation-making powers of the Minister.
Wildlife Act 1976 and the Wildlife (Amendment) Act 2000	Irish legislation in relation to the protection of biodiversity.
Flora (Protection) Order 2015	Sets out the list of plant species protected by Section 21 of the Wildlife Act.
Quality of Salmonid Waters Regulations 1988 (S.I. No. 293 of 1988)	The objective of these regulations is the maintenance of water quality for salmon and trout freshwater species.
County Council Heritage and Biodiversity Plans	These plans help to ensure that targets for species and habitat conservation in the National Biodiversity and Heritage Plans are translated into effective action at the local level.
National Biodiversity Action Plan 2017-2021	The Biodiversity Action Plan contains seven strategic objectives to achieve the overall goal of protecting Irelands biodiversity for future generations.
Material assets	
Waste Framework Directive (2008/98/EC)	Directive 2008/98/EC outlines the definitions related to waste management. It requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest.
Government Infrastructure and Capital Investment Plan 2016–2021 (Department of Public Expenditure and Reform, 2017)	Framework for investment in infrastructure in Ireland 2016-2021.
National Spatial Strategy for Ireland 2002-2020 (Department of the Environment and Local Government, 2002)	The National Spatial Strategy emphasises that “Green Structure” should be put in place in regional level plans and strategies with the aim of preventing urban sprawl and reducing the loss of agriculture and other land to urban uses.
Waste Management Acts 1996 - 2005	The Waste Management Acts provide for a general duty on everyone not to hold, transport, recover or dispose of waste (WTP residuals) in a manner that causes or is likely to cause environmental pollution.
Waste Management in Ireland; A Resource Opportunity (2012)	Sets out the roadmap for the management of waste in Ireland in order to move away from dependence on landfill, by putting in place the most appropriate technologies and approaches to reduce waste, while at the same time maximising the resources that Irish Water can recover from waste. It places renewed emphasis on the Waste Hierarchy, moving the emphasis from resource management, with landfill diversion as the key driver to resource efficiency and reducing reliance on finite resources. It takes account of the targets and requirements within the Waste Framework Directive.
Forestry Programme 2014-2020: Ireland	The Department of Agriculture, Food and the Marine has set

Plan, programme, policy, legislation[25]	Scope
(Department of Agriculture, Food and the Marine, 2015)	out measures in relation to the following to try and meet the main forestry needs: • Increase forest cover; and • Increase the production of forest biomass to meet renewable energy targets. • Support forest holders to actively manage their plantations; and Maximise the environmental and social benefits of new and existing forests.
National Peatlands Strategy (NPWS, 2015)	The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. The Strategy will: • Give direction to Ireland's approach to peatland management and how to optimise the benefits derived from our vast peatland resource over the coming decades; • Ensure that Ireland's peatlands are sustainably managed so that their benefits can be enjoyed responsibly.
Food Wise 2025: A vision for growth 2015-2025	Food Wise 2025 sets out a ten-year plan for the agri-food sector. It underlines the sector's unique and special position within the Irish economy, and it illustrates the potential which exists for this sector to grow even further. Food Wise 2025 identifies ambitious and challenging growth projections for the industry over the next ten years, including: • 85% increase in exports to €19 billion; • 70% increase in value added to €13 billion; • 60% increase in primary production to €10 billion; and • The creation of 23,000 additional jobs all along the supply chain from producer level to high-end value-added product development.
Regional Waste Management Plans (various), 2015	For the purposes of waste management planning, Ireland is now divided into three regions: Southern, Eastern-Midlands and Connacht-Ulster.
County based waste management strategies and mineral plans	Establishes a framework for the sustainable management of wastes generated in the county.
Landscape and visual amenity	
Council of Europe (2006) European Landscape Convention	The European Landscape Convention is the first international convention to focus specifically on landscape. Created by the Council of Europe, the convention promotes landscape protection, management and planning, and European co-operation on landscape issues. It applies to all landscapes, towns and villages, as well as open countryside; the coast and inland areas; and ordinary or even degraded landscapes, as well as those that are afforded protection.
National Landscape Strategy for Ireland 2015-2025 (Department of Arts, Heritage and the Gaeltacht, 2015)	The National Landscape Strategy will be used to ensure that Ireland complies with the European Landscape Convention.
County Landscape Character Assessments	The Landscape Character Assessments classifies and describes the landscape in a county.
Noise	
Environmental Noise Directive (2002/49/EC): • Environmental Noise Regulations	Directive 2002/49/EC applies to noise to which humans are exposed, particularly in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open

Plan, programme, policy, legislation[25]	Scope
2006 (S.I. No. 1401 of 2006)	country, near schools, hospitals and other noise-sensitive buildings and areas.
WHO Environmental Noise Guidelines 2018	The main objective of the guidelines is to provide recommendations for protecting human health from exposure to environmental noise.
Climate change	
The Kyoto Protocol 2007	The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialised countries and the European community for reducing greenhouse gas emissions.
Renewable Energy Directive (2009/28/EC)	Directive 2009/28/EC sets a target for Ireland to achieve 20% of its energy consumption from renewable sources by 2020 as a contributory factor in tackling climate change.
Paris Agreement 2015	Signed by nearly 200 countries, the agreement with the United Nations Framework Convention on Climate Change came into effect on 4 November 2016 and sets a target to keep global temperature rise to under 2˚C by 2050.
EU Energy and Climate (2020) Package 2009	The 2020 package is a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020.
Climate Action and Low Carbon Development Act 2015	Provides the statutory basis by which the Minister for Communications, Climate Action and Environment must make and submit to Government a series of successive National Mitigation Plans and National Adaptation Frameworks. When considering these plans and frameworks, the Government must ensure that the national transition objective is achieved by the implementation of measures that are cost-effective. The Act provides that the first National Mitigation Plan was to be submitted to Government no later than 10 June 2017, and the first National Adaptation Framework must be submitted to Government no later than 10 December 2017.
National Adaptation Framework – Planning for a Climate Resilient Ireland (2018)	The 'National Adaptation Framework' provides the policy context for a strategic national adaptation response to climate change in Ireland. The role of key sectors including local government is set out in the context of how Ireland can develop climate resilience while also recognising the need to ensure coordination of adaptation actions across sectors and Government Departments and Agencies. This Framework identifies impacts on water resources as a key impact to climate change including water scarcity and drought and how this can cause impacts in other sectors such as agriculture and critical infrastructure. Water Resource and Flood Risk Management has been identified as key area for developing adaptation plans. The Department of Housing, Planning and Local Government is responsible for defining actions that can be undertaken in the next five years in relation to Water Resource and Flood Risk Management.
National Mitigation Plan (Department of Communications, Climate Action and Environment, 2017)	The first National Mitigation Plan represents an initial step to set us on a pathway to achieve the level of decarbonisation required. It is a whole Government Plan, reflecting in particular the central roles of the key Ministers responsible for the sectors covered by the plan – electricity generation, the built environment, transport and agriculture, as well as drawing on the perspectives and responsibilities of a range of other

