

# Water Services Strategic Plan

A Plan for the Future of Water Services

Customer



Water



Wastewater



Environment



Growth



Investment



Safeguarding your water for your future

## **Irish Water** at a glance...

Irish Water was created in

**2013** and serves

3.3 million people producing over  
**1.6 billion Litres**

of drinking water every day and taking wastewater away for treatment before it is returned to our rivers and seas.

**Thousands** of assets are operated and maintained to provide these services, including around:

**900** *water treatment plants*

which deliver water through an estimated

**60,000 kilometres** of pipelines

We treat wastewater in more than

**1000** wastewater treatment plants

and it is collected through an estimated

**25,000 kilometres** of pipelines

plus numerous pumping stations and sludge treatment centres.

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# Executive Summary

## Our Vision

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. This document presents the Water Services Strategic Plan prepared by Irish Water which provides, for the first time, an opportunity to consider, at a national level, the way that water services are delivered in Ireland. The plan takes a 25 year view towards the vision that

*“Through responsible stewardship, efficient management and strong partnerships, Ireland has a world-class water infrastructure that ensures secure and sustainable water services, essential for our health, our communities, the economy and the environment”.*

The plan has been prepared to comply with our statutory obligation and as a basis for broad public and stakeholder engagement. A glossary of technical terms used is included at the end of the document.

## Overview of Irish Water

Irish Water was established as a subsidiary of the Ervia Group (formerly Bord Gáis Éireann). Ervia now has responsibility for the delivery of gas and water infrastructure and services in Ireland. Establishing Irish Water involved the creation of the required organisation, management systems and processes to manage the water services assets estimated to have a value of €11 Billion, drawing on the experience and expertise of Bord Gáis Éireann, as a modern efficient and customer focused energy utility.

Incorporated in July, 2013, Irish Water brings the water and wastewater services of the 34 local authorities together under one national service provider. From the 1st January, 2014, Irish Water became responsible for all public water services, involving the supply of drinking water and the collection, treatment and disposal of wastewater.

Irish Water took on the operation of the assets through Service Level Agreements (SLAs) with all 31 local authorities (after amalgamation of the previous 34), who continue to provide day to day operations. We also took over all of the capital investment decisions and implementation of the capital programme delivery across the country.

In discharging its role as the national water services utility, responsible for water services operations and investment, Irish Water is regulated by:

- a) The economic regulator, the Commission for Energy Regulation (CER), which is charged with protecting the interests of the customer, while approving an appropriate funding requirement sufficient to enable the utility to deliver the required services to specified standards in an efficient manner; and
- b) The environmental regulator, the Environmental Protection Agency (EPA), which 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.

## Our Legal Context

Irish Water will plan, develop and operate our water service functions in line with the requirements of prevailing relevant national and European legislation. Relevant legislation includes multiple statutes, regulations and European directives. Some of the most pertinent legislation in the context of the operations covered by this plan include the Urban Waste Water Treatment Directive, the Drinking Water Directive, the Water Framework Directive, the Birds and Habitats Directives and our obligations under the Aarhus Convention in terms of European legislation and the Water Services Acts, 2007-2014, Water Supplies Act, 1942, the Planning and Development Act, 2000, European Union (Drinking Water) Regulations 2014 and Wastewater Discharge (Authorisation) Regulations 2007 in terms of national legislation.

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## Our Challenges

Irish Water is responsible for the delivery of water services to approximately 80% of the population. Whilst many customers receive a good quality water supply and wastewater provision, a significant proportion are dissatisfied with these services; based on quality, capacity and reliability issues. Despite the good work of local authorities over many decades, under-investment combined with a lack of planned asset management and maintenance programmes has led to a legacy of deficiencies in our treatment plants and networks. In many areas, limitations on treatment and/or network capacity urgently need to be addressed to accommodate new housing, commercial and industrial developments.

In our two largest cities of Dublin and Cork, we continue to rely for part of the daily drinking water requirement on 19th century systems which are no longer fit for purpose in their current condition. This exposes these supplies to an unacceptable risk of failure. Outside of our major urban centres, our water supply network is fragmented with many small and vulnerable water sources. Water quality does not meet European and Irish drinking water standards in many of our schemes and up to 30% of water treatment plants are considered to be “at risk” of failure in terms of quality parameters. In 2014, an estimated 23,000 customers had a Boil Water Notice, indicating that their water was not fit for drinking due to the risk of microbiological contamination. One hundred and twenty six (126) water supply zones are on the EPA’s Remedial Action List (see Appendix 1 for a list of water supply zones on the EPA RAL in Q3 2014), requiring investment and/or significant improvement in operation to reduce the risk of failure to accepted levels. We are also losing almost half of the water we produce due to leakage within our water mains and within customer properties.

Wastewater must be collected and treated before it is returned to the environment. The most recent EPA assessment of urban wastewater<sup>1</sup> identifies that wastewater treatment is not at the required standard in 38 of our larger urban areas and that 44 areas discharge raw sewage (sewage that is untreated or has had preliminary treatment only) (see Appendix 2 for list of these areas). As a result of Ireland’s failure to meet the requirements of the EU Urban Waste Water Treatment Directive in respect of 71 agglomerations/areas in 2011 (see Appendix 3 for the list of the 71 non-compliant agglomerations) the European Commission has initiated an Infringement Case against the state. Many of our sewers in urban areas receive rainfall run-off from roads and hard surfaces in addition to wastewater. These combined sewers are frequently overloaded during periods of heavy rain resulting in the flooding of some properties and giving rise to overflows which can cause pollution within our rivers and streams.

Apart from these compliance challenges, the welcome return of economic growth brings a requirement for additional capacity to support housing development, together with offices, factories and commercial buildings supporting jobs. There are areas zoned for development which are currently constrained by limitations in system capacity for water and wastewater. This additional demand must be met without risk to existing customer service standards. Key national policy objectives for employment and increasing housing output (Construction 2020<sup>2</sup>) must be provided for. The Housing Supply Co-ordination Task Force for Dublin (established by the DECLG as an action under Construction 2020) identifies water services infrastructure deficit among the constraints to be overcome if housing needs are to be met in the Greater Dublin Area.

Substantial improvements to water supply capacity, quality and reliability are required in addition to upgrading of our wastewater infrastructure, both treatment plants and collection networks, in order to protect the environment. This will require significant capital investment over many years. Even with additional funding, the timescale to address all of the issues is likely to extend through a number of investment cycles so that we must prioritise projects which should proceed in order of criticality.

## What is the Water Services Strategic Plan?

This Water Services Strategic Plan (WSSP) 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. In developing the plan, we have considered its interaction with other national and regional strategic plans such as the National Spatial Strategy and River Basin Management Plans. This plan (Tier 1) also provides the context for subsequent detailed implementation plans (Tier 2) which will document the approach to be used for key water service areas such as water resource management, wastewater compliance and sludge management.

<sup>1</sup> Focus on urban wastewater treatment in 2013. Published by the EPA, December 2014.

<sup>2</sup> Construction 2020, A strategy for a renewed construction sector; May 2014; Government Publication; 2014

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The WSSP will be reviewed on at least a five yearly basis to ensure that it continues to be up to date with current and future needs. An interim review is also planned to ensure consistency with the new National Planning Framework, the new Regional Spatial and Economic Strategies and River Basin Management Plans which will be developed in the next few years.

In addition, Irish Water will prepare Business Plans during the period setting out targets for delivery of efficiencies in operational and capital expenditure and performance targets consistent with the delivery of the objectives in this WSSP. In accordance with the Service Level Agreements with the now 31 Local Authorities, a series of transformation initiatives are being implemented in partnership with the local authorities. The most important of these will be the development of the Water Industry Operating Framework to facilitate the delivery of water services under the single utility model.

The Water Services (No. 2) Act, 2013 provides for Ministerial Direction on the form and content of this WSSP and the Minister has set out the requirement for the plan to address the delivery of six strategic objectives as follows:

- **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.**

These are not in a particular order of priority. For each strategic objective within the plan, we outline the current situation, identify the key challenges and propose a number of aims and strategies to address the objective. We have suggested targets within the plan in order that our performance against the objectives can be monitored and assessed by our regulators, other stakeholders and our customers. It should be noted that a number of strategies are cross cutting between strategic objectives. For example, strategies for achieving effective wastewater management will also result in protecting the water environment.

An initial public consultation on the issues to be included in the plan was completed in the summer of 2014 and has informed this document. The plan has been subjected to Strategic Environmental Assessment and Appropriate Assessment and these documents are also published and are available at <http://www.water.ie>.

## **Our Current Priorities**

In this first strategic plan, we need to address urgent issues in the quality of our water services and in the integrity of our infrastructure, subject to adequate funding being available to us, while ensuring that water services that currently meet required standards continue to do so. We have therefore prioritised the following six areas:

- Demonstrating our commitment to the delivery of an improved quality water and wastewater service through the appropriate management of our assets in an economic and efficient manner ensuring least cost for our customers.
- Remediating the drinking water quality problems where customers have a Boil Water Notice or water supplies fail other mandatory requirements of the Drinking Water Regulations. We are also prioritising high risk plants identified in the EPA Remedial Action List.
- Complying with the Urban Waste Water Treatment Directive and, in particular, addressing the lack of wastewater treatment at 44 urban centres and improving treatment at the 38 larger urban areas which do not currently meet the required treatment standards. We are also prioritising upgrades at sites of serious pollution including sites resulting in adverse impacts on Bathing Waters.
- Reducing the excessive leakage from our water mains through our water conservation programmes. Completion of the domestic metering programme in line with Government policy will create customer awareness of their water usage and support behavioural changes in water consumption. It will identify the location of customer side leaks which can be addressed through our "first fix policy". In addition, the programme is adding to our knowledge of where lead service connection and supply pipes are located.
- Capturing accurate information on the nature, condition and performance of all of our assets (infrastructure and equipment) into quality assured databases, especially critical assets whose failure would have significant customer impacts, in order that we can better target investment in asset maintenance/upgrades.
- Catering for future growth.

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## Our Strategic Objectives

Our six strategic objectives are highlighted in the following sections.

### Objective: Meet Customer Expectations

Our aim under this objective is to **establish both customer trust and a reputation for excellent service** through delivering our set of defined strategies; thereby, building the trust and confidence of our customers.

We recognise the need for the provision of high quality, reliable water services, delivered through resilient systems in an efficient and economic manner. Our first response to ensuring delivery in an efficient and economic manner has been to review all proposed capital investment in the water services assets to more accurately define the scope required and confirm value for money. However, even with savings identified by re-scoping and introduction of new technologies, the level of investment required remains significant and we must prioritise the required projects against the available funding.

Our economic regulator, the CER, has set out the levels of service which we are required to meet in the Customer Handbook and this is supplemented by a number of Codes of Practice which we have published. These relate to how we will correspond with our customers, deal with requirements for billing, complaints and other matters.

We will communicate with our customers, particularly when we must temporarily interrupt services, giving advance notice in accordance with our regulatory requirements. When we have unplanned interruptions, for example as a result of burst mains or other emergency works, we will use the appropriate national, regional and local media as well as social media and mobile notifications and have a commitment to directly contact vulnerable customers.

We will fully support the work of the Public Water Forum to be established under the Water Services Act, 2014, with respect to their comments and suggestion in relation to the performance by Irish Water of its functions.



**Key targets** in relation to meeting customer expectations by the end of 2021, 2027 and 2040 include;

**Customer Contact Handling** – maintain the number of customer calls answered within 20 seconds at the current baseline of 80% and less than 5% of calls abandoned in line best practice in utilities in Ireland and the UK.

**Customer Complaint Handling** – increase the percentage of customer complaints resolved (or steps taken towards resolving the complaint) within 5 working days of receiving the complaint from current baseline of 90% to 100% by the end of 2021 and maintain this rate.

**Note:** for all targets identified in relation to this objective – see Indicators and Targets under this Objective in the main body of the document.

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## Objective: Ensure a Safe and Reliable Water Supply

Our aims under this objective are to:

- Manage the sustainability and quality of drinking water from source to tap to protect human health.
- Manage the availability, sustainability and reliability of water supply now and into the future.
- Manage water supplies in an efficient and economic manner.



Safe and reliable water supplies are essential to public health, social and economic growth. Irish Water currently operates around 900 water treatment plants. Water quality from some of these water treatment plants does not meet the current Drinking Water Quality Regulations due to microbiological contamination or exceedances of other water quality parameters. Many of these treatment plants take their water from small water sources which are vulnerable to contamination and the impacts of climate change. The water supply distribution networks operate as isolated systems which are not interconnected. We also estimate that, nationally, we are losing approximately 49% of the water we treat due to leakage from our water mains and within customers' properties. Some of our older water mains and our customers' service pipes are made from lead which can in itself contribute to contamination of water by dissolving into the water, particularly at times of no or low flow.

We have identified a set of actions to address the above challenges which include to:

- Prepare and implement a **National Water Resources Plan** for the strategic development of water supplies that comply with the water quality standards and build in security of supply through the interconnection, where practicable, of our current water supply networks and the development of new, larger and more secure water sources serving regional schemes.
- Prepare and implement **Drinking Water Safety Plans** to protect our water supplies in accordance with international best practice, eliminating Boil Water Notices other than from short term extreme events.
- Implement a **Lead in Drinking Water Mitigation Plan** to reduce the potential for water to dissolve lead from pipework and to replace our public lead water mains over a ten year period.
- Implement a national set of **Standard Operating Procedures** in our water treatment plants and networks to ensure their correct, efficient and safe operation.
- Manage all our **water abstractions** to minimise their impact on the environment.
- Implement **regional water conservation strategies** to reduce leakage from our water mains by over 50% in the period of the WSSP.
- Adopt an **asset management approach** to maintenance and investment in our infrastructure and equipment so that we maximise the lifespan of our assets for consistent levels of service at least cost, utilising the capabilities and systems established in Irish Water.

**Key targets** in relation to ensuring a safe and reliable water supply by the end of 2021, 2027 and 2040 include;

**Drinking Water Microbiological Standards** – increase the percentage of samples complying with water quality standards from the current baseline of 99.82% to 99.99% by the end of 2021 and maintain that compliance rate.

**Leakage of Treated Water** – reduce the current leakage rate of approximately 49% to less than 38% by the end of 2021, to 30% by 2027 and to an economic level of leakage by 2040.

**Note;** for all targets identified in relation to this objective – see Indicators and Targets under this Objective in the main body of the document.

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## Objective: Provide Effective Management of Wastewater

Our aims under this objective are to:

- Manage the operation of wastewater facilities in a manner that protects environmental quality.
- Manage the availability and resilience of wastewater services now and into the future.
- Manage wastewater in an efficient and economic manner.

Wastewater must be collected and treated to an acceptable standard before it is discharged back into the environment. As a minimum, discharges from our wastewater networks must comply with the standards set by the EU Urban Waste Water Treatment Directive (UWWTD). A number of our treatment plants do not meet this requirement. Some of our combined sewers (pipes which receive both wastewater and the rainfall run-off from our roads and other hard surface areas) do not have the capacity to cope with heavy rainfall and this can result in flooding of properties. During intense rainfall, combined sewer overflows (CSOs) discharge effluent into our watercourses with limited or no treatment and this can result in unacceptable levels of pollution.

We have identified a number of actions to tackle these issues including to:

- Prepare and implement a **Wastewater Compliance Strategy** to improve the management of the wastewater systems. This will seek to address unacceptable discharge quality through improvements to treatment and remediate problems associated with combined sewers, where feasible.
- Prepare and implement national **Standard Operating Procedures** to ensure that all of our wastewater treatment plants and networks are operated correctly, safely and efficiently.
- Progressively meet the requirements of the **UWWTD** and the EPA Discharge Licences and Certificates.
- Identify and record properties at risk of **flooding from combined sewers** and implement measures to reduce and mitigate this risk.
- Plan and deliver measures to reduce the pollution impact from **combined sewer overflows**.
- Adopt an **asset management approach** to maintenance and capital investment, as for our water supply services, utilising the capabilities and systems established in Irish Water.

**Key targets** in relation to providing effective management of wastewater by the end of 2021, 2027 and 2040 include;

**Compliance with UWWTD** – increase the percentage of the population equivalent served by wastewater treatment plants that are compliant with the requirements of the UWWTD from the current baseline of approximately 39% to 90% by the end of 2021, to 99% by 2027 and to 100% by 2040.

**Pollution Incidents caused by Irish Water's Waste Water Treatment Plants** – deliver a reduction in the number of Class 2 pollution incidents (localised pollution) from a current baseline of 168 incidents to 75 incidents by the end of 2021, to 20 incidents by 2027 and maintain this level.

**Note;** for all targets identified in relation to this objective – see Indicators and Targets under this Objective in the main body of the document.



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## Objective: Protect and Enhance the Environment

Our aims to protect and enhance the environment are to:

- Ensure that Irish Water services are delivered in a sustainable manner which contributes to the protection of the environment.
- Operate our infrastructure to support the achievement of objectives under the Birds, Habitats and Water Framework Directives.
- Manage all our residual waste in a sustainable manner.

Protecting and improving the long term quality of the water environment enables safe, affordable water services as well as protecting human health and biodiversity. Many sectors have activities which impact on the water environment including emissions from industry, polluted run-off from agriculture, private household septic tanks as well as our water and wastewater services. A balance needs to be struck between our activities that impact on the water environment and the ability of the environment to sustain these impacts over both the short and longer term.

Climate change in Ireland is predicted to cause a greater frequency of extreme weather events which could result both in increased flooding risk and periods of drought. It is important to ensure that water services are adapted to the impacts of climate change in terms of;

- Adapting our assets to be resilient to climate change impacts;
- Mitigating our climate impact by reducing our carbon footprint; and
- Supporting the objectives of the National Energy Efficiency Action Plan through targeted investments and adapting asset operations.

There are a number of European Directives that give special protection to identified areas which are important for drinking water supply, nature conservation, bathing and fisheries. The Birds and Habitats Directives designate specific habitats and species for special protection and set up a network of protected sites (Natura 2000). The Water Framework Directive, which is the over-arching Directive covering management of water resources in the EU, establishes a catchment based approach to the protection, improvement and sustainable use of inland and coastal waters including groundwater. It adopts the 'polluter pays' principle and seeks to develop holistic approaches to sustainable water use. Monitoring by the EPA indicates that many of our water bodies are not at 'Good Status' and discharges from wastewater treatment plants are one of the causes of this.