Plan, programme, policy, legislation[25]	Scope
	Government departments. The measures implemented through this plan lay the foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. The plan also includes over 100 individual actions for various Ministers and public bodies to take forward as irish Water move towards implementing what will be a living document. The plan does not provide a complete roadmap to achieve the 2050 objective but begins the process of development of medium- to long-term mitigation choices for the next and future decades.
Ireland's National Policy Position on Climate Action and Low Carbon Development (2014)	The National Policy Position establishes the fundamental national objective of transitioning to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050.
Energy White Paper: Delivering a Sustainable Energy Future for Ireland – the Energy Policy Framework 2007 – 2020	This white paper aims to achieve electricity supply which consistently meets demand and sets a target to meet 33% of consumption from renewable energy by 2020.
National Renewable Energy Action Plan (2010)	Outlines Ireland's national trajectories for the share of energies from renewable sources consumed in transport, electricity, heating and cooling between now and 2020.
Offshore Renewable Energy Development Plan (2014)	Describes the policy context for the development of offshore wind, wave and tidal energy in Irish waters.
Climate Action Plan (2019)	The Climate Action Plan sets out the governance of how Ireland will tackle climate disruption and achieve net zero greenhouse gas emissions by 2050. The report contains almost 200 actions to ensure Ireland meets its targets.
Cultural heritage (architectural and archaeological)	
EU conventions on archaeological, architectural and cultural heritage: • Convention for the Protection of the Architectural Heritage of Europe (Granada, 1985) • The European Convention on the Protection of the Archaeological Heritage (Valletta, 1992) • Council of Europe Framework Convention on the Value of Cultural Heritage for Society (Faro, 2005)	EU conventions related to the protection of archaeological, architectural and cultural heritage.
The Heritage Act 1995	This Act aims to promote public interest in, and knowledge, appreciation and protection of, the national heritage.
National Monuments Act (Amendment) 2004	Under these regulations, it is illegal to do any of the following things to a national monument: (a) to demolish or remove it wholly or in part or to disfigure, deface, alter, or in any manner injure or interfere with it; or (b) to excavate, dig, plough or otherwise disturb the ground within, around, or in proximity to it, without consent.
Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999	This Act provides for the establishment of a national inventory of architectural heritage and for related matters and to provide for the obligations of sanitary authorities in respect of registered historic monuments.

Plan, programme, policy, legislation[25]	Scope
Heritage Ireland 2030	Irelands new national heritage plan will establish a heritage framework under three themes, to ensure that Irelands heritage is valued and protected. The themes are: National Leadership and Heritage, Heritage Partnerships and Communities and Heritage.
County Heritage Plans	Local authorities are responsible for developing Heritage Plans to raise awareness for local heritage and promote the conservation of the built, natural and cultural heritage of the county.
Geology and soils	
Rural Development Programme 2014-2020	This programme sets out the rural development plan for the six-year period, including improving water quality and water management by setting out a choice of rural development measures for increasing efficiency in water use by agriculture, fertiliser and pesticide management, soil erosion and improving soil management.
Action Plan for Rural Development; Realising our Rural Potential	This document presents an action plan for sustainable rural development including the need to address water management.
Transboundary	
Planning Act (NI) 2011	The Planning Act (NI) sets out planning policy for Northern Ireland establishing a new two-tiered planning system with devolved powers to local government. The 2011 Act requires all councils to prepare a LDP that will provide a 15 year framework to support economic and social needs facilitating sustainable growth. LDPs should ensure that supporting actions are in place to ensure that developers provide necessary infrastructure such as road access, water supply, sewerage and land drainage.
Regional Development Strategy: Building a Better Future 2035	Aims to deliver the spatial aspects of the Programme for Government. It aims for balanced sub-regional growth and recognises the importance of key settlements as centres for growth and investment, dealing with climate change as a key environmental and economic driver, and the importance of rural communities. It aims to maximise the use of existing infrastructure and services.
Northern Ireland Climate Change Adaptation Programme	The Adaptation Programme provides the strategic objectives in relation to adaptation to climate change, the proposals and policies by which each department will meet these objectives, and the timescales associated with the proposals and policies identified in the period up to 2019. The adaptation programme will be reviewed cyclically, at least every five years.
The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2009	It is implemented through River Basin Management Plans that set out an objective for each water body and summarise the measures which will be taken to achieve this. For surface waters: • prevent deterioration. • aim to achieve good ecological status (or for Artificial or Heavily Modified Water Bodies, good ecological potential). • aim to achieve good chemical status. • aim to reduce/cease emissions, discharges & losses from priority substances and priority hazardous substances. • meet protected area objectives where relevant.

Plan, programme, policy, legislation[25]	Scope
	For groundwater: • prevent deterioration of status. • aim to achieve good quantitative status. • aim to achieve good chemical status. • prevent or limit the input of pollutants. • reverse significant upward trends in the concentration of pollutants. • meet protected area objectives where relevant.
Water Abstraction and Impoundment (Licensing) (Amendment) Regulations (Northern Ireland) 2007	Aims to protect the water environment and to secure efficient and sustainable water use. These Regulations provide a consistent, environmental risk based, approach to the assessment and authorisation of water abstraction and impoundment activities within Northern Ireland. NIEA is the competent authority and is responsible for implementing the regulations in Northern Ireland.
The Water Supply (Water Quality) Regulations (NI) 2007, as amended (2015)	These regulations implement Drinking Water Directive (DWD) requirements for controlling water quality including chemical and biological contamination. They require water companies to assess the risk posed by contamination of the raw water and have water treatment in place to ensure that the disinfection process is robust and able to either inactivate or remove all pathogenic organisms, including viruses, parasites and bacteria; and prevent pollution from chemicals, before water is supplied.
NI Water (2020) Our Strategy 2021-2046	This document indicates that water resource management measures should: • Continue to aim for sustainable levels of abstraction. • Recognise the challenges posed by climate change. • Protect conservation sites that depend on water. • Safeguard water resources through effective catchment management, considering the interaction between quality and quantity. • Promote water efficiency measures, with water companies contributing to water efficiency commitment. • Reduce leakage further. • Incentivise efficient use of water.
NI Water (2020) Water Resource and Supply Resilience Plan	This strategy sets out how NI Water intends to maintain the balance between supply and demand for water over the long-term, and the operational and management options and activities available to respond to short term critical events. It considers the following Government objectives and aspirations: • Sustainable catchment management – improving drinking water quality by managing diffuse pollution within an integrated catchment plan rather than through energy-intensive “end of pipe” treatment processes; • Water demand management – reducing leakage and introducing demand management measures that reduce waste, rather than by increasing water abstraction, treatment and transfer which all have an associated energy demand; and • Energy efficiency and reduced carbon emissions – managing and maintaining the existing asset base to improve energy efficiency and minimise emissions.