Water and wastewater treatment generates sludge products which require disposal or re-use where feasible. Wastewater sludge can be treated for re-use as a fertilizer and soil conditioner and also to generate renewable energy. We aim to retain and develop these outlets with full regard to all food safety and environmental considerations through quality management of all stages of the process.

We have identified a number of actions to achieve our environmental and sustainability aims including to:

- Implement a **Sustainability Policy and Framework**.
- Prepare and implement a **Sustainable Energy Strategy**.
- Prepare and implement a **Climate Change Adaptation and Mitigation Strategy**.
- Adopt a **green procurement approach** and review our current use of resources.
- Contribute to the delivery of the **Water Framework Directive** programmes of measures and our obligations under the Birds and Habitats Directives.
- Develop and implement **waste and sludge management plans**.

**Key targets** in relation to protecting and enhancing the environment to the end of 2021, 2027 and 2040 respectively include;

**Energy Efficiency** – improve the energy efficiency at Irish Water facilities over the 2009 baseline by 33% by 2020 (national policy target) and meet the targets that will be established by national energy policy to 2040.

**Facilitate the achievement of water body objectives under the Water Framework Directive and our obligations under the Birds and Habitats Directives** – achieve the key targets identified under the Provide Effective Management of Wastewater objective with respect to wastewater treatment and effluent discharges from Irish Water's facilities and under Ensure a Safe and Reliable Water Supply with respect to ensuring our abstractions for drinking water are environmentally sustainable.

**Note:** for all targets identified in relation to this objective – see Indicators and Targets under this Objective in the main body of the document.

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## Objective: Support Social and Economic Growth

Our aims under this objective are to:

- Support national, regional and local economic and spatial planning policy.
- Facilitate growth in line with national and regional economic and spatial planning policy.
- Ensure that water services are provided in a timely and cost effective manner.

The Central Statistics Office has published population growth forecasts at a national scale to 2046 and at a regional scale to 2031 based on the results of the 2011 census. These projections indicate that the national population will grow from 4.5 million in 2011 to between 5 million and 6.7 million by 2046, depending on the growth scenario used. Growth will vary across regions, with the Dublin/Mid East region likely to experience the greatest growth and the Western and Border Regions likely to experience the least growth.

The delivery of appropriate infrastructure to meet the required demand, where and when it is needed, supports the social and economic growth of the country. Reliable, high quality water supplies are increasingly important to attract foreign direct investment into Ireland. To achieve these objectives we must assess the demands for water services, based on national and regional spatial planning policies and plans, together with population and economic growth predictions. Our plans must ensure continuous service to all Irish Water's existing customers, whilst providing additional capacity to meet future population growth and industrial development. The objectives of the Government's strategic approach to housing identified in Construction 2020 must be provided for in terms of both treatment and network capacity.

However, there are a number of challenges in meeting this objective including the accurate prediction of the growth of the domestic population and changing demography. The demand from businesses and industry is uncertain and industrial development can have significant "one-off" demands for large water and/or wastewater capacity. This requires that our plans and implementation programmes are versatile and capable of being phased as far as possible to meet emerging needs.

To meet this strategic objective we will, in summary:

- Work with national, regional and local planning bodies to ensure that we understand and **plan for future development consistent with national, regional and local planning policy.**
- **Maximise the capacity of our existing assets** through effective management.
- **Invest in interconnection of networks and additional capacity** and ensure that we **maintain appropriate headroom** (spare capacity above demand) to cater for production risk and provide flexibility in capacity to meet new demands.
- **Balance investment for growth in demand with other priorities** to ensure best outcome for customers.
- Operate an equitable **new connections charging policy** for new customers.

**A key target** in relation to supporting social and economic growth to the end of 2021, 2027 and 2040 respectively includes;

**The availability of capacity, "Headroom", at water and wastewater treatment plants to meet "core strategies" identified in development plans.** The percentage of treatment plants meeting the target capacity headroom to increase from a current baseline of "unknown" to 60% of plants meeting their target by the end of 2021, 75% by 2027 and 100% of plants meeting their target by 2040.

**Note;** for all targets identified in relation to this objective – see Indicators and Targets under this Objective in the main body of the document.

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## Objective: Invest in Our Future

Our aims under this objective are to:

- **Manage our assets and investments in accordance with best practice asset management principles to deliver a high quality, secure and sustainable service at lowest cost.**
- **Invest in our assets while maintaining a sustainable balance between meeting customer standards, protecting the environment and supporting the economic development and growth of the country.**
- **Establish a sustainable funding model to ensure that Irish Water can deliver the required capital investment in order to achieve the required outcomes.**
- **Promote research and utilise proven, innovative technical solutions to meet standards set by our regulators including our objectives for cost and energy efficiency.**

The historic under-investment in our water and wastewater networks and treatment facilities means that we now need to secure significantly increased levels of funding (approximately €600M capital investment each year) in order to achieve adequate standards of drinking water and wastewater compliance and to support the growth of the country. Because of the very high levels of investment required and also the significant constraints on Government borrowing, the Irish Water funding model must enable us to raise finance from other sources.

In order for Irish Water to be able to raise significant finance at favourable interest rates, it will be necessary for it to demonstrate that it is an efficient water utility company, operating within a stable regulatory framework, with secure revenue streams.

We need to achieve a sustainable balance between the level of investment meeting customer standard, protecting the environment and supporting the social and economic development of the country through working with our regulators and stakeholders. This will require that we operate efficient systems and processes in both operations and capital delivery.

Our actions for achieving this strategic objective are to:

- Overcome the deficit in **knowledge of our current asset base** through the development of accurate databases linked to Geographical Information Systems and installing modern asset monitoring and reporting systems to support automation and process control.
- Maintain our infrastructure and plan for its replacement through adopting an **asset management approach** in line with international best practice.
- Develop a **sustainable funding model**. Irish Water is taking a 25 year perspective in relation to investment in water services.
- Engage collaboratively with our customers, stakeholders and regulators to deliver optimum investment outcomes at least cost using **clear and transparent investment criteria**.
- Raise **public and stakeholder awareness** of the value of water services and the requirements to deliver them to the required standards.
- Engage with organisations conducting **research and development** in water services, including Irish third level colleges and institutes, and use proven innovation to maximise benefits for our customers and the environment.

**A key target** in relation to investing in our future to the end of 2021, 2027 and 2040 respectively includes;

**Operational and capital efficiency** – meet 100% of the requirements identified by the CER with respect to operational and capital efficiency by end of 2021 and maintain this percentage.

**Note;** for all targets identified in relation to this objective – see Indicators and Targets under this Objective in the main body of the document.

## Summary of Strategic Objectives and Aims

A table summarising our strategic objectives and aims is presented below.

<b>CE</b>	<b>Meet Customer Expectations</b>
CE1	Establish both Customer Trust and a Reputation for Excellent Service.
<b>WS</b>	<b>Ensure a Safe and Reliable Water Supply</b>
WS1	Manage the sustainability and quality of drinking water from source to tap to protect human health.
WS2	Manage the availability, sustainability and reliability of water supply now and into the future.
WS3	Manage water supplies in an efficient and economic manner.
<b>WW</b>	<b>Provide Effective Management of Wastewater</b>
WW1	Manage the operation of wastewater facilities in a manner that protects environmental quality.
WW2	Manage the availability and resilience of wastewater services now and into the future.
WW3	Manage wastewater services in an efficient and economic manner.
<b>EN</b>	<b>Protect and Enhance the Environment</b>
EN1	Ensure that Irish Water services are delivered in a sustainable manner which contributes to the protection of the environment.
EN2	Operate our water services infrastructure to support the achievement of water body objectives under the Water Framework Directive and our obligations under the Birds and Habitats Directives.
EN3	Manage all our residual waste in a sustainable manner.
<b>SG</b>	<b>Support Social and Economic Growth</b>
SG1	Support national, regional and local economic and spatial planning policy.
SG2	Facilitate growth in line with national and regional economic and spatial planning policy.
SG3	Ensure that water services are provided in a timely and cost effective manner.
<b>IF</b>	<b>Invest in Our Future</b>
IF1	Asset Management. Manage our assets and investments in accordance with best practice asset management principles to deliver a high quality secure and sustainable service at lowest cost.
IF2	Balanced Sustainable Investment. Invest in our assets while maintaining a sustainable balance between meeting customer standards, protecting the environment and supporting the economic development and growth of the country.
IF3	Sustainable Funding Model. Establish a sustainable funding model to ensure that Irish Water can deliver the required capital investment in order to achieve the required outcomes.
IF4	Research and Innovation. Promote research and develop proven, innovative technical solutions to meet standards set by our regulators including our objectives for cost and energy efficiency.

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## Environmental Assessment, Consultation and Adoption of this Plan

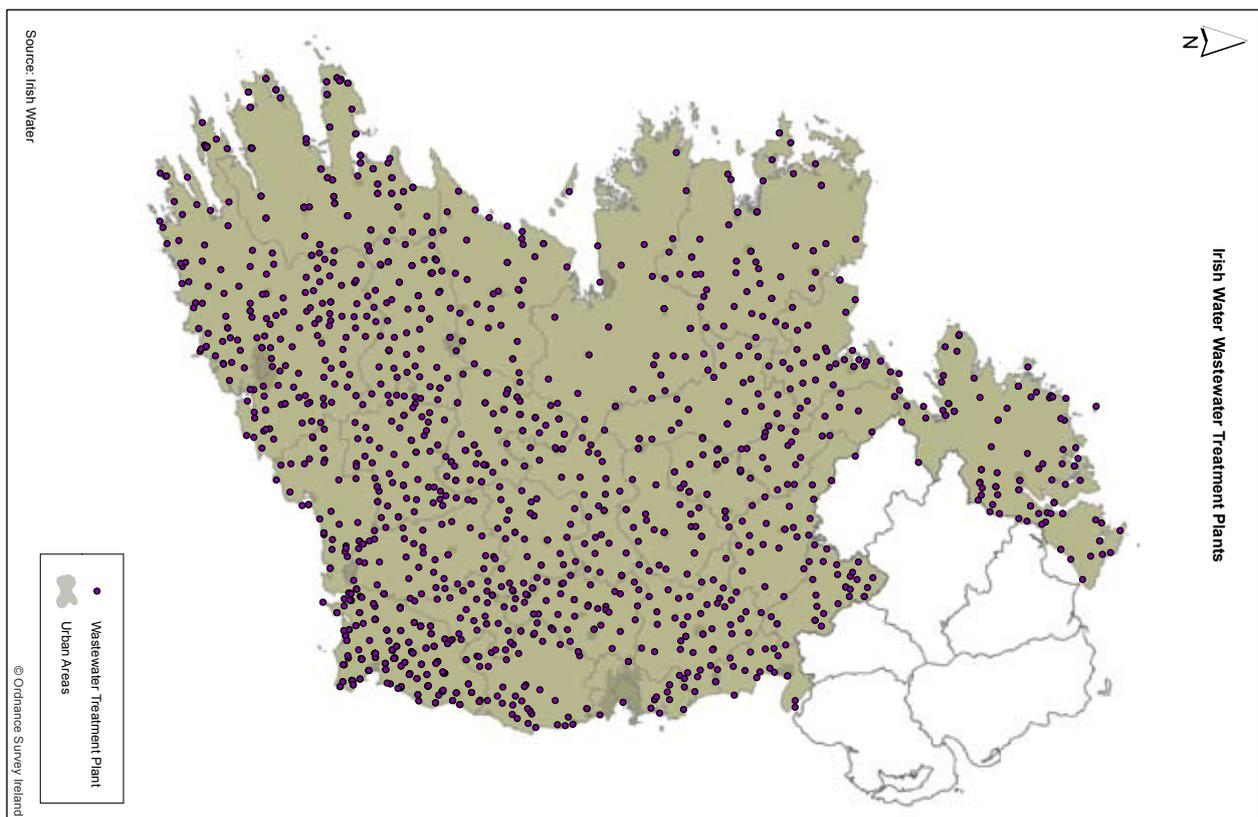
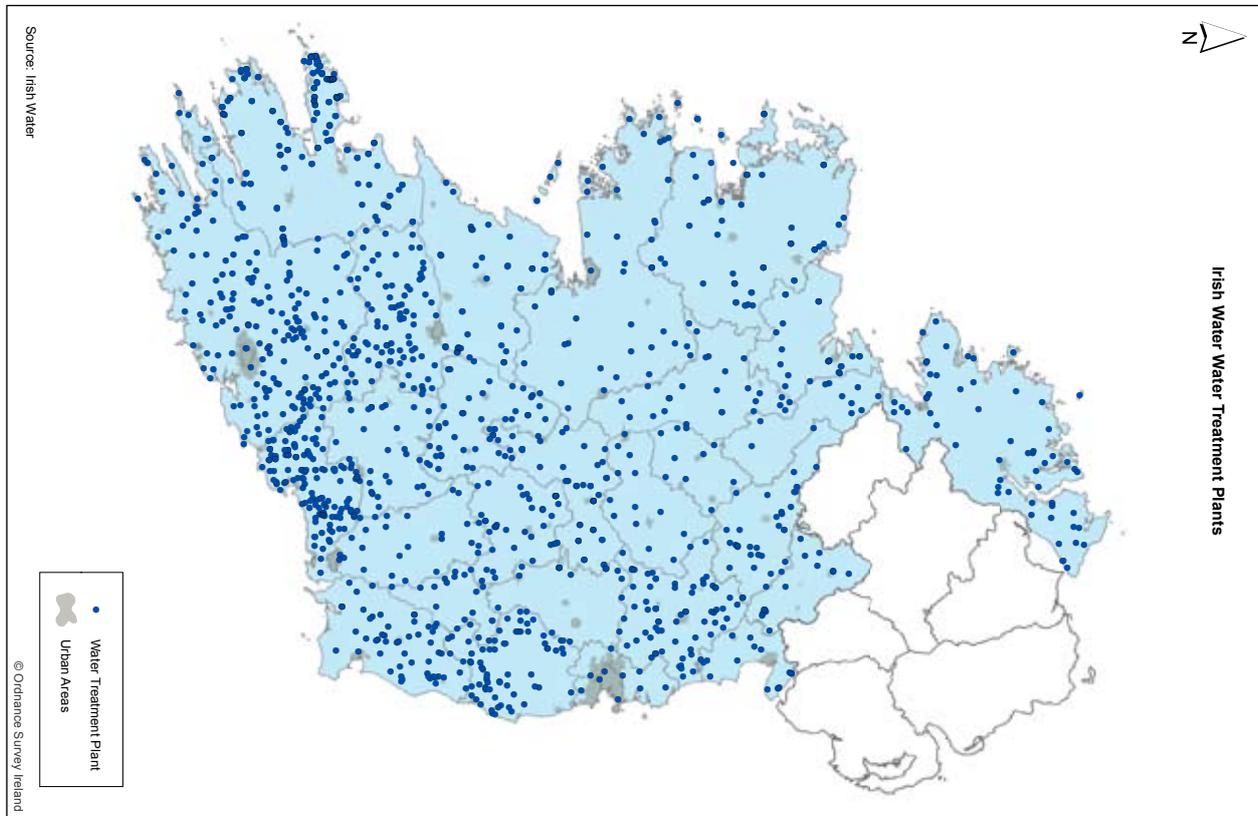
A Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) were undertaken by Irish Water during the preparation of this Water Services Strategic Plan. A draft Plan, SEA Environmental Report and Natura Impact Statement (NIS) were published for consultation with statutory and non-statutory consultees and the general public from the 19th February to the 17th April 2015. We have taken on board the feedback we have received through the consultation process in the preparation of this final Plan. The changes made to the draft Plan due to this feedback are identified in the SEA Statement for the Plan. The Water Services Strategic Plan was adopted by the Irish Water and Ervia Boards in June 2015 and was brought to the Minister for the Environment, Community and Local Government for approval in July 2015.

This document, the SEA Statement and AA Determination are available for download online at <http://www.water.ie>.



*River Barrow at Srowland WTP Intake Site. Photo: Nicholas O'Dwyer*

## Map 1 & 2 Irish Water Water Treatment Plants & Wastewater Treatment Plants



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# Chapter 1 Introduction

## Irish Water's vision

Through responsible stewardship, efficient management and strong partnerships, Ireland has a world-class water infrastructure that ensures secure and sustainable water services, essential for our health, our communities, the economy and the environment.

### Transforming the Delivery of Water Services

Water is one of our most valuable resources and essential for sustaining life. Water circulates through the landscape influencing the locations of our towns and cities and fuelling our social and economic growth. Access to clean water and effective management of wastewater is a requirement for a modern society. However, clean water is expensive to produce and deliver. It is a complex process to turn the water from our rivers, lakes and groundwater (referred to as raw water) into clean drinking water and deliver it safely to each customer's tap. Wastewater must then be collected and treated before it can be reintroduced safely back into our environment.

The water services which each customer receives require significant funding for both the operation of the existing treatment plants and pipe networks and for investment in maintaining existing infrastructure and providing new infrastructure for water services. Irish Water, as a new national utility, must promote an understanding and acceptance of the need for a new fully funded entity to deliver the water services of this country in the 21st century.

The creation of Irish Water has, for the first time, enabled a transformation of the way that water services are delivered in Ireland. A national utility has the scale to effectively and efficiently address the many issues and risks to delivering water services. Despite the work of the local authorities over the last 130 years, substantially more investment is needed across the country to address weaknesses in the current systems, including high leakage rates, varying drinking water quality standards, disruptions to supply and unacceptable wastewater discharges.

This Water Services Strategic Plan provides an opportunity to take, for the first time, a high level view of how water services should be provided, taking a national rather than local perspective and looking at a 25 year time frame as well as considering priorities for short term investment. The plan sets out the framework for future implementation plans and projects. It has been subjected to a Strategic Environmental Assessment and an Appropriate Assessment and these documents are also published and are available at <http://www.water.ie>.

### Supporting Social and Economic Development

Reliable water services with the capacity for expansion will enable urban communities, business and industry to grow and attract investment. Within the lifetime of this strategic plan, the emerging problems of water stress around the world will become more acute and sustainably planned water services in Ireland will be a key global competitive advantage. Future development of water services must be in line with agreed national and regional development plans. We will therefore work with regional and local planning authorities and other agencies in the forward planning of water services infrastructure to meet social and economic growth. Importantly, we will be an active consultee in the preparation of the National Planning Framework (which will replace the National Spatial Strategy) and will continue to support national and regional spatial planning policy as it evolves.

## Our Responsibilities

Irish Water is responsible for the public supply of drinking water to over 80% of the population. Our water supply responsibilities extend from the abstraction of (raw) water from wells, rivers, lakes and reservoirs, to treatment of this water such that it is suitable for human consumption and onward delivery to our customers' homes and business premises.

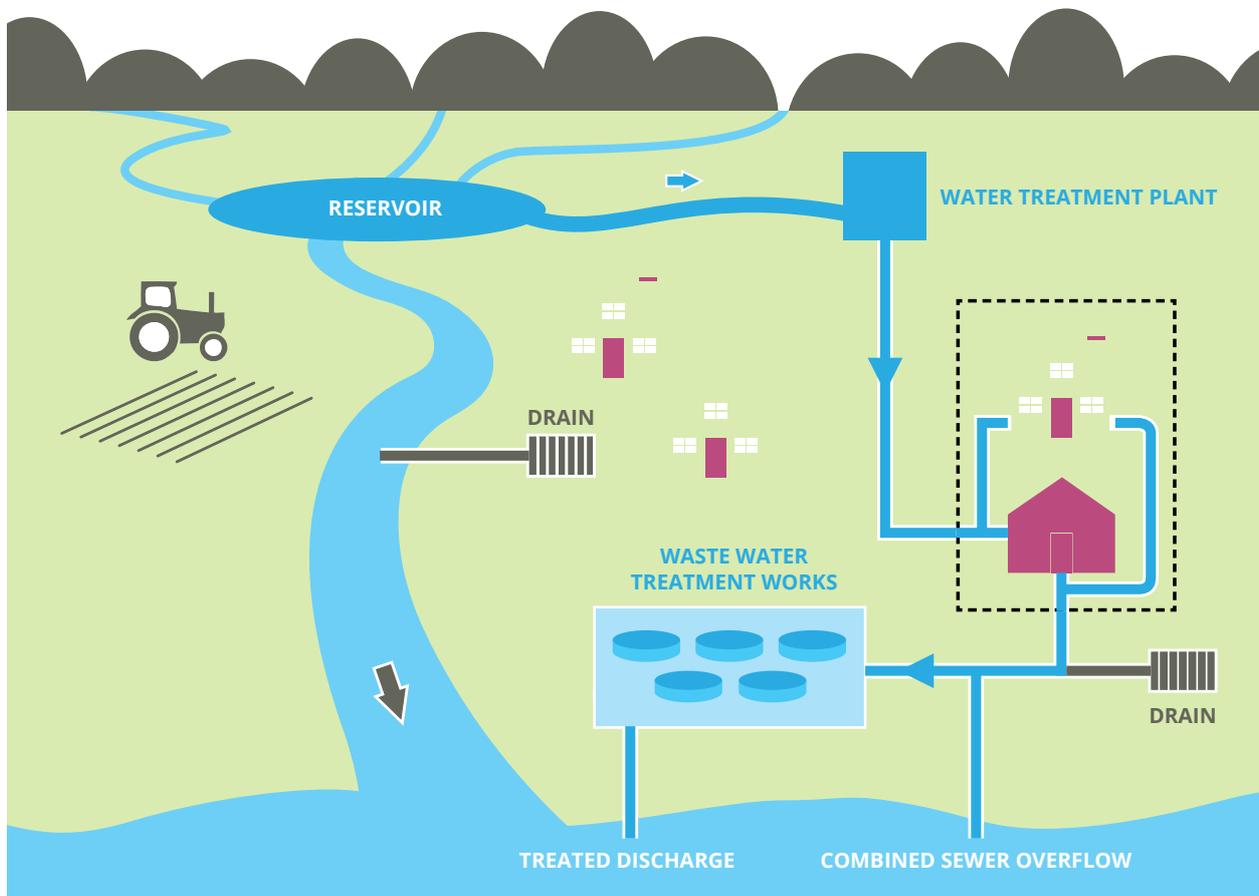
Our responsibilities for wastewater commence when effluent reaches the public wastewater network. We are responsible for its transfer to wastewater treatment plants, its treatment and the subsequent discharge of the treated effluent back into the water environment. We are also responsible for the treatment and disposal of the sludge that is generated from both our water and wastewater treatment plants.

Our environmental responsibilities are to ensure that the quantities of water that we abstract are sustainable and that sufficient water remains in water bodies to support the needs of the ecology and other water users. Our discharges to surface & ground water and emissions to the atmosphere must comply with current legislation, including meeting our discharge license requirements in relation to the EU Water Framework Directive objective to achieve "Good" water quality status for all water bodies. We must also meet national targets for energy efficiency set by the Government.

We are not responsible for Group Water Schemes or private water schemes. While we do provide water to those Group Water Schemes which are supplied from the public network, we are not responsible for their distribution networks and other infrastructure such as reservoirs and pumping stations. We are also not responsible for private wells or septic tanks. The surface water drainage network and flood prevention works remain the responsibility of the relevant local authority or the Office of Public Works. Our responsibility in this area relates only to flooding from our combined sewers (foul sewers receiving stormwater flows), that are generally found in older urban areas. We intend to establish a memorandum of understanding with both the Office of Public Works and local authorities to reflect the complex nature of urban flood management and the responsibilities of each of the parties.

The extent of our responsibilities is illustrated in dark blue in the graphic below.

**Figure 1** Extent of Irish Water's Responsibilities



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## Our Assets

Control of water services infrastructure assets, with a value of more than €11 Billion, transferred from 34 local authorities to Irish Water in January 2014. This large portfolio includes several thousand assets including reservoirs/ water storage facilities, water and wastewater treatment plants, pumping stations, approximately 60,000 km of water pipelines and 25,000 km of wastewater pipelines. At present, we supply drinking water to 3.3 million people through around 900 water treatment plants as well as the collection and treatment of wastewater from over 1,000 separate agglomerations (urban settlements). Due to the previously fragmented nature of the management of water services across the local authorities, the level and quality of data and records vary widely. Consequently, we will be carrying out asset surveys to increasing levels of detail, prioritising critical assets.

We do know that the condition of our assets varies from very good to 'at risk of failure' or in some cases the asset has actually failed. The scale of the remedial works required to eliminate the risk of failure has not yet been fully quantified. Of particular concern is the fact that a significant number of water supply zones are vulnerable to microbiological contamination. Leakage from our water supply networks is at unacceptable levels and well above international norms. Many of our wastewater treatment plants do not meet the legal requirements for discharging effluent to the water environment. Infiltration of groundwater into our wastewater collection network also presents difficulties for the adequate treatment of wastewater.

## Our Partners in Delivering Water Services

Irish Water took over the overall responsibility for water services from the 34 local authorities (subsequently amalgamated to 31) in January 2014. Irish Water operates the service on a daily basis through the implementation of Service Level Agreements with the local authorities (LAs) which will run for up to 12 years. Irish Water will prepare annual service plans with the local authorities and the plans will be delivered under these SLAs. Irish Water is currently implementing a transformation plan with the LAs to move towards a single way of working based on the utility model of delivering water services in Ireland into the future.

## Our Legal Context

Irish Water will plan, develop and operate our water service functions in line with the requirements of prevailing relevant national and European legislation. Relevant legislation includes multiple statutes, regulations and European directives, some of the most pertinent legislation is included below to illustrate the legislative context in which we operate and which is covered by this plan. The requirements of this legislation are elaborated on in the following chapters where relevant and a more comprehensive list of relevant European legislation is included at Appendix B of the SEA Environmental Report of the WSSP.

### Water Services Acts 2007- 2014

Irish Water was incorporated in July 2013 as a semi-state company under the Water Services Act, 2013. The Act sets the governance and funding arrangements for the company in addition to the requirements for water metering. The Water Services (No. 2) Act, 2013 provides for the transfer of water services functions and infrastructure assets from the Local Authorities to Irish Water. This Act also gives Irish Water the authority to charge all customers who are in receipt of public water and waste water services and requires that Irish Water submits a plan for the charging of customers for the provision of water services to the Commission for Energy Regulation (CER) for approval. The CER has been given the responsibility for the approval of a Code or Codes of Practice dealing with the standards of performance to be achieved by Irish Water in the delivery of its functions

Section 33 of the Water Services (No. 2) Act, 2013 requires Irish Water to prepare a Water Service Strategic Plan (WSSP). The WSSP shall state the objectives of Irish Water in relation to the provision by it of water services in respect of the period of 25 years following the approval of the plan by the Minister for the Environment, Community and Local Government. A review of the implementation and operation of the WSSP shall be conducted every 5 years. Section 34 of the Act requires Irish Water to prepare Investment Plans at intervals as directed by the CER. The Investment Plan sets out the investment in water services that Irish Water considers necessary for the effective performance of its function over the investment period. The Investment Plan forms a significant part of Irish Waters submission to the CER in relation to approval of charges to customers for water services. The WSSP and the Investment Plans must take into account statutory spatial planning policy and the requirements of river basin management plans prepared under the Water Framework Directive (see Figure 3).

## European legislation pertinent to the operation of Irish Water

As a member state of the European Union, the **Irish state** is required to comply with Directives set by the EU which are transposed into national legislation through Statutory Instruments. The principal directives and resultant national legislation pertinent to the activities of Irish Water are summarised below and discussed further in the Chapters 4, 5, 6 and 7.

- The European Drinking Water Directive (DWD), Council Directive 98/83/EC concerns the quality of water intended for human consumption and sets out quality requirements for same. It applies to all water intended for human consumption apart from natural mineral waters and waters which are medicinal products. The Directive is transposed into national legislation by the European Union (Drinking Water) Regulations 2014.
- The Urban Wastewater Treatment Directive (91/271/EEC) has the objective to protect the environment from the adverse effects of urban wastewater discharges through the regulation of the collection, treatment and discharge of urban wastewater. The Directive is transposed into national legislation by the Urban Waste Water Treatment Regulations 2001.
- The Water Framework Directive (2006/11/EEC) establishes a catchment based approach to the protection, improvement and sustainable use of rivers, lakes, transitional waters (estuaries), coastal waters and groundwater and is given effect through the preparation and implementation of River Basin Management Plans. It adopts the 'polluter pays' principle while the provisions of Article 22 of the Directive facilitates incorporating the requirements of a number of existing Directives into the wider objectives of the WFD. The Directive is transposed into Irish legislation by EU (Water Policy) Regulations 2003 and 2014, EU Surface Water Regulations 2009 and EU Groundwater Regulations 2010. The European Union Water Policy Regulations 2014 added Irish Water as a Public Authority for the purposes of cooperating with the Minister, the EPA and Local Authorities in the preparation and implementation of River Basin Management Plans. Irish Water participates within Tiers 2 and 3 of the new Governance structure summarised below:

**Figure 2** Irish Water's involvement in River Basin Management Plans

<p><b>TIER 1</b> National Governance</p>	<ul style="list-style-type: none"> <li>• <b>Policy, regulations and resources</b></li> <li>• <i>Led by DECLG</i></li> </ul>
<p><b>TIER 2</b> Technical Coordination</p>	<ul style="list-style-type: none"> <li>• <b>Coordination of monitoring, assessment, reporting and implementation</b></li> <li>• <i>Led by EPA</i></li> </ul> 
<p><b>TIER 3</b> River Basin District Actions</p>	<ul style="list-style-type: none"> <li>• <b>Implementation of Programmes of Measures, tracking and reporting</b></li> <li>• <i>Led by the lead Coordinating Local Authority</i></li> </ul> 

- The Habitats Directive (92/43/EEC) places an obligation on all Member States of the EU to establish the Natura 2000 network and require protection of defined habitats and species. The network is made up of Special Protection Areas (SPAs), established under the EU Birds Directive (79/409/EEC), and Special Areas of Conservation. The Directives were transposed into Irish national regulations and have been subsequently revised and consolidated in the European Communities (Birds and Natural Habitats) Regulations 2011.
- Environmental Liability Directive (2004/35/EC) transposed by the European Communities (Environmental Liability) Regulations 2008 which establishes a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage. A key aspect is that it requires all businesses to put in place management plans to prevent pollution of the environment and control spills of toxic substances.
- Aarhus Convention (1998) which lays down a set of basic rules to promote the involvement of citizens in environmental matters and to improve enforcement of environmental law. The provisions of the Aarhus Convention are broken down into three pillars: access to information, public participation in decision-making and access to justice. All members of the public are required to have access to review procedures to challenge decisions relating to the environment, made by public bodies or private persons. These procedures must be 'fair, equitable, timely and not prohibitively expensive'.

#### **Additional national legislation pertinent to the operation of Irish Water**

- Water Supplies Act, 1942. The abstraction of water from any lake, river, stream, well, or spring by a sanitary authority (Irish Water has the status of a sanitary authority) for a public water supply is governed by the Water Supplies Act which requires a sanitary authority wishing to abstract water for public supply to apply to the Minister (now An Bord Pleanála (ABP)) for a water abstraction order. When determining whether or not the sanitary authority can take a supply and the volume and abstraction rate for that supply, ABP must consider the potential impact of the abstraction on riparian owners, on the water body itself and on the navigability of navigable rivers or canals. ABP may refuse the granting of an abstraction order or alter the terms of the abstraction. The Water Supplies Act, 1942 also allows the sanitary authority to protect the source of their abstraction from pollution or interference with the flow.
- Planning and Development Act, 2000 and Regulations, 2001 (as amended). Irish Water is a prescribed body for the purpose of the making of making Regional Planning Guidelines, county development plans, local area plans and planning schemes. Irish Water is also a prescribed body for development management and can be asked by the planning authorities and ABP to make observations on planning applications. In addition, Irish Water must comply with the statutory requirements of the Act and Regulations when planning the development of water services infrastructure.

## **Our Commitment**

"We believe that all of our customers should receive a safe and reliable supply of drinking water and have their wastewater collected and safely returned to the environment.

We will protect the environment in discharging our responsibilities and support Ireland's social and economic growth through appropriate investment in water services."



## Our Strategic Plan for 25 years

The preparation of this Water Services Strategic Plan is required under Section 33 of the Water Services (No. 2) Act, 2013, with the purpose of stating the objectives for Irish Water in the provision of water services and the means to achieve those objectives over the next 25 years. As a public plan, it has been subjected to Strategic Environmental Assessment (SEA) in accordance with the European Union (EU) SEA Directive (2001/42/EC) and Appropriate Assessment (under the EU Habitats Directive) and these documents are also published for review.

This is the first Water Services Strategic Plan of Irish Water and it will be reviewed on at least a five yearly basis to ensure that the plan continues to be appropriate and captures the strategic objectives needed to provide efficient and effective water services for Ireland. The reviews will also be informed by changes in legislation and better information, especially on asset performance, demographics and climate change. Future reviews will also benchmark our performance against the targets set out in this plan and allow for revision of these targets to achieve our long term objectives.

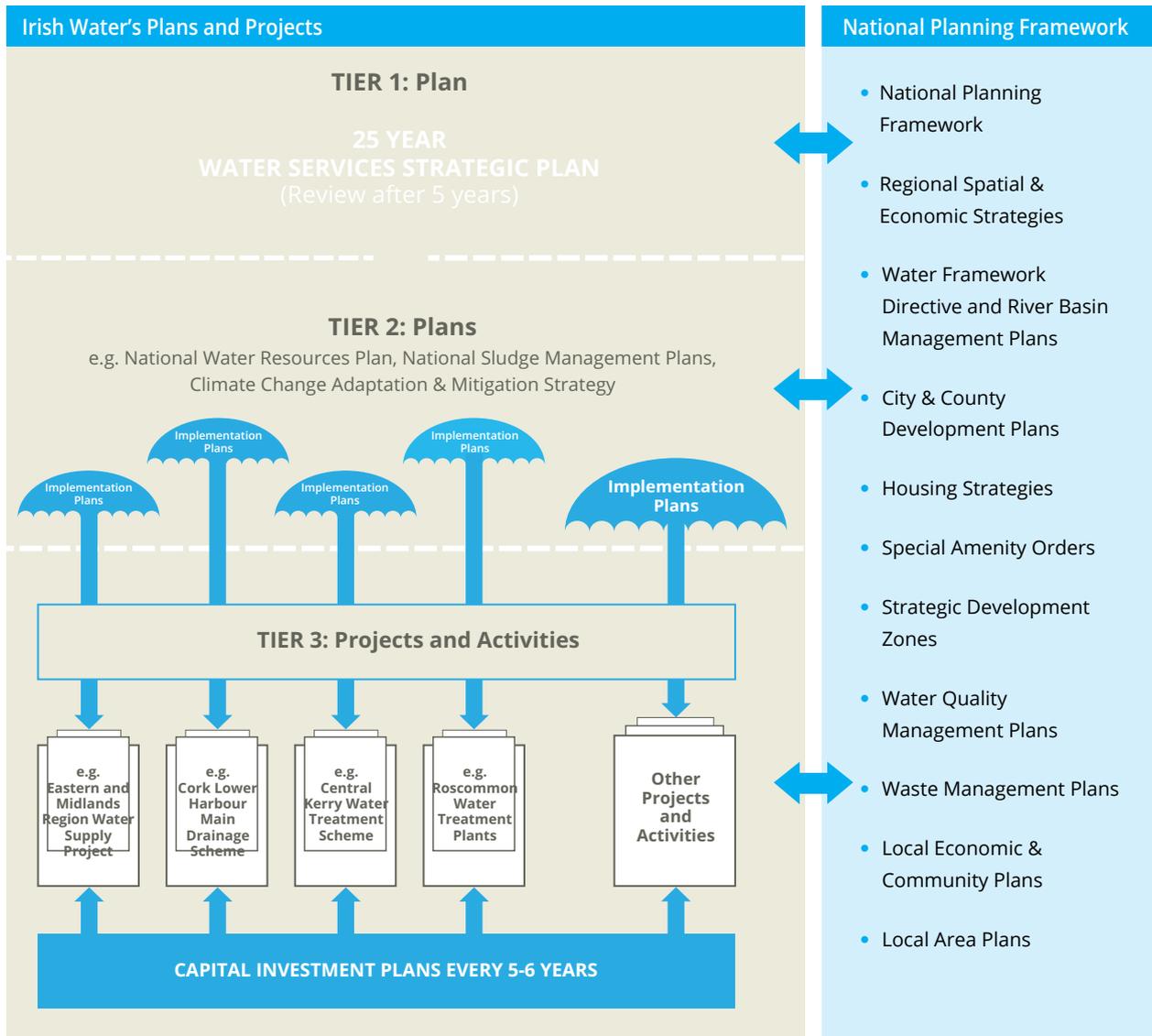
An interim review is also planned to ensure consistency with the new National Planning Framework, the new Regional Spatial and Economic Strategies and River Basin Management Plans which will be developed in the next few years.