Appendix C. Summary of Responses to the SEA Scoping Report

Consultee	Submission	Action
Projects and development		
Health Service Executive Environmental Health Service Health Service Executive Drinking Water Group	Some consultees raised issues with private water supplies. It was recognised that Irish Water has no direct responsibility for private water, water quality in private supplies continues to pose a public health risk. However, desire expressed for Irish Water, as the national body charged with water delivery, to use its resources where possible for a positive impact on private water supplies. If there is an opportunity to promote/consider small, single, private supplies, it should be included even though this is largely a 25-year strategy for public water supplies.	Irish Water recognise the importance of this. However, private water supplies do not fall under the remit of the National Water Resources Plan (NWRP) Framework. The NWRP considers supplies that are provided by us only. It cannot address issues around supplies it has no control over.
Health Service Executive Drinking Water Group	A suggestion to include an objective of the NWRP in relation to the distribution network – both the geographical spread and the age and state of repair of the network.	The NWRP has assessed an interim updated Sustainable Economic Level of Leakage targets for the public water supply, based on information from the newly developed Leakage Management System. These targets will be assigned to the Water Resources Zones on a prioritized basis at the start of each year, and focussed on areas with significant supply demand balance issues, including environmental sustainability.
Transport Infrastructure Ireland	Comments about, for example, national roads, methods/techniques, potential schemes and effects.	All issues will be considered at project level, through detailed design and Environmental Impact Assessment.
An Fórum Uisce	The Forum has requested that Irish Water arrange for a presentation from Irish Water on [the Eastern and Midlands Water Supply Scheme] at their next meeting.	Consultation and engagement on the Eastern and Midlands Water Supply Scheme will not be dealt with as part of the Framework Plan.
Dublin City Council Limerick Chamber Tipperary County Council	A number of stakeholders raised concerns about national water projects, including Ringsend WwTP, planned construction of the new Regional WwTW north of the city, and Parteen Basin source and the impacts on the operation of Ardnacrusha Hydroelectric Scheme in addition to alternative developments considered in the Parteen Basin source	The Framework Plan will not make recommendations on the Preferred Approach for the Greater Dublin Area or the Midlands Region. The needs in these areas will be considered through the Regional Water Resources Plan for the Eastern and Midlands Region.

Consultee	Submission	Action
	Final Options Appraisal Report.	
Dublin City Council	Some further consideration of the impact of the Resource Plan on the people and on the environment of Ireland in terms of the non-delivery of key infrastructure and the impact of any such delays on the growth potential, the existing demand for services and the receiving environment is required.	The NWRP, as it will be published, will look into demand and supply based on the National Planning Framework (Government of Ireland, 2018).
General environmental		
Health Service Executive Drinking Water Group Inland Fisheries Ireland	Fewer but larger abstractions: Attention drawn to the fact that a smaller number of abstractions will mean larger abstractions sometimes. The need to assess impacts from lowland surface water raised. Consolidation of abstraction locations should not be based solely on economic evaluation. While a reduction in the overall number can be a positive, any increase in abstraction volumes at individual locations must be cognizant of Water Framework Directive (WFD) requirements and principles of environmental sustainability.	These issues will be taken into consideration at the assessment stage in the next iteration of the Framework Plan: fine screening. The methodology will ensure that all aspects are considered. Rationalisation of abstractions will be assessed against environmental, economic, technical and progressability objectives as part of a Multi-Criteria Analysis.
Geological Survey Ireland Environmental Protection Agency Green Party	Water quality issues raised included: • Water quality as a key aspect in the availability of water; using higher quality raw water sources and implementing pollution reduction measures in water supply source catchments can minimise treatment costs. • Water conservation and mitigation measures rather than a focus on provision of new and sufficient water supplies should be more prominent as it might help to reduce demand for treated water. Irish Water should identify measures for water demand reduction, leakage reduction, conservation. Alternative supplies (such as rainwater harvesting and grey water use) should be an essential part of the plan. Irish Water should develop a plan to reduce pollutant inputs within the source catchment, in preference to end-of-pipe solutions • The WFD objective of “no deterioration” should be considered for waterbodies of Good Status or Good Ecological Potential. • The Environmental Protection Agency’s (EPA’s) study of “At Risk” waterbodies should be factored into	The NWRP considers anything that could potentially affect the quantity. This includes catchment management and water conservation. Irish Water is also undertaking other site-specific assessments into water quality issues at their WTPs outside of the NWRP. The options appraisal process will consider many issues and risks around sources, including whether it is on the EPA Remedial Action List and the impact this would have, or whether it is “At Risk” of achieving the WFD objective or “good” status or deteriorating from “good” status in the future.

Consultee	Submission	Action
	the development of the NWRP. • It should also be considered whether a water supply is included on the EPA's Remedial Action List and/or whether high risk hazardous events are associated with a supply's Drinking Water Safety Plan.	
Environmental Protection Agency	Reference is made to the significant pressure work produced by EPA (2016), but reference should also be made to both hydromorphology and abstractions not being developed to a significant enough level in that assessment, both of which are critical to the plan. And clarity is needed on what constraints Irish Water envisages will be needed on the land within the catchments of water supplies. For example, will the Drinking Water Protected Areas get larger if the volumes abstracted increase?	The NWRP will outline that separate assessments further to the EPA pressure work will be carried out on any proposed measures, such as additional abstractions, which will consider the potential impact of the abstraction regarding the chemical and ecological status and the WFD objectives. The options appraisal process will consider the impact of any increased abstractions on the environment. This includes upstream and downstream of the abstraction point and within the catchment and beyond.
Environmental Protection Agency Health Service Executive Environmental Health Service Limerick Chamber Geological Survey Ireland	Many consultees raised the interrelationship between the Plan and the OPW's CFRAM Flood Risk Management Plans, the issue of flooding throughout Ireland and the need to set flood planning as one of the main objectives alongside drought planning.	The NWRP considers delivery of Ireland's public water supply, which is not a significant source of flood risk. However, there is the potential for Flood Risk Management works to impact on hydrology in a positive or negative way. The potential for cumulative effects between options proposed in the Framework Plan and measures contained in Flood Risk Management Plans will be considered on a case-by-case basis, as will the resilience of proposed options to future climate change (including flood risk). Irish Water recognise the importance of flooding and consider the impact of climate change in terms of flooding on their resources. Any proposed options will be considered for their ability to deal with the effects of climate change, or their potential to increase vulnerability of the environment to climate change. However, development of a flood plan is not something that would be included in a Water Resources Plan.
Health Service Executive Environmental Health Service Environmental	Emphasis was placed on cost by consultees in the terms of: • Energy usage of water industry and need to focus on more energy efficient plants;	The NWRP will take consideration of the Whole Life of Cost of Options and will try to ensure the Best Value for Money. This will include trying to minimize operational expenditure

Consultee	Submission	Action
Protection Agency Green Party The Water Forum	• Acceptable usage of public money to pursue the objectives of the NWRP by using catchment management and protection to cost-effectively deliver water services; and • Raising awareness and educating the public in relation to water provision cost and conservation requirements and solutions.	(OPEX) and cost of carbon. Rationalisation of sources is something Irish Water aspire to do. Therefore, the Framework Plan will consider source rationalisation, but it needs to be balanced against the cost, environmental and socio-economic benefits of the alternatives through a Multi-Criteria Analysis. Water conservation and public awareness around this is something the NWRP will support. Irish Water has a number of initiatives and plans aimed at improving public awareness of issues of water conservation which the NWRP will align with.
Irish Creamery Milk Supplies Association Health Service Executive Drinking Water Group Environmental Protection Agency	Agriculture was highlighted as a significant pressure on the water environment and to Irish Water's operations by the Health Service Executive. Drinking Water Group. However, Irish Creamery Milk Supplies Association has raised the need to consider the impacts of other industries/urban and non-farming rural sources also influence water quality. The assessment should also consider the impacts of agricultural policy on water demand.	All significant pressures on the water environment will be considered throughout the development of the plan. Food Wise 2025 and Food Harvest 2020 strategies and targets have been considered and risks/threats associated in terms of water quality and water demand.
Environmental Protection Agency Inland Fisheries Ireland	Mixed views on effluent re-use were raised by EPA and Inland Fisheries Ireland. It should be noted that the EPA were not in favour of direct effluent reuse as a source of drinking water, whilst Inland Fisheries Ireland welcomed the inclusion of "Effluent Reuse", "Reservoirs" and "Desalination" as potential option types and would encourage serious consideration of these options for future use.	All options must be considered at least in the Framework Plan process. Options will progress based on the outcomes of a Multi-Criteria Analysis which includes feasibility and flexibility, resilience, progressability and Sustainability (Environmental and Social Impacts).
Environmental Protection Agency	Leakage reduction targets should be given to individual Water Resource Zones rather than applying a national leakage reduction target. Irish Water recommend that more aggressive targets should be in place for sources where the abstraction is putting the waterbody at risk or WTPs are being operated close to or above design capacity.	Leakage reduction will be applied at least at county level and possibly Water Resource Zone level.
Department for Culture, Heritage and the Gaeltacht	Issue of protected species raised; protected species; effects on European Sites, and availability of water from European sites.	The Strategic Environmental Assessment (SEA) will take cognisance of all species of conservation interest, including those not protected under key pieces of legislation (for example the

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		International Union for Conservation of Nature and the Birds of Conservation for Concern's Red Data list species) to ensure that these species are considered in any impact assessment at the project level (where appropriate). It should be noted in Ireland that all sites are candidate Special Areas of Conservation. However, they have the same protection whether a candidate Special Area of Conservation or a Special Area of Conservation. For ease, Irish Water will refer to them as Special Areas of Conservation as the National Parks and Wildlife Service does.
Geological Survey Ireland Health Service Executive Environmental Health Service	Issues in relation to climate change arose: "Climate change will impact surface and groundwater resources alike, both quantity and quality. Reductions in effective rainfall, particularly spring/summer, will likely cause an increase in agricultural water use for irrigation and stock. Even if reliant on private supplies, increases in agricultural and other sector use will impact on Irish Water's ability to increase abstraction in water stressed areas. " Projections on changes in sectoral use as a function of climate change would be important to incorporate. The NWRP should have looked at the modelling of potential future rainfall (this would also tie into the issue of headroom). Modelling can add value and direction to the NWRP.	Climate change modelling has been integrated throughout the NWRP development process in the modelling of water available and demand forecasting. The NWRP has developed long-term historical estimates of flow at Irish Water's sources and has examined the impact of climate change on future water availability. The methodology establishes a framework for more detail as required but given the scale of the task in developing a plan for the whole country, this will be on an as-required basis.
Department for Culture, Heritage and the Gaeltacht Dublin City Council Environmental Protection Agency	A number of submissions were made in terms of demand forecasting in relation to: • Demand projections timeframes – should be run beyond 2050 where the trend is continuously increasing, as future thresholds may be reached and require alternatives. But at what stage will these options will cease to be sufficient (for example, 2060, 2075, 2100) given various population and demand growth projections need to be assessed in terms of future alternatives. • Water supply/demand equations, based on current trends, demonstrate an increasing risk of supply capacity not meeting demand from 2020/2021,	The NWRP is a 25-year plan. The level of uncertainty beyond this is too great to be a driver for investment. It may lead to investment being targeted in the wrong areas or to a scale that is not required. Twenty-five years is considered to be a reasonable balance between planning for the long term but ensuring that investment is not wasted. This is consistent with approaches in other jurisdictions. Major schemes that may be recommended by a Water Resource Management Plan can consider longer periods but even this would not likely extend much further than

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	even assuming the hoped-for savings in demand are met through Irish Water's water conservation measures. There are already issues in terms of the lack of any current headroom between supply capacity and current demands. • Incomplete information is available on users of, and demands for, water, and the SDB assessment is therefore based on an incomplete picture, meaning that Irish Water can only adopt an interim position at present.	2050. The NWRP will undertake an assessment on the SDB for the whole country from 2017 and 2041, including allowing for a target headroom. It will help identify where deficits are now and into the future. It will define a methodology for identifying and assessing options to meet these deficits. Irish Water agree there is a degree of uncertainty around the SDB. The plan will make recommendations for closing data gaps and reducing uncertainty. The plan will propose a methodology for doing this and how to develop, appraise and recommend options, but because of the significant uncertainty, the SDB is not considered robust enough to develop a detailed 25-year investment plan.
Inland Fisheries Ireland	Inland Fisheries Ireland raised the importance of aquatic biodiversity in terms of the protection of the physical environment, hydrological process and protection of the ecological status of river catchments. Insidious impacts of chronic pollution are as serious as dramatic discharges which result in instantaneous fish kills. The plan should promote sustainable water use based on long-term protection of available resources.	These aspects are considered in the biodiversity SEA Objectives, and the Options Assessment Methodology will consider the ecological status of the waterbodies near the option. Irish Water expect the abstraction licensing regime to provide a framework to deliver the environmental protection required. This is a developing area and the plan will take account of the uncertainty.
Inland Fisheries Ireland	Consideration should be given to potential impacts on: • Water quality including assimilative capacity • Aquatic and associated riparian habitats • Biological diversity • Ecosystem structure and functioning • Fish spawning and nursery areas • Surface water hydrology • Passage of migratory fish • Areas of natural heritage and geological heritage	The NWRP will be guided by WFD and the Habitats Directive. As the WFD takes a holistic approach using chemistry, biology and ecological assessment, the specific considerations raised by Inland Fisheries Ireland are addressed. In addition, at the project level, robust impact assessment will be undertaken which will take into consideration impacts on each/all of those listed by Inland Fisheries Ireland, as appropriate.
Green Party	The SEA assessment approach was raised stating that assigning vague adjectives (such as "positive", "slightly negative" and "neutral") to vital quantifiable environmental factors does not amount to SEA. Water resource management draws heavily on	The screening methodology, SEA Environmental Report and Multi-Criteria Analysis considers a range of qualitative and quantitative analysis used, including those raised here. These will inform a rating of positive, negative or neutral with a

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	quantitative analysis. Therefore, SEA must contain credible quantitative analysis. Factors which must be analysed quantitatively include: water demand, water demand management and reduction, energy demand and greenhouse gas emissions.	clear guide created to remove subjectivity as far as reasonably possible.
Inland Fisheries Ireland	Suggestion made that the Framework Plan should include a statement on the prevention of river fragmentation and encourage the connectivity or re-connectivity where possible of fisheries waters in line with the Adaptive Management of Barriers in European Rivers Project.	Irish Water is not wholly responsible for the Adaptive Management of Barriers in Europe Project but are a key stakeholder. The Framework Plan will consider the impact of Irish Water's current and future abstractions on the river bodies but will not comment on wider issues regarding the river systems of Ireland.
The Water Forum	Queries in relation to conservation measures: • Proposals to utilize grey water for non-drinking water requirements; • The range of conservation issues including the use of rain water harvesting; • Financial incentives for households to reduce use.	Irish Water are developing a Water Conservation Strategy to focus on conservation of water, including many of the issues raised. The NWRP will align with this strategy and will consider a twin track approach of demand management with source development to ensure the balance between supply and demand is secure.
Legislation		
Health Service Executive Drinking Water Group EPA Geological Survey Ireland Limerick Chamber Inland Fisheries Ireland	The following legislation, plans, policies and programmes were raised for inclusion: • Healthy Ireland Strategy • Food Harvest 2020 • Directive 2013/59 Euratom • Draft Climate Change Adaptation Framework • National Mitigation Plan • National Planning Framework • The Draft Fourth Nitrates Action Programme • Revised Good Agricultural Practices Regulations S.I. No. 610 of 2010, which implement the Nitrates Directive • The National Peatlands Strategy • Fáilte Ireland's five-year Tourism Strategy • The Fisheries Consolidation Acts 1959 (as amended) • Regional Spatial and Economic Strategies • Metropolitan Area Strategic Plans for the Cork, Limerick and Waterford Metropolitan areas, as part of the	The issues within most of these plans, policies and programmes have been considered in the baseline environment and the options assessment process. Plans of a European, national and regional level have been considered, but many specific local-level plans and strategies have not been considered in specific detail. These, however, would be considered at project level.