## Planning for the Future

This Water Services Strategic Plan sets the context for subsequent implementation plans. These implementation plans will detail the programmes of works to be completed in specific water service areas, for example, water resource planning, sludge management planning, climate change adaptation and mitigation and wastewater compliance. Each implementation plan will ensure that we comply with our legal obligations, meet the objectives of this Water Services Strategic Plan and our performance targets. The implementation plans will also take into account the findings of other relevant national, regional and local plans (e.g. river basin management plans and regional development plans) and will be subject to Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) legislation as required.

The relationship of this (Tier 1) Water Services Strategic Plan to the (Tier 2) implementation plans and the future (Tier 3) projects is illustrated in Figure 3 with their relationship to the national spatial planning framework included.

**Figure 3** Relationship of this Tier 1 WSSP to the Tier 2 plans and Tier 3 projects and their relationship to the national planning framework



**Table 1** A draft timetable for the delivery of implementation plans and strategies

Title of Plan/Strategy	Estimated Date Available	Strategy addressed
National Water Resources Plan	Q3 2017	WS1a
Drinking Water Safety Plans <i>Plans for 135 water supply zones (WSZ)</i> <i>Plans for the remaining WSZ</i>	Q1 2016 Q1 2021	WS1b
THM & Pesticides Strategies	Q3 2017	WS1f
National Water Treatment Plant Sludge Management Plan	Q3 2017	EN3c
Lead in Drinking Water Mitigation Plan	Q1 2016	WS1e
Wastewater Compliance Strategy	Q3 2017	WW1a
National Wastewater Sludge Management Plan	Q4 2015	EN3b
Climate Change Adaptation and Mitigation Strategy	Q2 2016	EN1c
Corporate Waste Management Strategy/Plan	Q4 2015	EN3a
Sustainable Energy Strategy	Q3 2015	EN1b



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## Our Strategic Objectives and Aims

The Minister for Environment, Community and Local Government has issued a Ministerial Direction (Water Services Strategic Plan Direction 2014) which sets out the form that this plan shall take and directs the plan to follow a customer-focussed approach with identifiable time-bound and measureable objectives. The direction also states that the plan should address the following seven thematic headings:

- **Challenges and Strategic Priorities;**
- **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.**

The latter six headings form our strategic objectives whilst not being in any particular order of priority. We will address these strategic objectives in partnership with our customers, our economic and environmental regulators, industry and other stakeholders to develop innovative, holistic, sustainable solutions whilst providing value for money.



## How this Document is Laid Out

The document presents the challenges and strategic priorities in the next chapter. This highlights the current and future challenges which we face in the provision of water services to customers and for the protection and enhancement of the environment. Our current priorities are also identified.

The six strategic objectives are presented in separate chapters. For each objective, we detail our understanding of the current situation, key challenges, what our customers can expect from us in the future and our high level strategies to address the challenges. Indicators and targets, against which our performance can be assessed, complete each chapter.

## A 25 Year Strategic Plan

The challenges which face the provision of water services are identified as:

- Meeting Customer Needs in an Economic and Efficient Manner
- Providing Safe Water Supplies
- Managing Wastewater
- Protecting the Environment
- Becoming more efficient in Energy use



*Roundstone, Connemara. Photo: Alan Forsyth*

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# Chapter 2 Challenges and Strategic Priorities

## The Current State of Water Services

Irish Water currently operates many fragmented and disjointed networks of water and wastewater systems. The origins of this position lie in the dispersed and rural nature of a significant part of the Irish population and the development of water and wastewater services within individual local authority boundaries. The services also reflect the historic development of our assets dating from the 19th Century up to the most recent investments.

The majority of Ireland's drinking water is of excellent quality. However, in some of our water supply zones, water quality does not meet European Union (EU) Directive and Irish Drinking Water Regulations due to microbiological contamination or exceedances of other water quality parameters. This can be due to the quality of the water source, the performance of the treatment plant or the condition of the distribution network.

Water abstractions have in many areas been sourced from smaller water bodies (lakes, rivers or groundwater) which are not capable of meeting future growth in demand without adversely affecting the surrounding environment. Likewise, smaller water bodies have a lower capacity to accept discharges from wastewater treatment plants without significant impact to the ecology (e.g. mammals, fish, invertebrates and plants).

The security of supply of water services is weak in many areas of the country with networks reliant on a single source, treatment plant or storage reservoir and low available headroom (spare capacity above normal demand) to cater for emergencies, planned maintenance or equipment failures. For example, there is frequently just 2% headroom available to supply water to the Greater Dublin Area. The vulnerability of this supply was seen in 2013 when water restrictions impacted many areas of Dublin due to a production problem at the Ballymore Eustace water treatment plant which delivers over 50% of the supply to Dublin.

A comparison with water services in Scotland is instructive. Scottish Water operates around a quarter of the number of water treatment plants as Irish Water to serve 2.4 million domestic households. The higher number of smaller water treatment plants controlled by Irish Water (many of which rely on small vulnerable sources) are more difficult and expensive to operate and we need to reduce this number through rationalisation where funding permits.

Local authorities were reliant on the exchequer for the bulk of their capital and operational funding. Capital funding rarely met the levels required especially over the last 30 years when EU standards drove the need for massive investment in upgraded treatment of drinking water and to an even greater extent in wastewater treatment. More seriously, operational budgets made only very limited provision for asset maintenance and even less for planned maintenance to preserve design capacity. The absence of an asset management approach meant that assets deteriorated over time and this is now reflected in the performance deficits giving rise to compliance failures and excessive leakage in water and wastewater networks.

## Challenges over a 25 year Period

This Water Services Strategic Plan challenges us to think holistically about water, and commit ourselves to what that means for the delivery of water services to our customers, so that we provide a strong policy-driven framework for our implementation plans and projects.

Looking beyond the current transitional challenges and immediate priorities to enable service delivery, the strategic challenges that face the provision of effective and efficient water services are:

- **Meeting Customer Needs in an Economic and Efficient Manner;**
- **Providing Safe Water Supplies;**
- **Managing Wastewater;**
- **Protecting the Environment;**
- **Becoming more efficient in Energy use; and**
- **Providing water services for future population and economic growth.**

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Within each of the later chapters on the Strategic Objectives we propose strategies to address these challenges. At the end of this chapter we identify our current, short term priorities. But first it is necessary to define their context.

### **Meeting Customer Needs in an Economic and Efficient Manner**

Meeting compliance standards and providing capacity for new development requires significant capital investment in our water services assets, particularly our treatment plants and networks. This capital investment must be delivered within efficiency targets set by CER, our economic regulator.

We must meet the service commitments to which we have agreed in the Customer Handbook, particularly in relation to accuracy of customer billing, reaction time to service requests and our relationships with customers whilst carrying out our operations. Our overall challenge is to meet the required level of customer satisfaction consistent with other utility companies within a short timescale.

### **Providing Safe Water Supplies**

Meeting the EU and Irish drinking water quality standards for all of our water supplies is a significant challenge. Pollution of water sources, groundwater and surface water, poses a significant risk of contamination to drinking water supplies and increases the cost of producing high quality potable water. Groundwater, in many areas of the country, is highly vulnerable due to the local geology and is susceptible to pollution from agricultural activities, septic tanks and other discharges to ground. Surface water sources are vulnerable to runoff of pollution from adjacent land and properties.

Leakage of water from supply networks is a serious problem on a national scale. Leakage, both in Irish Water's networks and within customer properties, is estimated nationally at approximately 49% of the water produced for supply. This is twice the level of that in the UK and several times the typical figures in Germany, Denmark and the Netherlands, indicating that significant investment will be needed over a number of investment cycles to catch up with international norms in the water utility sector. High levels of leakage result in more raw water being abstracted and treated. This uses more energy and chemicals, requires larger treatment plants and pipelines, and leaves less water in our natural environment.

Water supply within our cities and large towns does not meet international norms for available headroom. Headroom is the spare capacity of all infrastructure (abstractions, treatment plants, pumps and networks). This spare capacity is used in the event of adverse weather conditions or during unplanned incidents such as breaks in trunk mains or problems at a water treatment plant. Planning for resilient water supplies must also take place, independently of any progress in demand management (reducing unnecessary use of water) or success in reducing leakage, because loss of a key water source, treatment plant, or pipeline remains a separate risk to be managed.

Adapting to the impact of climate change places additional challenges in providing safe and reliable water supplies. Periods of drought and greater frequencies of high intensity rainfall events are predicted to result from climate change. These events will affect the reliability and quality of smaller water sources which may become unavailable or suffer deterioration in water quality for periods of the year.

### **Managing Wastewater**

The European Commission reported adversely in 2013 on Ireland's implementation of the Urban Waste Water Treatment Directive (UWWTD) and has initiated an Infringement Case against Ireland in relation to 71 wastewater agglomerations. The UWWTD sets minimum standards for collection systems, wastewater treatment plants and discharge of treated wastewater back to water bodies. The most recently available Environmental Protection Agency (EPA) publication on wastewater compliance reported that 38 (23%) of the discharges from 162 larger urban (>10,000 population equivalent (PE) and >2000 PE if discharging to freshwater bodies or estuaries) agglomerations in the country are not meeting the relevant effluent quality and sampling standards set by the Directive. These include 7 agglomerations that have no treatment or only preliminary treatment. While 77% of the 162 agglomerations meet the relevant discharge and sampling standards, they represent only 39% of the total load (PE) discharged from these agglomerations.

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Historically, combined sewer systems have been constructed in many urban areas. During periods of heavy rainfall, surface drainage from roads and other impermeable areas combines with household and business wastewater in a 'combined' sewer. This places a large stress and capacity requirement on our wastewater networks and treatment plants. In a few cases flows from combined sewers also result in the periodic flooding of nearby properties with sewage effluent. Network modelling is required to identify the level of risk and the appropriate investment needed to manage such flows.

Additionally, periods of drought impact on the ability of smaller water bodies to dilute wastewater discharges to acceptable levels. Greater frequencies of drought, as a result of climate change, will result in the requirement for increased treatment of wastewater prior to its discharge.

## **Protecting the Environment**

Irish Water is faced with a major challenge in meeting EU and national environmental obligations.

The Birds and Habitats Directives designate specific habitats and species for special protection and set up a network of protected sites (Natura 2000). Many of these sites include water bodies and others rely on water bodies such as groundwater to support key habitats and species. The EU Water Framework Directive (WFD) focuses on the environmental quality of surface (both inland and coastal) and groundwater bodies, under all influencing factors including water abstractions and treated wastewater discharges. The WFD is implemented through river basin management plans which contain programmes of measures needed to deliver the water quality targets. The implementation of the UWWTD is one of a number of basic measures that must be implemented as part of an overall WFD programme of measures. The EPA, in licensing municipal wastewater discharges, has regard to the Environmental Objectives set under the WFD, the requirements of the Birds and Habitats Directives and the timelines set out in the river basin management plans to achieve these objectives. The key objective of the WFD is to protect and prevent deterioration in all water bodies and to return all waters to at least good status.

On the forthcoming review of the river basin management plans by the EPA, Irish Water will seek to agree effective and affordable measures that will have the greatest impact in terms of water quality improvement, recognising that other water users must also play their part in achieving water quality objectives.

Irish Water recognises the significant environmental compliance challenges that must be met. The range of issues across which progress must be made is broad and we must seek agreement with our environmental and financial regulators on the balance of priorities and necessary phasing of investments.

## **Becoming More Efficient in Energy Use**

Inefficient use of energy results in higher emissions of carbon dioxide, a contributor to climate change, and higher costs. As one of the largest single users of energy in Ireland, it is important that we optimise our energy use and seek to reduce it where possible.

We will seek to optimise our daily use of energy to take advantage of cheaper, off-peak and night time energy through, for example, running pumps and treatment plants to top-up reservoirs during these periods when feasible and without compromising service levels. We will improve energy efficiency through effective operation and replacement of inefficient plant and through energy recovery.

As a major energy user on a national scale we need to develop our use of renewable energy sources through working with the energy utility companies and to maximise generation of renewable energy from wastewater sludge where feasible.

## **Providing for Future Population and Economic Growth**

The challenge of providing for population and economic growth is one of making careful, timely and cost-effective investments in new plants and upgrades, based on forecasted growth rates. This will require close interaction with the preparation of spatial planning policy at the national level and with regional and local development planning.

Irish Water needs to plan across a range of growth and demographic scenarios and to ensure that plans are consistent with national and regional spatial planning policy. As a national utility we must regularly update our strategic planning to ensure that we provide water services where and when they are needed and that water supplies and wastewater treatment capacity are not limiting constraints to the economic development of the country.

### Building Our Capacity to Address these Challenges

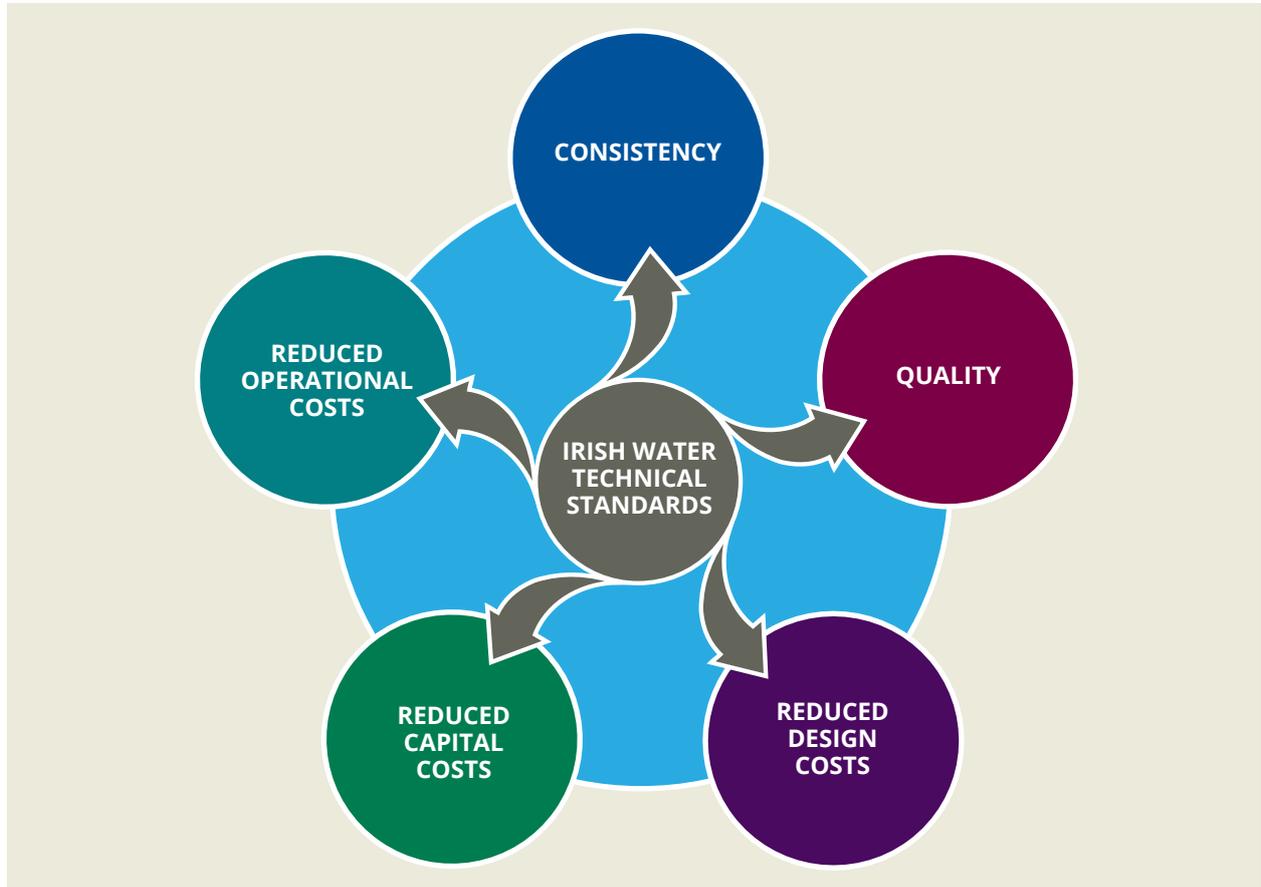
Irish Water was established to bring a consistent and efficient approach to the provision of water services. A key part of this approach is the development of our systems and processes, drawing on international best practice, where appropriate.

We will apply an asset management approach to achieve the optimum capacity from our existing infrastructure on a national basis. This will require the development of IT systems, including databases and Geographical Information Systems, to collate and display the location, condition and performance of our assets. These decision support systems will enable us to plan future maintenance and planned replacement of our asset base at least cost.

Prior to the creation of Irish Water, each local authority used its own standards based on local experience. We have begun the process of introducing Standard Operational Procedures across plants and networks. We are also introducing standardisation for spare parts, improved health and safety procedures for operatives and planned maintenance schedules. This planning and standardisation will in time improve safety and reduce the cost to operate and maintain our assets.