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	Regional Spatial and Economic Strategies • County Groundwater Protection Schemes • City Development Plans, including Limerick 2030 Vision: An Economic /and Spatial Plan for Limerick • Strategic Integrated Framework Plan for the Shannon Estuary • Specific Port Plans including Shannon Foynes Port Company Vision 2041 • Local authority Green Infrastructure Strategies The following projects were raised for inclusion: • Eastern and Midlands Regional Water Supply Project; • Irish Water's Draft Pesticides Action Programme; and • Irish Water's National Disinfection Programme.	
EPA Dublin City Council Inland Fisheries Ireland	Concerns were raised by consultees in relation to the pending abstraction licensing being developed by EPA, in relation to: • Protection of groundwater for private group schemes and private wells; • Potential delays to Parteen Basin source due to the Water Framework Directive requirement for the regulation of abstractions; • Ecological sustainability of existing abstractions; • ICMSA understand that the registration of water abstractions greater than 25cm^3/day will affect predominantly dairy farmers with more than 200 cows. The Department of Agriculture, Food and the Marine estimate that this is between 600 and 650 farmers.	There is new abstraction legislation currently being drafted by the Department which will guide on the requirements of any abstraction. The NWRP takes cognisance of the risk of the new legislation on all Irish Water abstractions. It is thought that this will give details on how to deal with existing abstractions also. But it should be clear that the NWRP is being developed by Irish Water and the abstraction licensing is being developed by the EPA separately.
EPA Health Service Executive Environmental Health Service	Consultees noted the need to take consideration of certain issues recommend by the SEA Regulations (S.I. No. 435 of 2004: • It was raised that the issue of transboundary effects with Northern Ireland Plans should be considered in the NWRP and SEA/Appropriate Assessment and consultation with Northern Ireland authorities also important. • Reasonable Alternatives – there	All requirements from the SEA have been met. Table 1.2 details how they have been met and in what section of the report.

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	needs to be clear rationale for choosing the alternatives that are assessed. The term “any other that are deemed appropriate” should be qualified by a criteria or a basis for assessing what is considered appropriate. • SEA Statement including a summary of how environmental considerations have been integrated into the plan or programme; of how the SEA Environmental Report and the submissions received from stakeholders have been taken into account; reasons for choosing the plan or programme as adopted, in light of the other reasonable alternatives considered and measures decided concerning monitoring.	
Transport Infrastructure Ireland	Transport Infrastructure Ireland raised a number of issues, including: • The need to establish the relationship between the location of the proposed development and the national road(s) in the area, vis-a-vis so that future schemes should not compromise the construction of the future national road schemes in the area. • Any crossings of the existing motorway network will require approval from Transport Infrastructure Ireland under Section 53 of the Roads Act 1993 (as amended). • The promoter should liaise with the relevant National Road Design Office and/or county council in consultation with Transport Infrastructure Ireland and agree detailed specifications for the proposed structures in relation to any future schemes. • A Traffic and Transport Assessment should be carried out in accordance with the relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network, associated national road junctions and junctions of lower category roads with national roads.	The Framework Plan will not detail any solutions or identify specific structures. It will not go into the detail of specific projects. This comment is relevant to project level assessment. In the Phase 2 Regional Water Resources Plans, when location-specific options will be developed, Irish Water will look at all national, regional and local infrastructure projects which could have cumulative impacts with the Framework Plan. The NWRP team will consult with all stakeholders through the consultation process.
Economy and social		
Inland Waterways Association of Ireland Health Service Executive Drinking	Importance of water for recreational use raised by a number of consultees in terms of: • Competing needs for recreational use including the hosting of a number of	Further emphasis can be placed on these areas in the baseline assessment. The aspects raised are considered as part of the environmental assessment of the Framework Plan and are integrated

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Water Group	international events. • Recreational use of water and the consequent economic benefit and health gains, and the potential risks to water quality from fuel or contaminant pollution.	into the SEA Objectives so therefore influence the development of the NWRP.
Limerick Chamber	Consultees raised the point that Irish Water may need to conduct more balanced assessment needs or set aside funding to expand or provide treatment plants within regional towns, rural towns and villages, to allow for their future growth. It can appear that Dublin gets priority on water flows.	The NWRP will consider the water resource needs for all customers, including consideration for potential growth in all areas. The plan will seek to ensure there is safe and secure water available for all needs. The future demand assessment has been undertaken largely based on the National Planning Framework plans for growth in Ireland. A number of proposed options will be considered to deliver this in the next iteration of the Framework Plan. This will include both locally based options and larger regional and national options that can serve local needs. The methodology will include a multi-criterion approach to determining the optimum solution.
Limerick Chamber	Pertaining to future trends in human health, have Irish Water quantified the expected relationship between an aging population and levels of water usage? Can Irish Water identify and specify how they are going to prioritize capital investment and the resolution of existing losses through leakage.	The Framework Plan considers changing levels of water usage. This includes considering trends in individual per capita consumption usage and the changes in demand due to changes in occupancy rates in housing. Leakage reduction is a key objective for Irish Water, as outlined in the Water Conservation Strategy.
Inland Fisheries Ireland	Angling currently contributes €836 million to Ireland's economy annually, supporting upwards of 11,000 jobs, many of which are in rural and coastal areas. Under the National Strategy for Angling Development, Inland Fisheries Ireland (2015) is aiming to increase the contribution from angling to €932 million and increase employment by 1,800 jobs.	The economic value of tourism has been considered in the baseline environment of the Environmental Report.
Health Service Executive Environmental Health Service	The need to consider that there is potential health gain from construction of new water resource options was raised.	The Multi-Criteria Analysis process for the screening of options provides the opportunity to score an option positively, based on health gains that would result from it.
Health Service Executive Drinking Water Group	Suggestion to include the following: • Maximize the proportion of the Irish population with access to a high quality public water supply; and • Implement incentives to reduce per capita usage on public water supply	• These would not be objectives of the SEA, but of the NWRP if they were considered. The issue of supplying a larger proportion of the population with high quality drinking water is not a

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	and minimize waste.	consideration of the NWRP. • The NWRP will complement Irish Water's National Leakage Reduction Programme in recommending the water efficiency measures outlined in the Water Conservation Strategy are carried out and that demand management should be an integral part of their strategy in the future.
Irish Creamery Milk Supplies Association	ICMSA propose that an environmental assessment should be completed on the number of water and wastewater plants present in Ireland. Such an assessment would lead to gains in terms of the environment as well as economic efficiency.	The NWRP is a strategic plan that does not consider detailed assessments of existing plants at an individual level. Any proposals involving WTPs will be subject to assessments required under the SEA. Any recommendations of the Framework Plan will require their own individual project assessment, but this will not fall within the remit of the NWRP. The NWRP does not consider WwTPs.