We will develop national approaches and specifications for the design and construction of new treatment plants and networks. This will ensure that our new infrastructure achieves the required performance in operation, that it maximises its design life and that it can be operated in a safe and efficient manner for the lowest whole life cost. The benefits from the above approaches are represented in Figure 4. )

**Figure 4** Benefits of Standardisation



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## Working With Our Regulators, Customers and other Stakeholders

To improve provision of water services, enable future growth and protect the environment, we will work closely and collaboratively with our regulators, customers and other stakeholders in all our planning, development and operational activities.

Irish Water is regulated by both the Commission for Energy Regulation (CER) for economic matters and the Environmental Protection Agency (EPA) for environmental matters and drinking water quality standards.

Irish Water's financial responsibilities (under the regulatory supervision of CER) extend to:

- The need to ensure that we perform our functions in a commercially viable manner whilst maintaining a balance between commercial viability and the cost of the service to customers.

The Environmental Protection Agency (EPA) regulates environmental matters and drinking water quality standards and our responsibilities relate to;

- The quality of the drinking water we supply.
- The impact of our activities on the water cycle (quantity and quality).
- The quality of the effluent we discharge to the environment.

The Health and Safety Authority (HSA) is responsible for Health and Safety whilst the Health Service Executive (HSE) is responsible for public health.

Irish Water also has obligations under the Water Services Act, 2013 in relation to spatial planning and is required to work with the DECLG, Regional Planning Authorities and Local Authorities in the delivery of future water services to support agreed national, regional and local spatial planning policies and plans.

## Our Current Priorities

In this first strategic plan, we need to address urgent issues in the quality of our water services and in the integrity of our infrastructure, subject to adequate funding being available to us, while ensuring that water services that currently meet required standards continue to do so. We have therefore prioritised the following six areas:

### 1. Our Customers

Demonstrating our commitment to the delivery of an improved quality water and wastewater service through the appropriate management of our assets in an economic and efficient manner ensuring least cost for our customers.

### 2. Reducing Drinking Water Quality Problems

Where water supplies are subject to Boil Water Notices, due to microbiological contamination, or have other drinking water quality problems, these must be resolved as key priorities through capital investment in infrastructure or changes to operational procedures where appropriate.

### 3. Achieving Compliance with the Urban Waste Water Treatment Directive

Bringing Ireland into compliance with the Urban Waste Water Treatment Directive must be an immediate priority. The European Commission's Infringement Case against Ireland for the 71 non-compliant agglomerations is likely to be progressed in 2015 and will require committed plans to meet the compliance limits on these and other schemes within a prescribed period.

### 4. Reducing Leakage in Water Supply Networks

We are currently utilising the early returns from the water metering programme to help us refine estimates of legitimate usage and levels of leakage within customers' properties. This will better define the size of the leakage problem, the optimum solutions and help us to determine where the largest leaks are. Works can then be prioritised which bring the largest water savings with targeted deployment of repair teams. We will also seek to reduce overall leakage within a network through better management of water pressure. We are determined to achieve the lowest level of leakage which is technically and economically sustainable, taking account of the state of the networks.

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## 5. Addressing Inadequate Asset Condition Information

Gathering accurate information on all of our assets into a quality assured database is a strategic priority. It is an essential tool for asset management over the lifetime of this plan and we cannot function effectively without it. We have currently drawn together all asset records onto a common national database (Geographical Information System) and are improving the accuracy and quality of these records on an on-going basis.

## 6. Catering for Growth

Irish Water will prioritise the allocation of resources to cater for growth using a risk based approach to determine which strategic assets are likely to constrain growth in the near future and taking into account the priorities set by the Minister and national planning policy. For example, the Minister has identified the need to address infrastructure constraints impacting on the delivery of housing units in urban areas as a current priority.

### How we will prioritise the allocation of funding.

Irish Water will prepare and publish a Capital Investment Plan (CIP) and submit this to the CER for approval of funding. The CIP will be prepared on at least a five year basis and will propose investment priorities in line with the policy set by the Minister taking into account the objectives and targets identified in this and subsequent revisions of the WSSP. Our proposed investment prioritisation methodology will be set out in each CIP.

## Monitoring Our Performance

This Water Services Strategic Plan proposes a suite of targets and indicators for each Strategic Objective presented in the later chapters. Our performance against these targets and the monitoring plan included in the SEA Statement will be assessed and reported by us within each revision of the Plan. This performance will therefore be available for scrutiny by our regulators (CER and EPA), other stakeholders and the general public. However, our progress against these targets is subject to adequate funding being available. Indicators and targets may change in subsequent revisions of the WSSP to reflect the priorities identified for the following period.

Our economic regulator, the CER, has published and will maintain **'The Customer Handbook'** which is primarily concerned with customer billing and communication. In accordance with this, we have published a set of Codes of Practice for the delivery of customer operations which will be subject to periodic revision and approval by CER.

As part of our regulatory framework, and in line with our commitment to customer care, we also operate a Customer Charter relating to our provision of water services for network operations and Terms and Conditions for both domestic and non-domestic customers. These will be published and periodically updated throughout the life of this plan.



Lough Gur, Co. Limerick. Photo: Alan Forsyth

# Chapter 3

Objective:

# Meet Customer Expectations



## Our Strategic Aim

- Establish both Customer Trust and a Reputation for Excellent Service

### Introduction

Irish Water's first strategic objective is to meet our customers' expectations through the provision of high quality, reliable water services, delivered through resilient systems, in an economic and efficient manner, reflecting the customer service levels expected in a modern economy.

We must ensure that the need to meet higher standards for compliance in drinking water quality and wastewater discharges to the water environment is balanced against the cost of water services that we provide to our customers.

Our first response to ensuring that we deliver our services in an economic and efficient manner has been to review all proposed capital investment in our water services assets, for which we took over responsibility in January 2014, to more accurately define the scope required to address short and medium term needs and ensure value for money invested. Even with this revised scope of projects, the capital investment need remains large (€5-6 Billion is estimated to be needed by 2021).

### The Current Situation

As a new utility, we are in a period of transformation from the provision of water services by 34 (now 31) local authorities to operation and management of these services by Irish Water. Local authorities are presently working under service level agreements with Irish Water to ensure a continuity of service and a smooth transition. Our customers will continue to be served on the ground by local authority staff, operating the local treatment plants and networks. Irish Water staff will have an increasingly important role in planning and managing the provision of water and wastewater services, defining both the operational and investment strategies.

We are, therefore, in a period of transformation into a more centralised and cost effective customer operation. We will develop a new water industry operating framework to deliver more services regionally, with shared cross boundary working, centres of excellence and increased specialisation. This will enable transition to a leaner customer support team with a nationally consistent approach.

### Key Challenges

There is presently a lack of detailed knowledge of the cost and technical challenges that Irish Water face in the provision of water and wastewater services to the standards expected in a modern economy. This is because of uncertain information on the condition and performance of the assets, especially underground water distribution and sewage collection networks. Despite these limitations, Irish Water recognises that customer expectations of the quality of the service they will receive will increase following the introduction of charges.

Key challenges facing Irish Water in relation to meeting customer expectations are summarised below:

#### Identifying our customer base

Water services for part of the population are provided by Group Water Schemes or private supplies, while wastewater treatment for much of the rural population is served by septic tanks. As a result, one of our earliest activities is to identify and obtain correct contact and scope of services information for all of our customers. A primary function of the domestic customer application campaign is to identify who receives their water and/or wastewater services from Irish Water and who doesn't. This will ensure efficient delivery of services to each customer, together with accurate billing information.

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### Delivering reliable water services

Our water and wastewater assets have suffered from significant under-investment over an extended period of years. Consequently, water and wastewater services can be variable and inconsistent. We will prioritise investment to firstly ensure universal, basic service availability and beyond that to deliver consistent service quality equivalent to that provided by high performing utilities in other sectors.

### Meeting our customer service commitments and Codes of Practice

We are committed to achieving the service standards set out in the Customer Handbook. These standards are approved by the Commission for Energy Regulation (CER) and are the basis of the content of Irish Water's Customer Charter, Terms and Conditions and Codes of Practice.

### Delivering customer satisfaction

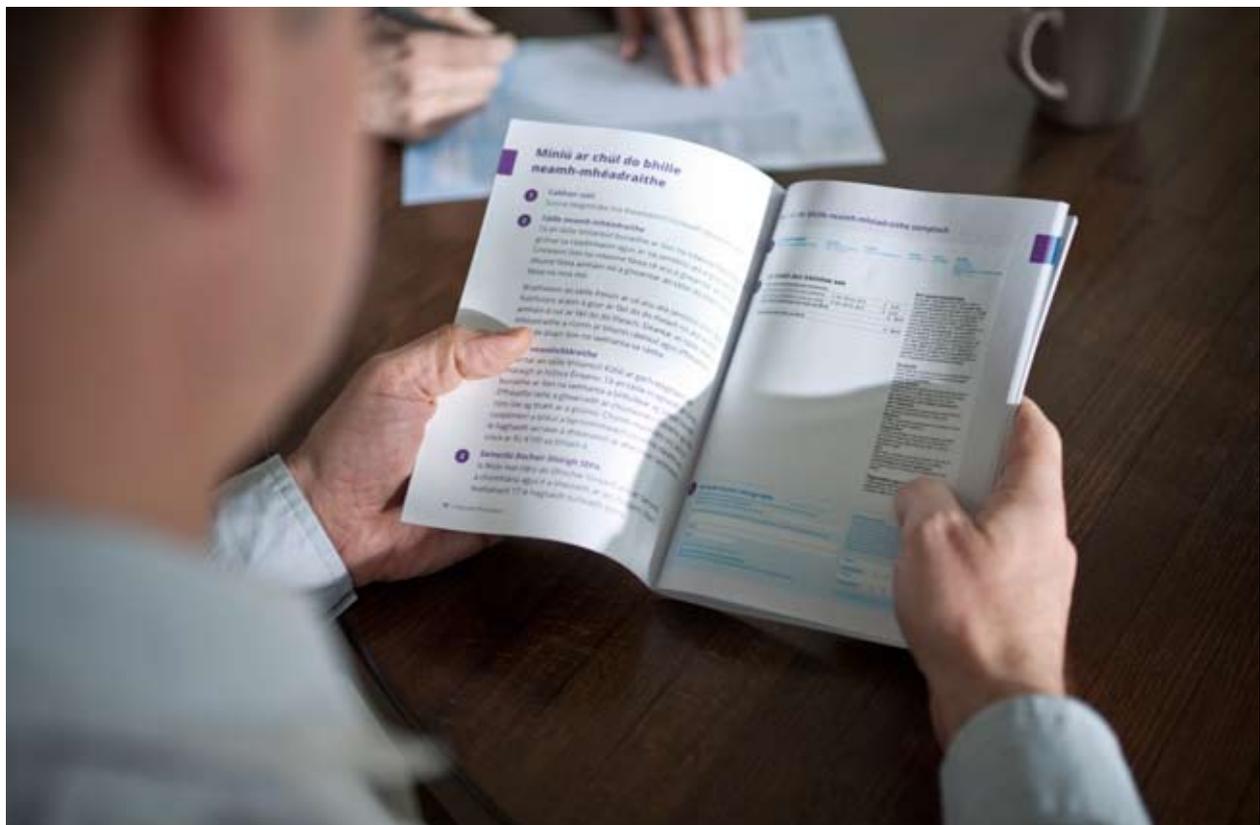
We anticipate a high level of communication with our customers by letter, email, phone, digital channels and through the media. We are committed to handling all customer communication in the manner expected of a modern professional utility. We aspire to deliver a consistent, functional and ultimately satisfying customer communication experience in relation to operational and billing queries, complaints, service requests, new connections services and all other interactions with Irish Water staff and contractors.

### Establishing sustainable customer funding

We are in a period of transition from water services being funded primarily through general taxation to one where direct charging of the end user provides part of the funding. As a utility increasingly dependent on the payment of water charges, it is essential that our customers recognise the importance of good water services provided efficiently.

### Balancing key customer objectives

Irish Water must work with our economic regulator to ensure that the costs incurred to deliver necessary improvements in infrastructure, services and standards is based on efficient working (both capital and operational).



## Objectives and Strategies

The proposed strategies to meet the above challenges and to achieve this objective are summarised in the table below and are detailed in the remaining sections of this chapter.

Strategy		Purpose
<b>Aim CE1 – Establish both Customer Trust and a Reputation for Excellent Service</b>		
CE1a	Create and operate a lean and effective Customer Operation.	Deliver best practice and value for money in customer operations.
CE1b	Build and maintain accurate customer databases.	To ensure accurate customer services and billing.
CE1c	Establish sustainable customer revenue.	To secure funding necessary to deliver efficient and effective water services.
CE1d	Establish effective communication channels with customers.	To ensure that customers can communicate with us when they need to in a manner that suits them and can be promptly informed of changes to services.
CE1e	Establish national customer service standards and robust customer protection measures.	Set appropriate customer expectations and deliver to these.
CE1f	Fully support the work of the Public Water Forum and establish effective communication with all our stakeholders.	To address the comments and suggestions of the Public Water Forum in relation to the performance by Irish Water of its functions and to ensure that we are open and transparent in relation to our obligations under Freedom of Information legislation and the Aarhus Convention.

### **CE1: ESTABLISH BOTH CUSTOMER TRUST AND A REPUTATION FOR EXCELLENT SERVICE**

#### **[CE1a] Create and operate a lean and effective customer operation.**

The employment of an effective workforce is an important part of delivering a competent customer service operation. This also requires Irish Water to establish the structure and governance procedures needed to deliver effective customer services. To ensure that the customer service operations are efficient, flexible long term service contracts with our suppliers will be required which will incorporate strict contract management systems. Irish Water is working with each local authority to ensure that effective structures, work practices, management and training of water services employees under the service level agreements is in place. It is working actively with the sector to achieve cross boundary working by local authority personnel to drive efficiency and improve service quality.

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## **[CE1b] Build and maintain accurate customer databases.**

Collating an accurate database of customers is critical to efficient delivery of services to each customer as well as Irish Water's revenue generation capability and customer acceptance of water charges. Irish Water is currently validating its domestic customer lists whilst simultaneously working with local authorities to transfer all non-domestic customers. This will provide Irish Water with the capability to communicate with, and provide quality water services to, customers effectively into the future and to implement accurate billing. Maintenance of an accurate database is crucial to Irish Water to enable delivery of an effective water service to all customers.

## **[CE1c] Establish sustainable customer revenue.**

To be willing to pay for the water and wastewater services that they are receiving, customers need to be satisfied that they are paying a fair amount for a defined service level. It is essential that Irish Water has a clear and transparent tariff structure and that we explain this clearly. We are working closely with our economic regulator (the CER) and other stakeholders on tariffs and customer protection consultations in order to achieve this objective. Customers expect to be able to pay in a way that best suits their needs. Irish Water will provide payment methods and frequency of payments that meet with customer demand.

## **[CE1d] Establish effective communication channels with customers.**

A number of documents have been published setting out how Irish Water will communicate with our customers.

The Customer Handbook, published by the Commission for Energy Regulation (CER) provides guidelines on the required levels of customer service. The Handbook is available at;

**<https://www.cru.ie/home/customer-care/water/customer-protection-2/>**

The Codes of Practice and Customer Charter set out our commitments for effective communication with our customers.

The Customer Charter (**<https://www.water.ie/docs/Customer-Charter.pdf>**) sets out the service provided and service quality levels offered to our customers. It also sets out a number of commitments where charter payments apply for domestic customers.

The Codes of Practice (**<http://www.water.ie/our-customer-commitment/>**) set out the standards and conditions of service for our customers and include information on: our charging structure, payment options, customer complaint handling (including the CER's dispute resolution role), frequency of bills and the testing of meters. They also include details on how you can expect us to communicate with customers and what we will do during planned and unplanned interruptions to the water supply.

All new domestic customers are issued with a copy of our Domestic Terms and Conditions for Water Services

**<http://www.water.ie/docs/Domestic-Terms-and-Conditions-English.pdf>**

We understand that some of our customers have different needs when it comes to using our water services and communicating with us. We have developed a register of vulnerable customers, which includes:

- a special services register for those customers who require additional support communicating or receiving services from us and;
- a priority services register for those customers who are critically dependent on water for their medical needs.

The vulnerable customer Code of Practice **[http://www.water.ie/docs/Vulnerable\\_Services\\_Booklet\\_ENG\\_web\\_final.pdf](http://www.water.ie/docs/Vulnerable_Services_Booklet_ENG_web_final.pdf)** gives details of how we plan to respond and adapt the services and communications provided to suit the needs of customers who tell us they are vulnerable.

We are committed to providing an excellent service to our customers that meets their evolving needs and requirements, while taking into account the challenges we face in establishing a modern water utility and the necessary upgrade of our assets to provide a reliable water supply.

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Our communications are intended to reach all of our customers and other interested parties and include the use of:

- **Our website;**
- **Social media;**
- **SMS messages (texts, used in clusters to communicate local operational problems);**
- **Telephone;**
- **Letter; and**
- **Face to face.**

Irrespective of the form of communication used we will always listen to feedback from our customers.



### **[CE1e] Establish national customer service standards and robust customer protection measures.**

Irish Water is committed to providing a satisfactory standard of water services to our customers with robust customer protection measures in place.

Our service standards outlined in our Codes of Practice and Customer Charter (for both domestic and non-domestic customers) are approved by the CER. Our Customer Charter originally published on the 30th September 2014 (<https://www.water.ie/docs/Customer-Charter.pdf>) commits us to engage with customers through a range of communication channels. It also offers a process for the resolution of Customer Complaints and sets out Guaranteed Service Standards.

We operate under a range of Codes of Practice which comply with the requirements of the Water Handbook relating to:

- **Domestic Customer Communications Code of Practice**
- **Domestic Metering Code of Practice**
- **Domestic Billing Code of Practice**
- **Domestic Vulnerable Customer Code of Practice**
- **Domestic Network Operations Code of Practice**
- **Domestic Complaint Handling Code of Practice**
- **Business Customer Codes of Practice**

These are available from our Customer Communications team or on our website (<https://www.water.ie/our-customer-commitment/>). We expect our published codes and charter commitments to expand and evolve over time.

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## **[CE1f] Fully support the work of the public water forum.**

Irish Water will fully support the work of the Public Water Forum to be established under the Water Services Act, 2014. This forum represents the interests of Irish Waters' customers. We will work with this customer consultative forum to fully understand the expectations of our customers in relation to how we perform our statutory functions. We will listen to and address the comments and suggestions coming from the forum in relation to the performance of our functions.