Appendix D. Fine Screening Environmental Scoring Guide

Criteria: Environmental and Social Acceptability		Major Positive / Beneficial	Moderate Positive / Beneficial	Minor Positive / Beneficial	Neutral / Negligible Risk	Minor Risk	Moderate Adverse Risk	Major Adverse Risk
Sub-criteria	**Fine screening questions**	**3**	**2**	**1**	**0**	**-1**	**-2**	**-3**
Population, health, economy & recreation	Will the option impact public health and quality of life, during construction? Will the option impact public health and quality of life, during operation? What is the impact on recreational amenities?	**Some long-term and/or significant positive opportunities/benefits** to public health and quality of life that should be seen as a highly favourable effect of the option. Or, Potential for significant positive effects, such as a creation of a new recreational area or activity or enhanced quality of water based recreation, due to improved water quality status.	**Some intermittent, medium-term, positive opportunities/benefits** to public health and quality of life that should be seen as a favourable effect of the option. Or, Potential for positive effects, such as a noticeable improvement in existing views or the actual amenity.	**Some short-term, minor and/or infrequent positive opportunities/benefits** to public health and quality of life. Or, **Some potential for short-term positive opportunities/benefits** to recreational amenity, footpaths or access to recreational amenity that should be seen as a favourable effect of the option, such as improved access.	No discernible effect, either positive or negative to human health, quality of life or recreational amenity	**Potential for some minor and short-term effects** to public health and/or quality of life, short-term disruption from dust, noise and/or traffic during the construction phase of the option. Or, The option has the **potential to result in minor effects** to recreational amenity or access to recreational amenity, such as through the construction of the option.	The option has potential for significant effects to public health or quality of life, such as reduced security of supply or water quality risks from supply or environmental contamination. Or, The option has the **potential for significant effects** such as a noticeable change to important views, loss of the actual amenity with limited potential for compensation provision, or increased traffic journey lengths or traffic volumes nearby.	**Even with the implementation of mitigation,** this option has the potential for significant effects to public health or quality of life, such as long-term noise or traffic generation or increased risks to security of supply and access to water. Or, **Significant effects**, such as a noticeable visual detractor affecting highly valued views, loss of important amenity, increased journey lengths to the amenity or traffic volumes nearby.
Water environment: quality & resources	Would the option or associated construction activities affect WFD Status of water body status, in terms of quantity and quality for surface water? Would the option or associated construction activities affect WFD Status of water body status, in terms of quantity and quality for groundwater? Would the option or associated construction activities affect WFD Status of water body status, in terms of hydro morphology? Would this option reduce pressure on water environment through water savings? Is there a potential for this option to increase flood risk – e.g. increase base flow or result in loss of flood plain? Will Navigation be affected?	**Potential significant contribution to the achievement** of objectives for waterbody status/quantitative status improvement or potential to achieve RBMP objectives due to **reduced pressure on the water environment** through significant water use savings, for example replacement of existing abstraction where environmental stress is likely to an area where the abstraction is more environmentally sustainable.	**Potential contribution to the achievement of** objectives for waterbody status/quantitative status improvement or potential to achieve RBMP objectives as a result of **reduced pressure on the water environment** through water use savings, or reduced abstraction during low flow or low water level/environmental stress periods.	**Potential contribution to waterbody quality or resource availability but not expected to change** waterbody ecological status/quantitative status or may contribute to achieving WFD objectives due to **reduced pressure on the water environment** through minor water savings, for example water efficiency measures.	No change to waterbodies near the option. No water savings, but no change to water associated with the scheme.	The option has the potential to result in minor or short-term effects to a waterbody as a result o**f increased pressure on water environment but within resource capacity**, or effects could be easily mitigated or avoided, for example operational rules so that abstraction is limited to high flows.	This option has the potential to result in medium risk of deterioration of the waterbody or impediment to achieving the RBMP/WFD objectives as a result of **increased pressure on the water environment**, for example through increased water abstraction compared to water available.	This option has the potential to result in a high risk of deterioration of the waterbody or impediment to achieving the RBMP/WFD objectives as a result of **increased pressure on the water environment**, for example through increased water abstraction compared to water available.
Water environment: quality & resources	Is there a potential for this option to increase flood risk, for example increase base flow or result in loss of flood plain?	Option will **clearly provide permanent, long-term resilience** against flooding near the option, for example on line water storage designed to provide flood storage capacity as well as water supply or catchment management improving retention of water.	Option will **provide considerable contribution to protection or resilience** against flooding downstream for example water storage reservoir which would provide some additional flood water storage capacity.	Option will **clearly provide some contribution to resilience** against flooding near the option, for example ground water abstraction where high groundwater levels can cause flooding.	Option causes **no impediment to or increase of flood risk** nearby.	Option could result in **minor impediment to flood risk management or result in loss of a small area of flood plain that could be mitigated through implementation of flood prevention measures**.	Option could result in **major impediment to flood risk management or result in loss of a considerable area of flood plain that could be mitigated through implementation of flood prevention measures**.	The option has the potential to result in **major impediment to flood risk management** nearby or result in the **loss of a significant area of flood plain that would be difficult or highly costly to avoid through flood prevention measures**.

Criteria: Environmental and Social Acceptability		Major Positive / Beneficial	Moderate Positive / Beneficial	Minor Positive / Beneficial	Neutral / Negligible Risk	Minor Risk	Moderate Adverse Risk	Major Adverse Risk
Sub-criteria	**Fine screening questions**	**3**	**2**	**1**	**0**	**-1**	**-2**	**-3**
Biodiversity, flora and fauna	Is there potential for the option to result in adverse effects on the integrity of a European site ((for example by undermining the European sites' conservation objectives through direct or indirect effect pathways, including but not limited to direct loss of habitat, changes in hydrology)? Is there potential for the option to impact on an Annex species (through direct or indirect effect pathways, including but not limited to direct loss of habitat, changes in hydrology) outside designated areas?	The option will not adversely affect the integrity of any European site and either: (a) provides the potential **to create new areas of habitat that could be of international or European importance without reducing any existing areas of such habitat** (that is, potential for future designation as an SAC, SPA or Ramsar site) or which extends the existing network of international and European sites as a result of water resource management options, for example construction of wetlands. And/Or, (b) **removes an existing cross-catchment Invasive INNS risk** affecting European sites, for example, replacing raw water transfer with treated water transfer.	The option will not adversely affect the integrity of any European and either: (a) has the **potential to improve the existing condition of a European site** (for example, reduced abstraction near water dependent habitats and species). And/Or, (b) **removes an existing cross-catchment INNS risk** affecting European sites, for example replacing raw water transfer with treated water transfer.	The option will not adversely affect the integrity of any European and may have the **potential to remove a local risk of spreading INNS to European sites**.	The option has **no potential to result in adverse effects on internationally or European sites or species, including any increased risk from the spread of INNS.** The option is **unlikely to result in increased risk from the spread of INNS**.	The option will not adversely affect a **European site** if appropriate mitigation measures are adopted and **adverse effects can be easily mitigated or avoided** (for example, seasonal constraint to works). The option's **potential to result in minor increased risk from INNS can** be avoided with additional mitigation.	The option has the **potential to result in adverse effects on European sites** in the absence of mitigation. However, it is considered that **adverse effects on site integrity could potentially be avoided with mitigation** in place. The option has a **moderate risk of spreading INNS to European sites that could potentially be avoided through mitigation**.	The option has the **potential to result in adverse effects on European sites** And/Or, the option has a **high risk of spreading INNS to European sites**. It is considered that **adverse effects on site integrity could potentially be avoided with mitigation** in place. However, mitigation may be more complex, and risk of effects judged higher then for moderate and minor scoring categories. It may be determined that mitigation will not be sufficient to avoid such effects based on the data available when making the Regional Water Resources Plans, or it may only be able to do so after data is gathered at site level to inform the design of the project. **Where options are identified with potential for adverse effects on a European site's integrity (AESI) and it has been determined that mitigation will not be sufficient to avoid AESI based on the data available when making the Regional Water Resource Plans these options are not taken forward.** Alternative options will be taken forward instead.
Biodiversity, flora and fauna	Is there potential to result in significant impacts on local, county or national biodiversity but not European sites, for example through loss of significant areas of ecologically valuable habitat (for example woodlands/ hedgerows/ wetlands) and, in particular,	The option has potential to **contribute to meeting national biodiversity targets**. The option **removes an existing cross-catchment Invasive INNS risk**, for example,	The option provides the **potential to create new areas of habitat that could be of national importance** (that is, potential for future designation as an NHA) or which extends the	The option has the **potential to contribute to local, county or national biodiversity through habitat creation** (for example wetlands/hedgerow planting), water quality	The optional has **no potential to result in significant effects local, county or national designated sites and/or on biodiversity**.	The option has the **potential to result in significant effects on local, county or national biodiversity.** However, it is considered that **significant effects**	The option has the **potential to result in significant effects on local, county or national designated sites and/or biodiversity** in the absence of mitigation.	Even with the implementation of mitigation, the option still has the **potential to result in significant effects on local, county or national**

Criteria: Environmental and Social Acceptability		Major Positive / Beneficial	Moderate Positive / Beneficial	Minor Positive / Beneficial	Neutral / Negligible Risk	Minor Risk	Moderate Adverse Risk	Major Adverse Risk
Sub-criteria	**Fine screening questions**	**3**	**2**	**1**	**0**	**-1**	**-2**	**-3**
	irreplaceable habitats (for example ancient or long-established woodlands) or by undermining biodiversity objectives outlined in the National Biodiversity Action Plan or local county development/biodiversity action plan?	replacing raw water transfer with treated water transfer.	existing network of nationally important sites as a result of water resource management options, for example, construction of wetlands. The option has **potential to contribute to meeting regional or national biodiversity targets**. The option **removes an existing cross-catchment INNS risk**, for example replacing raw water transfer with treated water transfer.	improvements and/or enhancement or extension of local nature reserves.	Option is unlikely to contribute to the enhancement of biodiversity at a local or national scale. The option is **unlikely to result in increased risk from the spread of INNS**.	**could be easily mitigated or avoided** (for example, seasonal constraint to works). The option has the **potential to result in minor increased risk from INNS** which could be avoided/reduced with additional mitigation.	However, it is considered that **significant effects could potentially be avoided with mitigation** in place. The option has a **moderate risk of spreading INNS** which could be avoided/reduced with additional mitigation.	**designated sites and/or biodiversity**. Mitigation may be more complex, and risk of effects judged higher than for moderate and minor scoring categories. The option has a **high risk of spreading INNS**.
Material assets	Will the option make effective use of existing assets or reduce water abstraction? Will this option conflict with critical infrastructure, or does the option conflict with existing business, planned land use or valuable agricultural land?	The option **is likely to bring significant and long-term added benefits** such as where the option would facilitate or "open up" areas for business development or high value agricultural production (for example, where existing access to water is limiting potential). And/Or, Option will provide regional or national facilities for promoting residual treatment efficiency and residual reuse.	The option **has the potential to bring moderate added benefits** for business development, planned land use or high value agricultural production. And/Or, Option will promote residual treatment efficiency and residual reuse.	The option has the potential to **bring some minor added benefits** to existing infrastructure and/or businesses, planned land use or valuable agricultural land, such as where the option would be supportive to agricultural diversity. And/Or, The option **makes use of suitable existing water assets**. And/Or, Option will provide some opportunity to promote residual treatment efficiency and residual reuse.	There is **no change to existing water infrastructure and would result in no change to other infrastructure** and/or businesses, planned land use or valuable agricultural land. And/Or, No change to material residual.	The option has the potential to result in **minor and short-term conflicts** with existing infrastructure and/or businesses, planned land use or valuable agricultural land, such as through construction works. However, it is considered that these effects could be easily mitigated or avoided. And/Or, Option will increase resource use and/or increase residual disposed of to landfill (note that resource use can be captured through carbon accounting).	The option has the potential for significant, long-term conflicts with existing infrastructure and/or businesses, planned land use or valuable agricultural land. These would include loss of prime agricultural lands, disruptions to existing utilities or to the operations of existing businesses. However, it is considered that these impacts could be avoided/reduced with mitigation. And/Or, Option will increase resource use and residual production to landfill (note that resource use can be captured through carbon accounting).	Even with the implementation of mitigation, this option has the potential to result in **significant and permanent effects** to existing infrastructure and/or businesses, planned land use or valuable agricultural land. And/Or, Option will result in major increase to resource use or residual production including residual to landfill (note that resource use can be captured through carbon accounting).
Landscape and visual amenity	Could this option impact the landscape character areas, townscape character areas or important views (detract or improve)?	The option will provide **significant and permanent positive/beneficial enhancement** to a moderate to high value local landscape character/feature or to visual amenity.	The option will provide **localised positive/beneficial enhancement** to a moderate to high value local landscape character/feature or to visual amenity.	The option will provide **localised positive/beneficial enhancement** to local landscape character/feature or to visual amenity.	Option causes **no change to landscape** character or visual amenity, as there is **no construction, installation or operation of** infrastructure required.	Option has the potential to create **minor and short-term effects** to local, regional or national landscape character or visual amenity, such as excavation works to install underground infrastructure which will not be visible in the long	This option has the potential for significant effects such as the development of minor infrastructure elements which would noticeably alter the local, regional or national landscape or visual amenity. However, it is considered that these	Even with the implementation of mitigation, this option has the potential for significant effects such as the **development of large-scale, major infrastructure** which would **detrimentally alter local, regional or**