In addition to and complementing our communication channels with our customers through the strategies outlined in above and through the Public Water Forum, Irish Water will take a proactive approach to communicating with our broad stakeholder base and will fulfill our obligations under the Freedom of Information Act, 2014 and the Aarhus Convention as outlined below;

### **Freedom of Information Act 2014**

Irish Water is a listed FOI body and full information on our FOI process and approach can be found on our website: <http://www.water.ie/about-us/freedom-of-information/>

### **Aarhus Convention**

The aim of the Aarhus Convention is to link environmental protection with human rights by ensuring access to environmental information (AIE), public participation in decision making and access to environmental justice.

### **Access to Environmental Information (AIE)**

Full information on our approach to AIE can be found on our website:

[https://www.water.ie/about-us/freedom-of-information/Access-to-Information-on-the-Environment\\_.pdf](https://www.water.ie/about-us/freedom-of-information/Access-to-Information-on-the-Environment_.pdf)

We are currently developing a facility on our website where the public can access information on the quality of drinking water in any Water Supply Zone. Results of our sampling regime of 11 drinking water parameters will be available on our website in Q3 of 2015 and the site will continue to be developed to allow the customers/members of the public to link an address to the water quality in a specific Water Supply Zone.

In addition, Annual Environmental Reports (AERs) for all our licensed wastewater treatment plants are available on the EPA's Website and Irish Water will work with the EPA to ensure this information continues to be available through access to their website and links on Irish Water's website.

### **Public participation in decision making**

There are a number of existing statutory instruments through which Aarhus is legislated for, these include Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) and our national statutory planning process. Irish Water will ensure that we comply with this legislation and examine where additional public participation can be incorporated in the early phases of these processes.

Irish Water has demonstrated this approach in the consultation undertaken to date on the WSSP, which has had both statutory and non-statutory consultation phases in order to ensure that the general public can participate as early as possible in the decision-making process.

### **Environmental Justice**

All persons who feel their rights to access to information have been impaired (request for information ignored, wrongfully refused, inadequately answered) must have access, in the appropriate circumstances, to a review procedure under national legislation.

Irish Water will, as stated above, endeavour to help people access information; however there are procedures within the legislation that a person can follow if they feel they are not satisfied.

## Indicators and Targets

Indicators and targets to demonstrate that we meet this objective are presented in the table below.

MEET CUSTOMER EXPECTATIONS					
Indicators	Definition	Current Baseline	End of 2021 Target	End of 2027 Target	2040 Target
AIM CE1	Establish both Customer Trust and a Reputation for Excellent Service				
Contact Handling	Call answering and call abandonment	80% of calls answered in less than 20 seconds. Less than 5% of calls abandoned	80% of calls answered in less than 20 seconds. Less than 5% of calls abandoned	80% of calls answered in less than 20 seconds. Less than 5% of calls abandoned	80% of calls answered in less than 20 seconds. Less than 5% of calls abandoned
Complaint Handling	Time based	90% resolution or understood steps to resolution within 5 working days	100% resolution or understood steps to resolution within 5 working days	100% resolution or understood steps to resolution within 5 working days	100% resolution or understood steps to resolution within 5 working days
Supply Interruption	Advanced Notice	Not established	Minimum 2 day advanced notice of planned interruption	Minimum 2 day advanced notice of planned interruption	Minimum 2 day advanced notice of planned interruption
Billing & Payments	Meet CER's requirements	Accurate quarterly bills based on actual reads (for metered customers) Range of customer focused payment options available Sympathetic handling of payment difficulty cases			

# Chapter 4

Objective:

# Ensure a Safe and Reliable Water Supply



## Our Strategic Aims

- Manage the sustainability and quality of drinking water from source to tap to protect human health.
- Manage the availability, sustainability and reliability of water supply now and into the future.
- Manage water supplies in an efficient and economic manner.

### Introduction

Safe and reliable water supplies are essential to public health and to social and economic progress. The water we need must be abstracted from surface or groundwater sources and treated to a high standard before it is distributed through an extensive network of water mains to households and businesses.

This chapter details the current situation in regard to water supply, the challenges that Irish Water faces and our strategies for tackling these challenges. These strategies are arranged around three key requirements of:

- **Quality;**
- **Sustainability and Reliability; and**
- **Managing Water Supplies in an Economic and Efficient Manner.**

Performance targets against these key requirements are also presented.

### The Current Situation

Delivering a safe and reliable drinking water supply to over 80% of the population requires the abstraction, treatment and delivery of over 1,600 million litres of water each day. Water is delivered to each tap from a water supply zone. This is a defined supply area served by a single source or group of connected sources. Treated water is processed and transported from the water source through to each tap. The system serving the water supply zone includes one or more abstractions (where water is taken from - lake, river or groundwater), treatment plants to purify and disinfect the water, storage in a tank or reservoir and distribution through pipes. A graphical representation of a water supply zone is presented in Figure 5. There are currently around 900 separate water treatment plants and approximately 60,000 km of pipelines delivering water in Ireland.

Water supply zones were historically developed within local authority boundaries rather than on a river basin or regional level. This fragmentation has resulted in a large number of small water treatment plants and water supply zones and a highly variable performance ranging from good operation in newer treatment and distribution infrastructure (e.g. pumps, plant and pipes) to periods of unacceptable performance in older systems. Smaller water sources are also susceptible to sporadic and seasonal variations in water quality and availability.

### Our Main Legal Obligations

Legislation in relation to water services and public health dates back to the last century. The water quality standards which our treated water supplies must now meet are set by the European Drinking Water Directive and transposed into law in Ireland through the European Union (Drinking Water) Regulations, 2014. Enforcement of these regulations is the responsibility of the EPA. Amongst other requirements, the regulations set the limits of concentrations for a range of chemical and microbiological parameters in water intended for human consumption. Under the drinking water regulations, Irish Water must notify the EPA of non-compliances with these parameters. Parameters which do not impact on the wholesomeness or cleanliness of water intended for human consumption, such as colour or hardness, are not included as a required standard within the Drinking Water Directive.

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The abstraction of water from any lake, river, stream, well, or spring by a sanitary authority (Irish Water has the status of a sanitary authority) for a public water supply is governed by the Water Supplies Act, 1942. This Act requires a sanitary authority wishing to abstract water for public supply to apply to the Minister (now ABP) for a water abstraction order. When determining (i) whether or not the sanitary authority can take a supply; and (ii) the volume; and (iii) abstraction rate for that supply, ABP must consider the potential impact of the abstraction on riparian owners, on the water body itself and on the navigability of navigable rivers or canals. ABP may refuse the granting of an abstraction order or alter the terms of the abstraction. The Water Supplies Act, 1942 also allows the sanitary authority to protect the source of their abstraction from pollution or interference with the flow.

Our commitments in relation to the Birds, Habitats and Water Framework Directives are detailed in the Chapter 6 – Protect and Enhance the Environment and generally relate to the preservation of sustainable ecological flows in water bodies from which we abstract and ensuring that the construction and operation of our water supply infrastructure does not impact negatively on protected areas and species.

## Key Challenges

The challenges which face Irish Water to ensure a safe and reliable water supply to all its present and future customers are summarised in the paragraphs below.

There are currently many water supply zones which fail to meet the European and Irish Drinking Water standards for microbiological and chemical parameters or have significant operational, maintenance or capacity problems at individual treatment plants, giving rise to water quality risks. This includes customers who have a Boil Water Notice due to microbiological contamination in their water supplies (approximately 23,000 customers in January, 2014). This situation is unacceptable to us and addressing it is our top priority.

Protection of water sources from contamination ensures safe water supply and reduces treatment costs. However, the protection of individual water supply sources has to date been variable and risk based assessments to determine and prioritise protective measures have not been completed for all water supply sources.

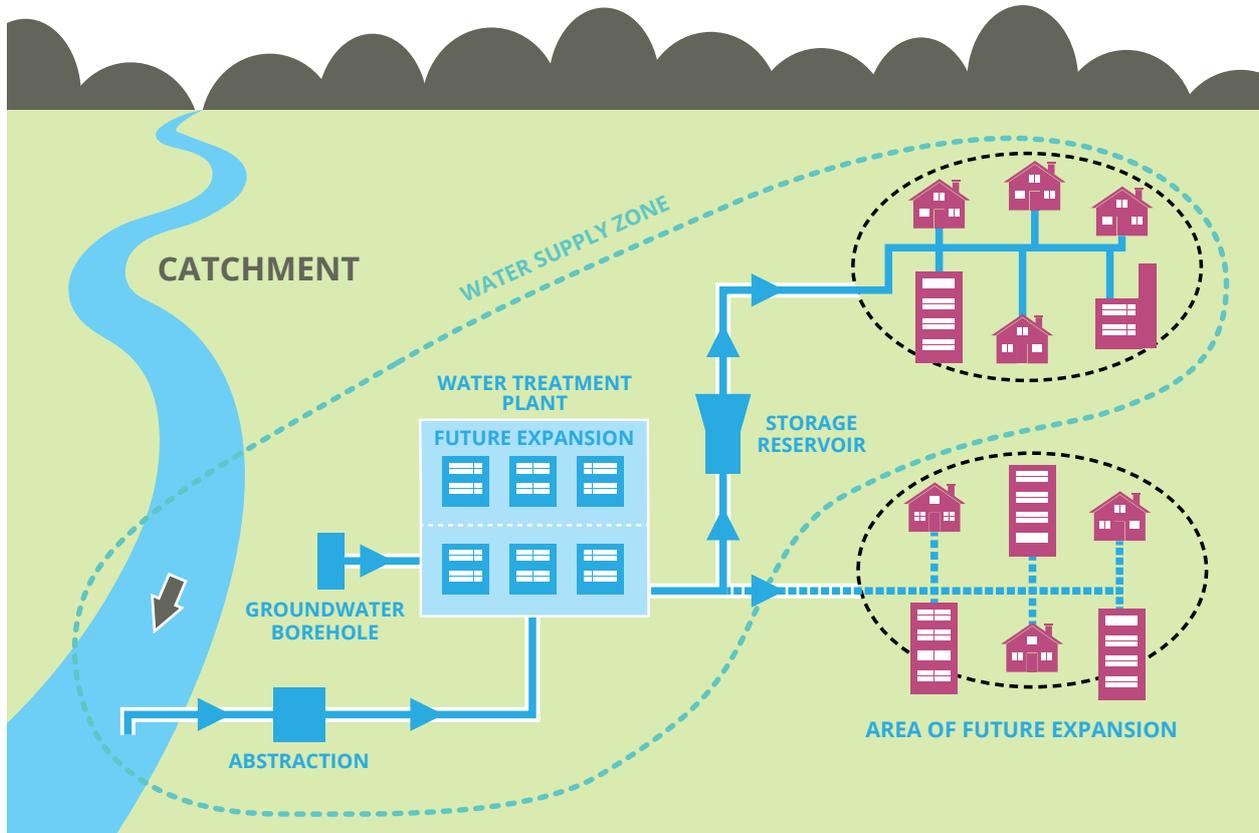
Water resources for supply have not, previously, been managed on a catchment, regional or national basis. Therefore, we have urban regions such as Dublin where there is a potential shortage of future water resources whilst in the west of Ireland there are catchments with a surplus of potential available resources but a deficit in treatment provision.

No national rules are in place to ensure correct, safe and efficient operation of our treatment plants, storage and distribution network. In some areas there is limited knowledge of the condition, lifespan and location of our above and below ground assets (e.g. treatment plants, pipes, valves and other infrastructure).



*Water Treatment Plant Pipework. Photo: Maurice O'Connell*

**Figure 5** Graphical Representation of a Water Supply Zone



Water flows through pipes at pressure from the treatment works to each household tap. We currently estimate that nationally we are losing approximately 49% of our treated water to leakage from the distribution network and in customer properties. This is unacceptable and reducing this level of leakage is a priority. However, with an underground network of ageing pipes and with a pressurised system including thousands of joints vulnerable to ground conditions and traffic vibrations it will never be possible to reduce water leakage to zero. Instead, our intention is to apply a best practice asset management approach in an economic and efficient manner in order to achieve the optimum water savings to achieve a sustainable and economic level of leakage. The metering of domestic and commercial properties will aid the detection of leaks within the customer's property and alert customers to the wastage of water on their property with the potential to reduce their water bills.

Water supplies also face a range of challenges from external factors outside of Irish Water's control such as climate change and the need to maintain sustainable resources by balancing abstraction against environmental needs.



*Ballymore Eustace Water Treatment Plant. Photo: Irish Water*

## Case Study

# Vartry Water Supply, a City Perspective

Prior to the 1860's in Dublin, most drinking water was sourced from the Royal and Grand Canals. The canals were poor water sources, offering limited supplies of low pressure, filthy water.

***"Drink the canal water as it is and you swallow filth and animal nature; boil it and you drink a decoction of poison"*** wrote one Dubliner of the day, Walter Thomas Meyler. The poor quality of drinking water in the city, resulted in large scale outbreaks of cholera and in the 1860's over a thousand deaths were traced directly to a single public water tap in Dublin which was contaminated with sewage. In 1852, an eminent doctor John Gray, was elected to Dublin City Council where he gained a reputation for his interest in improving the lot of the impoverished. In 1853 he was elected to the Waterworks Committee, and began work on improving the water supply for Dublin. He identified the River Vartry rising below the Sugar Loaf Mountain in County Wicklow, as the best potential source for the city. He sought to have a Parliamentary Bill passed to empower Dublin Corporation to advance the works, however, he faced wide scale objections from the private owners of the canals and there was outcry in the media at the high cost of the works and the volumes of water proposed. The Bill was debated for nearly five weeks and the first stones were turned on site in 1862. The Vartry Supply involved building two

major reservoirs to the south of Roundwood in Co. Wicklow, a water treatment plant, a 2.45 mile long tunnel under Callowhill, and forty miles of trunk water mains to deliver water to the city. The project was an amazing feat of engineering, with the works completed by men using picks and shovels, horses and carts.

The new supply project resulted in significant improvements in the quality of life for the inhabitants of Dublin. In terms of public health, the last major outbreak of dysentery was recorded in the late 1860's and the Vartry scheme dramatically reduced the scourge of waterborne disease in the city.

As a testimony to the success of the project, the original Vartry supply still provides drinking water for 200,000 people or 15% of the population of the Greater Dublin Area. However, the treatment plant and infrastructure has had no major upgrade since it was first built over 150 years ago, and the supply is now in decline. The water treatment plant does not conform to modern drinking water regulations, the tunnel is in danger of collapse, and the reservoir draw-off facilities need a to be re-built to ensure the safety of the structure. The upgrading of the Vartry Water Supply is likely to be addressed in Irish Water's National Water Resources Plan and future Capital Investment Plans.



Vartry Water Treatment Plant. Photo: Nicholas O'Dwyer.



Statue of Dr John Gray in O'Connell Street, Dublin.

Photo: Irish Water

## What our customers can expect from us

We will develop and implement strategies underpinned by 'on the ground' measures to meet water quality standards, ensure water availability and provide an acceptable level of service to our customers. We will monitor and report our compliance with these strategies.

## Objectives and Strategies

The proposed strategies and performance targets to achieve this objective are summarised in the table below and are detailed in the remaining sections of this chapter.

Strategy	Purpose
<b>Aim WS1 - Manage the sustainability and quality of drinking water from source to tap to protect human health</b>	
WS1a	Prepare a National Water Resources Plan and implement on a phased basis.
WS1b	Prepare and implement Drinking Water Safety Plans for all Water Supply Zones.
WS1c	Implement Standard Operational Procedures for all water treatment plants, water storage facilities and distribution networks.
WS1d	Develop and implement Capital Investment Plans to improve drinking water quality
WS1e	Prepare and implement a "Lead in Drinking Water Mitigation Plan".
WS1f	Prepare and implement strategies to manage other quality issues in water supplies.

Strategy	Purpose
<b>Aim WS 2 – Manage the availability, sustainability and reliability of water supply now and into the future</b>	
WS2a	<p>Implement risk assessments for all water supply areas in terms of short, medium and long term risks to customer supply.</p> <p>To ensure that water supply areas have quantified risk assessments and appropriate mitigation measures are in place.</p>
WS2b	<p>Manage existing water resources and plan for new resources taking a regional view of needs and having regard to the objectives of the Water Framework Directive (WFD).</p> <p>To ensure long term sustainability of yields is considered in the management of existing and new water sources to meet predicted needs while being aligned with the requirements of the WFD with respect to maintaining sustainable ecological flows.</p>
WS2c	<p>Develop long-term sustainable water sources with resilience to climate change.</p> <p>To ensure all new sources are able to cope with the potential impacts and risks from climate change.</p>
WS2d	<p>Develop methodologies to build strategic resilience and network connectivity into resource planning.</p> <p>To ensure that all water supply zones have built in security and reliability, by developing larger scale regional solutions which offer better governance, economies of scale in operation and can be monitored effectively</p>
WS2e	<p>Manage future regulatory requirements for abstraction licencing, headroom in treatment facilities and population growth.</p> <p>To ensure security in Levels of Service for all customers which take account of impacts from future regulation and population growth.</p>
WS2f	<p>Match water abstraction to availability and quality using surface water and groundwater sources. This is known as Conjunctive Use.</p> <p>To ensure Levels of Service for all customers accounting for seasonal and climate change variations, maximising source resilience.</p>
WS2g	<p>Prepare Regional Water Conservation Strategies and implement on a phased basis.</p> <p>To reduce water leakage to a sustainable economic level in stages through a systematic work programme over a reasonable period.</p>

Strategy	Purpose
<b>Aim WS3 – Manage water supplies in an efficient and economic manner</b>	
WS3a	Adopt an asset management based approach to capital maintenance and capital investment.
WS3b	Optimise the unit cost of water supply through proper water resource and treatment planning.
WS3c	Prepare and implement water demand management and customer education strategies.
WS3d	Optimise capital and operational investments in water supply.