Criteria: Environmental and Social Acceptability		Major Positive / Beneficial	Moderate Positive / Beneficial	Minor Positive / Beneficial	Neutral / Negligible Risk	Minor Risk	Moderate Adverse Risk	Major Adverse Risk
Sub-criteria	**Fine screening questions**	**3**	**2**	**1**	**0**	**-1**	**-2**	**-3**
						term and lands can easily be reinstated. Effects resulting from the option could be easily mitigated or avoided.	impacts could be avoided/reduced with mitigation.	**national landscape or visual amenity**.
Climate change	What is the level of construction and operational carbon emissions associated with the option (tonnes)? Does the option increase climate change vulnerability for the environment or add resilience?	The option clearly provides **significant** carbon emission reductions or savings **in relation to the Deployable Output** created. And/Or, The option will provide significant protection in the long term to water dependent habitats and species, soils and landscapes and from the effects of climate change, for example through wetland creation.	The option **provides moderate** carbon emission reductions or savings **in relation to the Deployable Output** created. And/Or, The option will improve future resilience from the effects of climate change for water dependent species and habitats, soils and landscapes including contributing to restoring peatlands, grasslands and broadleaved forestry in upper catchments.	The option **provides some** carbon emission reductions or savings **in relation to the Deployable Output** created. And/Or, The option will contribute to improving future resilience of species and habitats, soils and landscapes from the effects of climate change. Provides scope for offsetting effects of carbon emission and climate change adaptation by contributing to peatland, grassland or forestry within catchments.	This option would not save or increase carbon emissions The option will not increase environmental vulnerability to climate change nor contribute to improved resilience to climate change.	There is a **low level of carbon emissions associated** with the option **in relation to the Deployable Output** created. And/Or, The option could increase the vulnerability of species and habitats or soils to the effects of climate change.	There is a **moderate level or carbon emissions** associated with the option **in relation to the Deployable Output** created. And/Or, The option will result in an increase in vulnerability to the effects of climate change for protected species and habitats or loss of peatlands, grasslands and woodlands important for water retention and carbon.	There is a **high level of carbon emissions** associated with the option **in relation to the Deployable Output** created. And/Or, The option will result in a significant increase in vulnerability to the effects of climate change for protected species and habitats, for example loss of wetlands.
Cultural heritage and archaeology	Does this option avoid direct damage to, or detract from the setting of, designated cultural heritage assets, or does this contribute to protecting them?	Option will provide clearly significant **positive/beneficial enhancement** to local cultural heritage or archaeological assets near the selected measure.	Option will provide some moderately **positive/beneficial enhancement** to local cultural heritage or archaeological assets near the selected measure, including indirect effects such as protection from flooding.	Option will provide some minor **positive/beneficial enhancement** to local cultural heritage or archaeological assets near the selected measure, such as potential for improved access.	**No cultural heritage, assets benefiting from protection or at risk** of damage as a result of the option.	The option is located where there are a number of cultural heritage assets listed under the Record of Monuments and Places/Record of Protected Structures and/or National Inventory of Architectural Heritage records and may be affected, such as loss of access, changes to setting or removal of the feature. Effects could be avoided/reduced with mitigation.	This option is located where there is nationally important cultural heritage asset(s) such as National Monuments in State Care, sites on which Preservation Orders or Temporary POs have been served) present and may be affected such as some alteration to access or setting or partial removal of the feature Effects could be avoided/reduced with mitigation.	This option is located where there are nationally important cultural heritage assets which may be affected, such as complete alteration of access or setting or complete removal of the feature. Or, This option is located where an internationally important cultural heritage asset is potentially affected, such as an alteration to access or setting or removal of the feature. Effects would difficult to avoid/reduce with mitigation.
Geology and soils	Would any designated or non-designated geological features, valuable soils, or contaminated land sites be affected?	Option will provide **clearly significant positive/beneficial enhancement** to soils near the selected measure, such as catchment management	Option will provide **moderately positive/beneficial enhancement** to soils near the selected measure, such as catchment management.	Option will provide **minor positive/beneficial enhancement** to local geological features and/or soils near the selected measure, such	**No geological features** or valuable soil resources **at risk** as a result of the option.	The option is located where there are a **number of sites listed under IGHS, NHAs or pNHAs of geological significance present and potentially affected that could be**	The option is located where there are a **number of sites listed as IGHS, NHAs or pNHAs of geological significance** potentially affected **but could be**	The option is located where there are a **number of sites listed as IGHS, NHAs or pNHAs of geological significance present** and **likely to be affected and would be**

Criteria: Environmental and Social Acceptability		Major Positive / Beneficial	Moderate Positive / Beneficial	Minor Positive / Beneficial	Neutral / Negligible Risk	Minor Risk	Moderate Adverse Risk	Major Adverse Risk
Sub-criteria	**Fine screening questions**	**3**	**2**	**1**	**0**	**-1**	**-2**	**-3**
		reducing soil erosion risks.		as catchment management.		**avoided/reduced with additional mitigation**. And/or, Minor disruption to soils expected throughout construction of the option. However, sustainable practices will ensure little or no impacts.	**avoided/reduced with additional mitigation**. And/or, Considerable disruption to soils through excavation. However, sustainable practices can be implemented to mitigate impacts.	**difficult to avoid/reduce with additional mitigation**. And/or, **Significant disruption to valuable soil type**.

Application of the Fine Screening Scoring Guidance

The questions for scoring options against the criteria and sub-criteria and the information to be considered will need to be applied as relevant to the option type and level of detail available on the option definition. The fine screening scoring guidelines will be developed as rules for scoring for application in the options assessments undertaken for the development of the Regional Plans. These will be consulted as part of SEA Scoping, this will inform the implementation of the Options Assessment Methodology and decision making process in the Regional Plans. The final scoring rules as applied will be provided as part of the Regional plan consultation process.

In a small number of cases, where the rules for option scoring at fine screening may not be applicable across some options for the development of the Regional Plans, Irish Water will use the input of expert judgment in the form of a review group. The process followed will be documented and fully outlined as part of the Regional Plans.

The Sample Case Study reports provide an example of how the scoring rules can be developed and applied as part of the Options Assessment Methodology.

Appendix E. Information for Option screening and assessment

Strategic Environmental Assessment topic	Strategic Environmental Assessment receptor information
Population, economy, tourism and recreation, and human health	• Urban/rural settlement areas • Road types • Population • Businesses in close proximity to the option • Tourist/recreational areas/attractions in close proximity to the option
Water environment	Data on water sources or receptors including freshwater and coastal waters: • WFD groundwater status for source aquifers • WFD surface water chemical status and ecological status/potential as sources or receptors • Water resource availability (Allowable Abstraction Assessment – current and climate change projections) • RBMP measures and WFD objectives • Current abstraction and wastewater discharge • Flood Risk Areas • EPA Remedial Action List
Biodiversity, flora and fauna	• Natura 2000 Network (Special Areas of Conservation, Special Protection Areas) • UNESCO World Heritage and Biosphere sites • Sites designated as Wetlands of International Importance (Ramsar sites) • National Heritage Areas (NHAs) • proposed National Heritage Areas (pNHAs) • Salmonid Waters • Freshwater Pearl Mussel Catchments • Nature Reserves • Waterbody ecological status • Invasive species records or risk assessments
Material assets	• CORINE Landcover type considered valuable; agricultural, peatlands, forestry • Urban areas/rural areas • Major built infrastructure (for example, main roads, rail, canals, existing water infrastructure) • Waste/wastewater generation
Landscape and visual amenity	• Option characteristics and proximity to sensitive sites • Landscape Character Areas • CORINE Landcover data
Air quality and noise	• Option characteristics and proximity to residential areas
Climate change	• Carbon footprint • Vulnerability of sources and receptors to climate change (Allowable Abstraction Assessment – current and climate change projections)
Cultural heritage (archaeological and architectural)	• National Monuments • Records of Monuments and Places • Record of Protected Structures,

Strategic Environmental Assessment topic	Strategic Environmental Assessment receptor information
	• Architectural Conservation Areas • National Inventory of Architectural Heritage • UNESCO World Heritage Sites
Geology and soils	• Irish Geological Heritage Sites (IGHS) • Soil types
Transboundary issues	• Abstractions from waterbodies that go over the border into Northern Ireland • WFD status of waterbodies in Northern Ireland • Natura 2000 Network in Northern Ireland (including RAMSAR sites) • Areas of Special Scientific Interest