## **WS1: MANAGE THE SUSTAINABILITY AND QUALITY OF DRINKING WATER FROM SOURCE TO TAP TO PROTECT HUMAN HEALTH**

### **[WS1a] Prepare a National Water Resources Plan and implement on a phased basis.**

A National Water Resources Plan is a country wide assessment of water resource availability and water demand. The plan will assess the likely future demands of our customers and balance these needs against availability and sustainability of water for supply on a catchment and river basin scale. The plan will then make strategic level recommendations for the development of water supply infrastructure to meet the demands of population and economic growth in a sustainable manner. The plan will take a regional perspective supporting balanced regional development and will include for inter-region or inter-catchment water transfers where required to ensure adequate water provision into the future. Any such transfers must be environmentally sustainable and therefore cannot compromise the needs of the local catchment or region.

Our National Water Resources Plan will focus on efficient, environmentally sustainable use of water and providing for reliability and security of supply (system resilience). We will improve or decommission water sources which are at risk from contamination or low flows or are causing avoidable environmental impacts.

The plan will also include strategies for addressing water quality issues related to pesticides, trihalomethanes (chemical compounds formed when chlorine used to disinfect drinking water reacts with organic matter) and sludges resulting from water treatment processes (See EN3c).

The plan will also include cost-effective measures to transfer water from areas that have plentiful water resources to those which have insufficient supplies to meet current demand and to support growth, ensuring that this approach meets sustainability criteria and supports balanced regional development in line with national and regional planning policy.

We are targeting a rationalised approach towards fewer larger water supply zones based on sustainable water sources to provide effective, consistent service, quality and value for money to our customers.

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## **[WS1b] Prepare and implement Drinking Water Safety Plans for all of our Water Supply Zones.**

Drinking Water Safety Plans (DWSP) seek to protect human health by managing risks to water quality taking a whole catchment approach to manage risks from source through to the tap. Protection of the water source is a priority component of this risk management as ensuring a high quality source of raw water can be the most effective way of reducing the cost of water treatment. The plans assess the risks of contamination of water sources and propose mitigation measures to minimise these risks. They then propose appropriate treatment processes and preventative measures for contamination risks in the water distribution system. Both the World Health Organisation (WHO) and the EPA strongly endorse the Drinking Water Safety Plan approach to managing drinking water supplies effectively in the interests of public health.

Irish Water will prepare DWSPs for all water supply zones (WSZs). All DWSPs will use an approach which is in accordance with the WHO guidelines and will ensure that protection and controls are put in place to meet health based standards. DWSPs will also consider the longer term impacts of climate change on the water sources.

We will categorise each WSZ on the basis of risk, focusing on those with the greatest risk of water quality failure. We have created data capture and management systems to assess risk and support DWSP development. We expect that these pro-active plans will take over from the reactive 'Remedial Action Lists' used successfully by the EPA up to now as the key drivers of investment in and operational management of our water supplies.

We will engage with all stakeholders, including landowners and the local authorities, in the development and implementation of measures aimed at delivering effective improvements in the quality of raw water within each catchment supporting good quality raw water sources. This approach will contribute towards sustainability and environmental gains, and potentially have a positive impact on both the cost of treating water and sustainability of yields from the catchment.

The categorisation of the water supply sources nationally using DWSP's will support the phased implementation of the National Water Resources Plan and inform where water sources should be abandoned or combined and also where treatment must be upgraded and centralised to meet water quality standards.

The implementation plan for DWSPs will be published in the first quarter of 2016 covering 135 WSZs and a subsequent programme will be published in 2021 covering the remaining WSZs.

## **[WS1c] Implement Standard Operating Procedures for water treatment facilities, water storage facilities and distribution networks.**

Standard Operational Procedures (SOPs) are written rules and processes for the correct operation of water treatment plants to ensure safe water supply and efficient operation. The procedures will be prepared by reference to best international practice, tailored for Irish conditions and will include staff training and maintenance regimes for all of our treatment plants, water storage facilities and distribution networks.

Irish Water will develop 'Asset Needs' briefs for each plant which will detail the improvements required to meet the SOPs. These documents will then inform the Capital Investment Plans. We will immediately address those failures which can be removed by implementing changes to plant operations or through our minor capital programmes.

We will update and maintain Drinking Water Incident Response Plans. These plans document the procedures, processes and information to support the management of a drinking water incident (unexpected event). The plans assess the risks and assign responsibilities in the event of an incident. They identify the correct communication channels and enable site and event specific arrangements to be made efficiently and effectively.

We will also work with relevant statutory bodies in support of 'A Framework for Major Emergency Management' as published by the Inter-Departmental Committee on Major Emergencies. We will develop and maintain an Emergency Response Plan, in accordance with the framework, so that Irish Water can respond when called upon in the support of the principal response agencies in reacting to and managing major emergencies.

## [WS1d] Develop and implement Capital Investment Plans to improve drinking water quality.

As we improve our knowledge of our assets, collect and interrogate data we will build up a greater understanding of our abstractions, treatment plants and distribution systems and how inadequacies in their operation, maintenance and condition contribute to water supply quality problems. We will then be able to prioritise our investment plans on the basis of risk.

We are presently implementing solutions to urgently address immediate inadequacies in water supply provision and Irish Water has developed a work plan for all schemes which are currently failing to comply with microbiological or chemical quality standards.

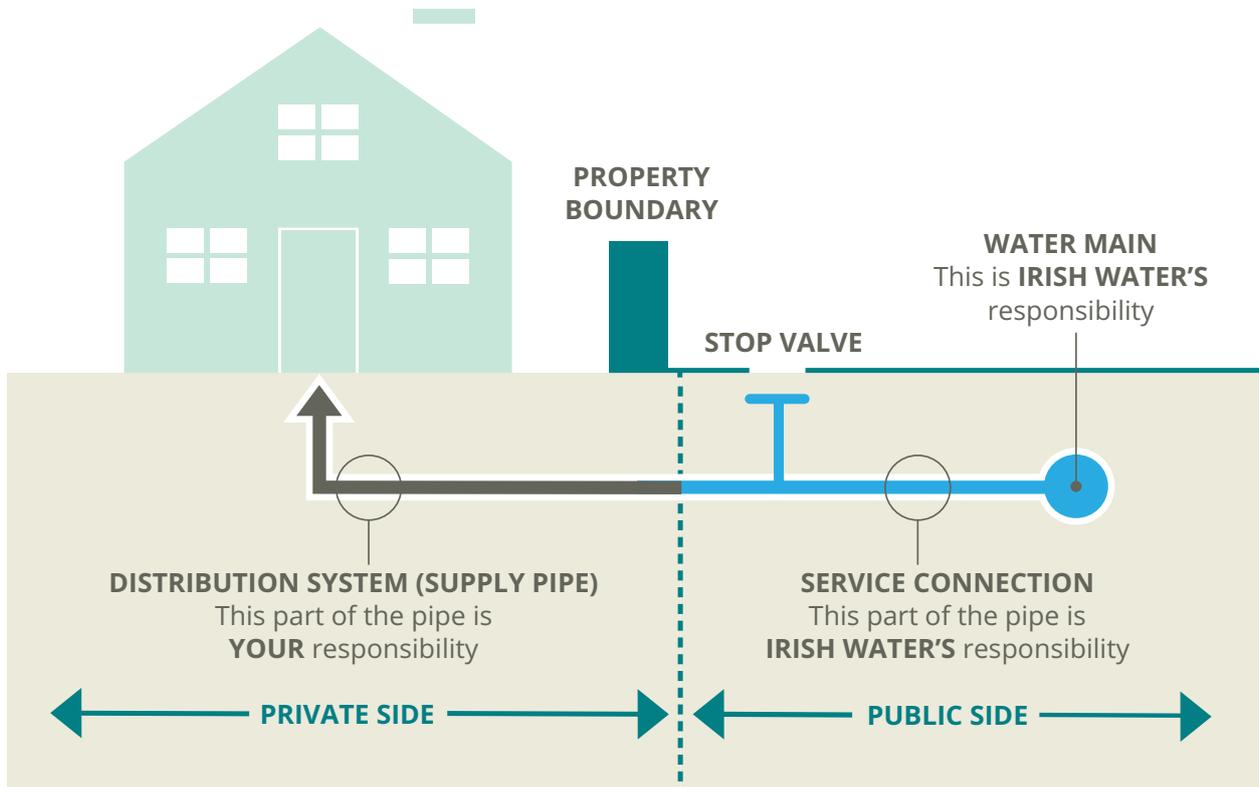
## [WS1e] Prepare and implement a Lead in Drinking Water Mitigation Plan.

The use of lead pipes and conduits in water supplies has been documented from Roman times. In Ireland water service connection pipes, storage tanks made of lead, lead supply pipes and internal plumbing were used in construction up until the early 1970s. Therefore, it must be assumed that the majority of older houses and public buildings may have lead supply pipes and internal plumbing, except where it has been replaced.

Lead can be absorbed into solution in water from lead pipes and the solubility (plumbosolvency) is a function of the water chemistry. Drinking water treatment usually includes pH adjustment (typically using lime) in order to reduce lead solubility, but this is only partially successful. Internationally, other chemical treatments are used which deposit a coating on the pipe wall inhibiting the solution of lead into the water.

The acceptable concentration of lead in drinking water is 10 µg/litre, based on standards set by the EU Drinking Water Directive, with effect from December, 2013. Prior to that date, the standard was 25 µg/l, down from 50µg/l in 2003. The general health advice, echoed by both the EPA and HSE, is that the preferred option for meeting this standard is full removal of lead from the distribution network (both public service connection pipes and private supply pipes and plumbing), but achieving this will inevitably take a considerable period of time.

**Figure 6** Extent of Responsibility for Household Connection Pipe



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The Irish Water website provides advice to customers on lead, including the HSE and EPA Joint Position Paper – Lead (Pb) in Drinking Water, December 2013 which is available from the following link (<https://www.water.ie/support/questions-and-answers/lead-pipes-information-for-customers/>).

Irish Water is responsible for public service connection pipes up to the site boundary as shown in Figure 6. Householders are responsible for the supply pipe from outside the site boundary and internally in the property.

Irish Water is currently surveying the extent of lead pipework in our system and mapping it into our Geographic Information System (GIS) using data from the metering project and local authority surveys of backyard supply pipes.

Based on currently available data, we estimate that there are some 160,000 domestic properties with lead service connection pipes. There are also a further 30,000 to 40,000 domestic properties which have shared supply pipes and a proportion of these are lead pipes.

IW is currently developing a Lead in Drinking Water Mitigation Plan which will include the replacement of lead service connection pipes over a 10 year period and consideration of other feasible technological alternatives to reduce lead in drinking water as quickly as possible in the short term. We aim to have this strategy in place by early 2016.

We will notify households of lead exceedances in their water supply and advise households with lead supply pipes on flushing protocols and replacement options. We will also advise our customers on the appropriate Domestic Plumbing Standards Policy based on international best practice. Where a customer decides to replace their (private side) lead supply pipe, we will commit to replace the (public side) service connection pipe at the same time, if this has not already been done.

### **[WS1f] Prepare and implement strategies to manage other quality issues in water supplies.**

Drinking water must comply with standards set by the Drinking Water Regulations (2014) and the strategies for meeting these standards are presented above. We will also identify water supplies that suffer from water quality issues which do not have required standards under the Drinking Water Regulations such as water hardness and discolouration due to natural sources. These problems can cause concern to customers and excessive hardness in particular can cause damage to hot water appliances. However, neither hard water nor the substances associated with hard water, such as lime, calcium and magnesium, require the restriction of a supply nor do they make water unfit for human consumption.

We will continue to review our treatment processes to ensure optimum removal of colour, iron and manganese compounds and dissolved solids leading to colour. We also recognise that colour and turbidity often arise from changes in flow in old mains (notably iron pipes) and we will work to minimise this, recognising that relining or replacement of these is a long term objective. While treatment to reduce hardness in water supply is not currently a priority, it may be considered in severe cases by the CER when priority compliance issues have been addressed.

## **WS2: MANAGE THE AVAILABILITY, SUSTAINABILITY AND RELIABILITY OF WATER SUPPLIES NOW AND INTO THE FUTURE**

### **[WS2a] Implement risk assessments for all water supply zones in terms of short, medium and long term risks to customer supply.**

Water sources can be susceptible to changes in river flows or lake and groundwater levels. We will prepare risk assessments for all water supply sources to determine short, medium and long term risks to water supply capacity. Based on these risk assessments, we will identify and develop our plans for sustainable water sources nationally. Measures to achieve this will include rationalisation of water supply zones to utilise larger sources and interconnection of networks to ensure security of supply.

Risk assessments of all water supply zones will be completed by the end of 2017.

**[WS2b] Manage existing water resources and plan for new resources taking a regional view of needs and having regard to the objectives of the Water Framework Directive (WFD).**

The WFD promotes a holistic approach to the management of the water environment where all stakeholders work together. Working with the EPA, we will seek to balance the volume of our abstractions and the locations where we abstract water with the needs of the ecology supported by the water environment. We will identify opportunities for co-operation on the development of catchment management initiatives that will increase protection of drinking water sources.

This will form a key part of the National Water Resources Plan and Drinking Water Safety Plans with the initial identification of appropriate measures aligned with the requirements of the WFD being completed by the end of 2017.

**[WS2c] Develop long-term sustainable sources with resilience to climate change.**

It is important that our water treatment and distribution systems are able to cope with impacts from both short term extreme weather events and longer term changes to water resources.

Climate change studies indicate that extreme weather events such as droughts and flooding resulting from intense or prolonged rainfall could become more common in the future.

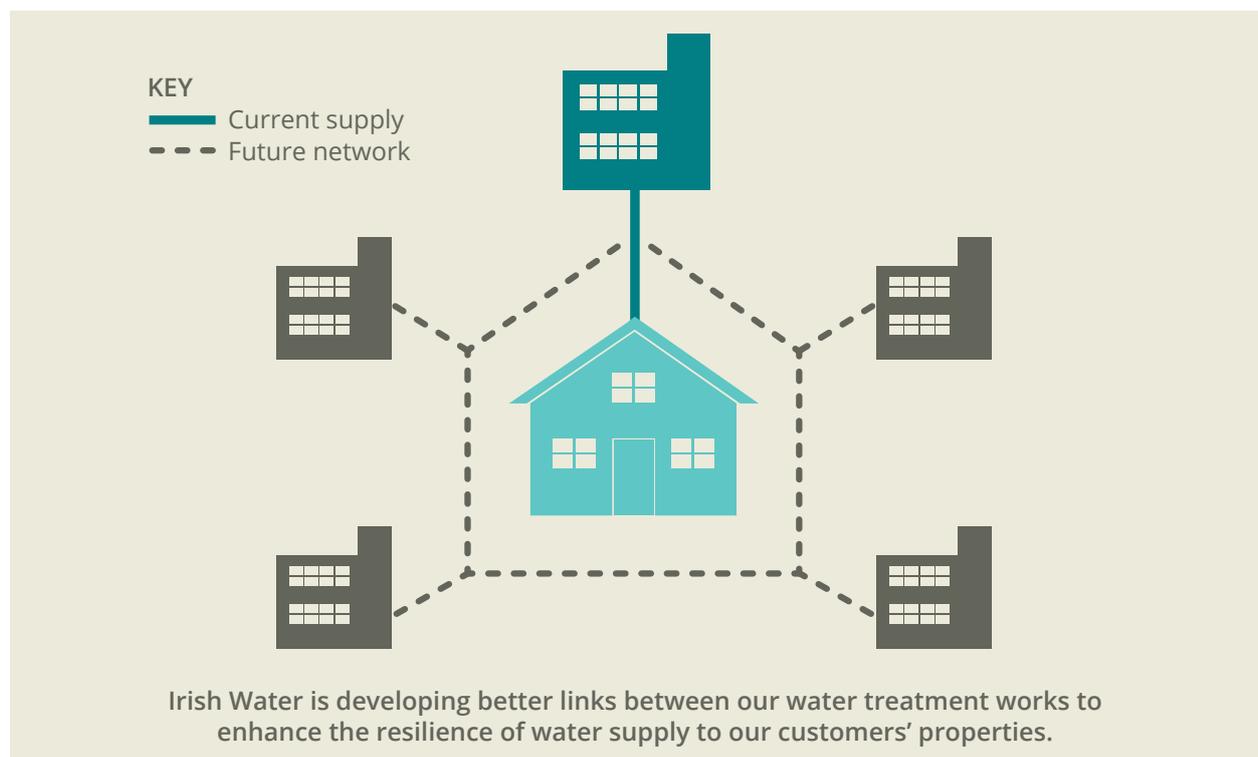
Irish Water will seek to develop new water sources and mobilise additional sources to support those at risk, in order to make our supplies resilient to potential climate change impacts.

**[WS2d] Develop methodologies to build strategic resilience and network connectivity into resource planning.**

Water supply zones that are reliant on a single source, water treatment plant or storage, are more vulnerable to short or longer term service interruptions due to contamination of a source or failure in a treatment process.

We will seek to interconnect water supply zones, where possible, or to develop back-up sources and treatment and storage facilities to ensure reliability and resilience in water supply. This will take account of the risk and impacts of supply failure and its mitigation will be a function of criticality and cost, taking account of funding available.

**Figure 7 Graphical Representation of a Strategic Water Supply Network**



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## **[WS2e] Manage future regulatory requirements for abstraction licencing, headroom in treatment facilities and population growth.**

We will work with the EPA and the Department of the Environment, Community and Local Government to manage the regulation of our water abstractions, on the assumption that new national regulations for abstractions are likely to be introduced in the near term. In respect of any new regulations, our paramount consideration will be to ensure that Irish Water can maintain supplies to its present and future customers.

The headroom capacity in some water treatment facilities, particularly in the Dublin area, is at critical levels. Irish Water has a target to maintain headroom capacity in the 10-20% range to ensure resilience of supply to meet peak demands, population growth and other demand increases. Where the scale and economic impact of supply failure is high, or the consequences to vulnerable customers would be significant, we believe that the available headroom should be at the upper end of this range, 20% over current daily need in large urban areas, 15% in regional gateway towns and 10% elsewhere.

## **[WS2f] Match water abstraction to availability and quality using surface water and groundwater sources.**

Irish Water will take a full part in the process of developing river basin management plans and related programmes of measures to protect water sources from catchment impacts. These can include runoff from agriculture, forestry, tourism or other activities. Drinking water supplies are particularly vulnerable to organic pollution (leading to algal blooms) but also to other compounds such as metals, chemical or pharmaceutical residues.

Within our water safety plans, we will include consideration of these risks and their mitigation. Depending on the level of risk, this may require consideration of mitigation measures such as temporary shut-down or interconnection of multiple sources, where practicable.

## **[WS2g] Prepare Regional Water Conservation Strategies and implement on a phased basis.**

Leakage is an immediate priority for Irish Water. Irish Water currently estimates that, nationally, 49% of water produced is lost to leakage, with the leakage lowest in the Greater Dublin Area and greatest in rural schemes with relatively long pipeline lengths per customer served.

We are currently carrying out detailed audits across the country and validation of the local area metering and valve controls forming District Meter Areas (DMAs) which have been installed since 2000 in most local authorities at a cost of over €100M. In many cases, the integrity of DMA boundaries has been compromised for local operational reasons so that accurate leakage calculations and leak targeting are not currently possible. We are working to re-establish the DMA infrastructure as a pre-requisite to a large scale programme of water conservation measures, which we plan to deliver on a regional basis.

We will prepare Regional Water Conservation Strategies that will deliver a targeted programme of leakage detection, leakage control, pressure management and leakage repair. This work will be implemented in a continuous programme over a number of investment cycles to bring leakage down and maintain it at sustainable economic levels. We will introduce pressure management measures and replace or rehabilitate water pipelines as required.

We estimate that 10% of our domestic customers have significant leaks, divided between internal leaks on fittings or plumbing and leaks on their external supply pipes. Our metering programme and our 'First fix' programme will assist in repairing the external leaks and will also encourage the repair of internal leaks by customers. We will analyse domestic metering data returns to build up a better picture of water usage and review demand calculations in all water supply zones during 2015 and 2016.

We plan on reducing leakage across all schemes to less than 38% by the end of 2021, 30% by the end of 2027 and will work to achieve a sustainable economic level of leakage, by 2040. Experience from the UK indicates that an economic level of leakage is in the region of 18-22% of water treated.

## **WS3: MANAGE WATER SUPPLIES IN AN EFFICIENT AND ECONOMIC MANNER**

### **[WS3a] Adopt an asset management based approach to capital maintenance and capital investment.**

Irish Water assets comprise our rights to abstract water from specific water bodies our reservoirs, extensive pipe networks, pumping and storage systems, treatment plants, buildings and other equipment. We recognise that robust and reliable information on the condition of our water assets, capacity and their future lifespan is vital to inform future investment plans and to ensure that assets are replaced or upgraded when necessary.

We have developed a national Geographic Information System (GIS) into which all of the available water network information from the local authorities has been mapped. This is reasonably comprehensive for the public water mains following major surveys as part of water conservation studies over the past 10 years. Where data is available, it is not always complete with regard to the size, material, condition or age of assets, all of which is useful information. The presence and location of fittings (valves, hydrants, manholes) and connections is also very important. Ongoing surveys will be needed to upgrade and increase the reliability and value of these asset datasets.

### **[WS3b] Optimise the unit cost of water supply through proper water resource and treatment planning.**

Minimising the unit cost of delivering water to the customer whilst meeting environmental compliance will result in the rationalisation of water supply areas over time and, subject to funding ability, will focus on a smaller number of high quality, sustainable sources with standardised treatment processes. This rationalisation approach will be developed within the National Water Resources Plan by the end of 2017.

### **[WS3c] Prepare and implement demand management and customer education strategies.**

Demand management encompasses activities to manage the use of water as a sustainable resource whilst protecting the environment.

As the Regional Water Conservation Strategies referred to in [WS2g] are implemented, the focus on customer demand management in combination with reduced leakage will ensure costs for water abstraction, treatment and distribution are reduced. Demand management will be facilitated through the domestic metering programme, with water use figures provided on quarterly bills and the potential for customer savings for low water use.

We will support education on water usage to encourage reduced water demand across both domestic and commercial water users. This will focus on the 'value of water' and how our actions and activities impact on our water demand and the implications for the environment, levels of service and costs to customers. The introduction of meters to measure domestic water usage at individual properties will facilitate this.

We will promote the reuse of grey water and water efficient domestic appliances, plumbing and fittings. We will also prepare and enforce standards on plumbing and fittings in relation to connection agreements. We will provide specific advice to our commercial and industrial customers on how to reduce water usage, thereby assisting our drive towards minimising abstraction.

### **[WS3d] Optimise capital and operational investments in water supply.**

We will develop detailed cost benefit analysis and prioritisation models for all strategies and projects that deliver best value for our customers and satisfy our regulators (CER and EPA). The assessment of capital investment projects will follow a process with key decision points and detailed options assessment to ensure that the most cost effective alternatives are selected.

Within the project planning and development process, we will engage with all stakeholders including regulators, planning authorities, landowners, fisheries, our customers and other interested parties and work with all concerned in a collaborative basis. This will assist towards delivering our projects and programmes in a timely and efficient manner, minimising add-on costs.

## Indicators and Targets

Indicators and targets for ensuring a safe and reliable water supply are presented in the table below.

ENSURE A SAFE AND RELIABLE WATER SUPPLY					
Indicators	Definition	Current Baseline	End of 2021 Target	End of 2027 Target	2040 Target
AIM WS1	Manage the Sustainability and Quality of Drinking Water from Source to Tap to Protect Human Health				
Drinking Water Microbiological Standards	% of national samples meeting microbiological compliance standards	99.82% (based on currently available data)	 99.99%	 99.99%	 99.99%
Boil Water Notices	 Notices in place >200 days	 23,000 people on notices (2014)	0 people on notices	0 people on notices	0 people on notices
Treatment Plants on the EPA 2013 RAL	Carry out Remedial Action at all WTPs on the EPA's 2013 RAL	126 WTPs on the 2013 RAL (list Appendix 1)	100% of required remedial action undertaken		
Drinking Water Lead standards	% of national samples meeting Lead Compliance Standards sampled in the public network.	 Estimated 85–95% meeting standard of 10µg/l*	 98% meeting standard of 10µg/l**	 99%**	 99.5% meeting standard of 10µg/l
Drinking Water Chemical Standards	% of national samples meeting chemical compliance standards	 99.51% (based on currently available data)	 99.75%	 99.90%	 99.90%
Drinking Water Trihalomethane Standards	% of national samples meeting THM compliance standards	 90.3% (based on currently available data)	 93%	 99%	 99.50%
<p>* To be established through a comprehensive national monitoring programme  ** Based on technological alternative to lead replacement being available</p>					

ENSURE A SAFE AND RELIABLE WATER SUPPLY					
Indicators	Definition	Current Baseline	End of 2021 Target	End of 2027 Target	2040 Target
AIM WS2	Manage the Availability, Sustainability and Reliability of Water Supplies Now and into the Future				
Water Supply Interruptions	Average hours of supply interruption per property served (per year) - hours lost due to water supply interruption for 3 hours or longer (planned or unplanned)	 Not currently available. To be defined by end of 2016	 Transition from unplanned to planned supply interruptions with targeted reduction in number of interruptions	 On track to achieving long term target	 0.13 hours lost per annum - planned and unplanned interruptions
Water Pressure	% of properties at or above reference level (minimum of 15 metre pressure head at property meter)	 Not currently available. To be defined by end of 2016.	 From 2019, 2% per annum decrease in properties below pressure reference level	 On track to achieving long term target	 99.9% receiving appropriate pressure
AIM WS3	Manage Water Supplies in an Efficient and Economic Manner				
Leakage	Leakage expressed as a % of treated water put into the distribution system	 Approx. 49% of treated water	 Less than 38% of treated water	 Less than 30% of treated water	 Achieve Sustainable Economic Level of leakage <small>(*currently considered 18 to 22% in the UK)</small>
National Water Resources Planning (NWRP)	Implement National Water Resources Plan	Large number of small unsustainable Water Treatment Plants (WTPs) (Circa 900 in total). (Define the appropriate number of WTPs based on NWRP to be developed and implemented by 2018)	Rationalisation of WTPs & Water Supply Zones. Target reduction to 780 WTPs.	Continue programme of rationalisation base on cost benefit and available funding	Fully implement NWRP target for optimum number and scale of water treatment plants

# Chapter 5

Objective:

# Provide Effective Management of Wastewater



## Our Strategic Aims

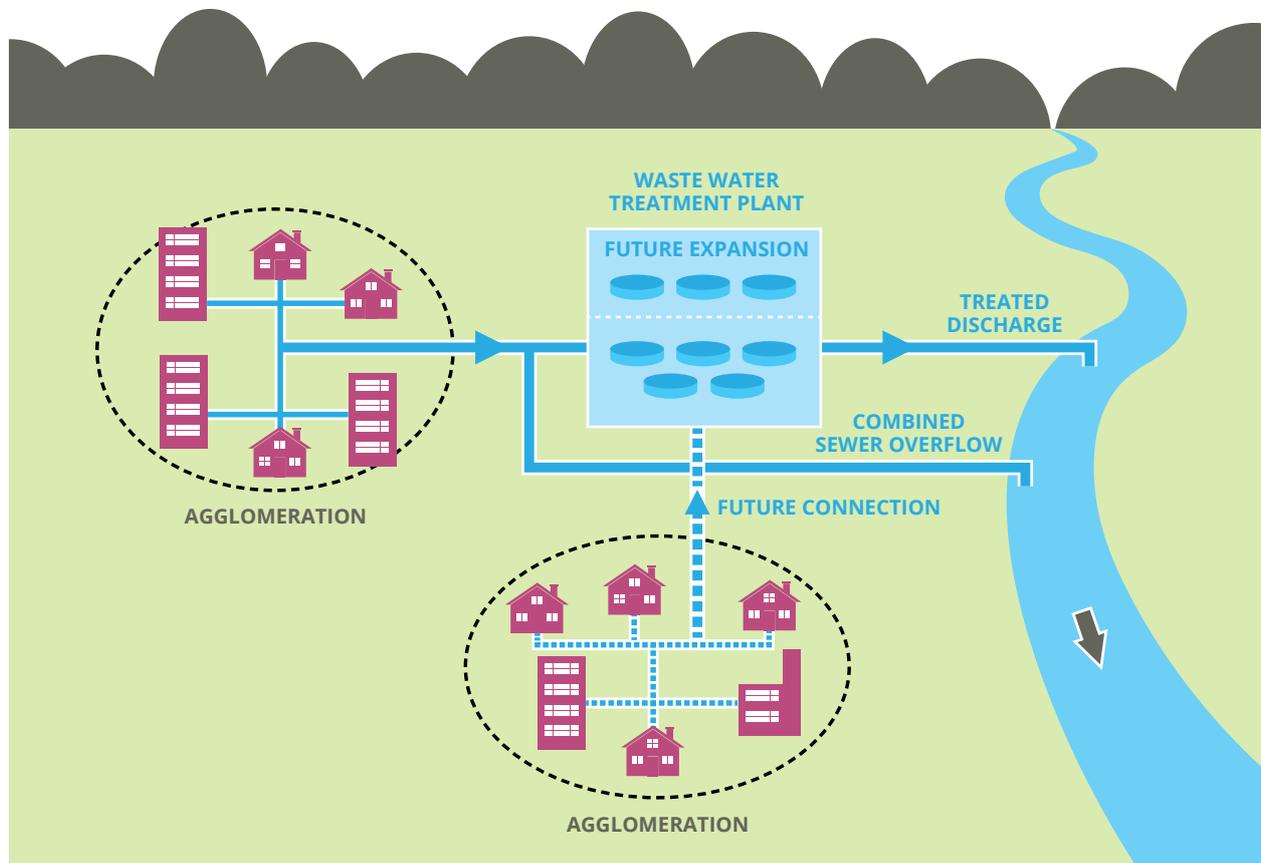
- Manage the operation of wastewater facilities in a manner that protects environmental quality.
- Manage the availability and resilience of wastewater services now and into the future.
- Manage wastewater services in an efficient and economic manner.

### Introduction

Providing an effective wastewater management system for the collection and treatment of effluent is essential to protect the environment and public health. The treatment of wastewater to appropriate standards prior to its discharge to watercourses safeguards water used for drinking water abstraction, bathing, fishing and other recreational activities. A graphic illustrating the elements of a wastewater management system is presented below.

This chapter details the current situation in terms of wastewater management, the challenges that Irish Water faces and our strategies for tackling these challenges. Performance targets against which our future progress can be assessed are also presented.

**Figure 8** Wastewater Management System



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## The Current Situation

Over 1,000 separate wastewater treatment plants and collection networks currently process our wastewater in Ireland. While some of our wastewater treatment plants have enough capacity to cope with their effluent loads, others do not. We have many smaller communities and a number of large coastal urban centres without any effective wastewater treatment. In addition, many communities are served by individual septic tanks or private treatment plants that are outside the scope of Irish Water's remit.

Under the previous funding model, investment in wastewater collection and treatment was the responsibility of the local authorities. This approach engendered a local focus rather than a regional or national perspective on the solution of issues. One consequence was that investment was concentrated in larger urban centres to address legislative requirements, at the expense of smaller development centres where a rapid expansion of housing had led to increased pressures and demands on outdated treatment systems. This has resulted in a large number of small schemes with either no treatment or unacceptable treatment which does not meet the requirements of the legislation.

At the same time, collection systems have developed in an ad-hoc manner. Older urban areas are served by combined systems which accept stormwater run-off and foul flows. Such systems present a risk of flooding and to offset this risk, many are provided with overflows which discharge excess flows to rivers and streams in times of heavy rainfall. These are referred to as Combined Sewer Overflows (CSOs) and where the overflows spill too frequently, or where the receiving stream is too small, they can be a source of pollution.

## Our Legal Obligations

The legislative context for provision and licencing of appropriate wastewater treatment infrastructure in Ireland is governed by the Urban Wastewater Treatment Regulations 2001 (UWWT Regulations) and the Wastewater Discharge (Authorisation) Regulations 2007.

The UWWT Regulations transpose the Urban Wastewater Treatment Directive 91/271/EEC (UWWTD) of the European Commission into Irish law. The UWWTD requires that secondary treatment must be provided at all larger urban areas, i.e. all areas with a population equivalent of greater than 10,000, and areas with a population equivalent between 2,000 and 10,000 that discharge to freshwater or estuaries. The Directive sets the permissible concentration in effluent discharges for a number of parameters, including nutrients (nitrogen and phosphorus) where effluent is discharged to designated sensitive waters. Achieving the permissible discharge concentrations set by the UWWTD forms one of the measures set by the EPA for the implementation of programmes of measures under the Water Framework Directive.

The Wastewater Discharge (Authorisation) Regulations 2007 require that all discharges from wastewater collection systems and treatment plants throughout the country which serve an agglomeration of greater than 500 PE (population equivalent) are issued with a Wastewater Discharge Licence from the EPA. Discharge licences set out the compliance and monitoring requirements in respect of treated effluent discharges to the receiving watercourse. All discharges from wastewater collection systems and treatment plants which serve an agglomeration of less than 500 PE (population equivalent) are required to be issued with a Wastewater Discharge Certificate from the EPA. The discharge licence/certificate sets the allowable Emission Limit Value for a discharge based on the status of the receiving water body, including its conservation status in relation to the Birds and Habitats Directives.

Compliance with these Directives and resulting regulations for surface waters, groundwater and water policy is discussed further in Chapter 6: Protect and Enhance the Environment.

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## Key Challenges

Currently, many of the discharges from our wastewater treatment plants do not comply with standards specified either in the UWWT Directive or in our Wastewater Discharge Licences due to overloading, lack of investment and in some cases poor operational procedures. As a consequence, an Infringement Case has been initiated by the European Commission on 71 agglomerations which did not meet the requirements of the UWWTD in 2011. The most recently available EPA publication on wastewater compliance<sup>1</sup> reported that 38 (23%) of the discharges from 162 larger urban (>10,000 PE discharging to coastal waters and >2000 PE if discharging to freshwater or estuaries) agglomerations in the country are not meeting the relevant treated effluent quality and sampling standards set by the Directive. These include seven agglomerations that have no treatment or only preliminary treatment.

While 77% of the 162 agglomerations meet the relevant discharge and sampling standards, they represent only 39% of the total load (PE) discharged from these agglomerations. Meeting compliance with the UWWT Directive for all of our wastewater treatment plants and discharges is a priority for Irish Water. The upgrading of the Ringsend wastewater treatment plant will make a significant contribution to Ireland meeting its obligations under the UWWTD and increasing our compliance rate (see reference to proposals to upgrade Ringsend in Chapter 8).

A key challenge is to ensure that compliance is achieved in a timely and cost effective manner through operational improvements and upgrading and replacement of assets. Investment must be prioritised to where the environmental benefit is greatest and growth is occurring.

A large proportion of our urban sewer networks function as combined systems carrying both wastewater and surface water runoff from impermeable hard-standings (e.g. roads, pavements, roofs of buildings, car parks). During periods of heavy rain, excess surface water run-off mixes with effluent and this can result in discharges through combined sewer overflows (CSOs) directly into watercourses. Such discharges can cause serious pollution from intermittent wastewater spills. Our challenge is to understand how these systems are operating and to design and implement appropriate interventions to mitigate the impact of discharges on the environment.

Currently, we have high volumes of infiltration of groundwater entering the wastewater collection networks due to leaky sewer pipes. This infiltration, together with peak flows in high rainfall and the variability of loads, represents a significant challenge to the efficient operation and performance of collection and treatment systems. In coastal areas, salt water intrusion has further adverse impacts in terms of plant corrosion and inhibition of the biological treatment process. The challenge of infiltration to sewers mirrors the leakage issue in water mains in that it is extremely difficult to quantify and resolve.

No national Standard Operating Procedures (SOPs) are in place for the collection and treatment of wastewater and their development and implementation is a high priority.

In many areas, there is limited knowledge of the location and condition of below ground assets. This requires significant surveys and upgrading of the GIS records, development of the system models and a process for keeping them up to date. Knowledge of networks is a pre-requisite for the efficient prioritisation of network improvements to deliver environmental improvement and to enable new development in a cost effective way.

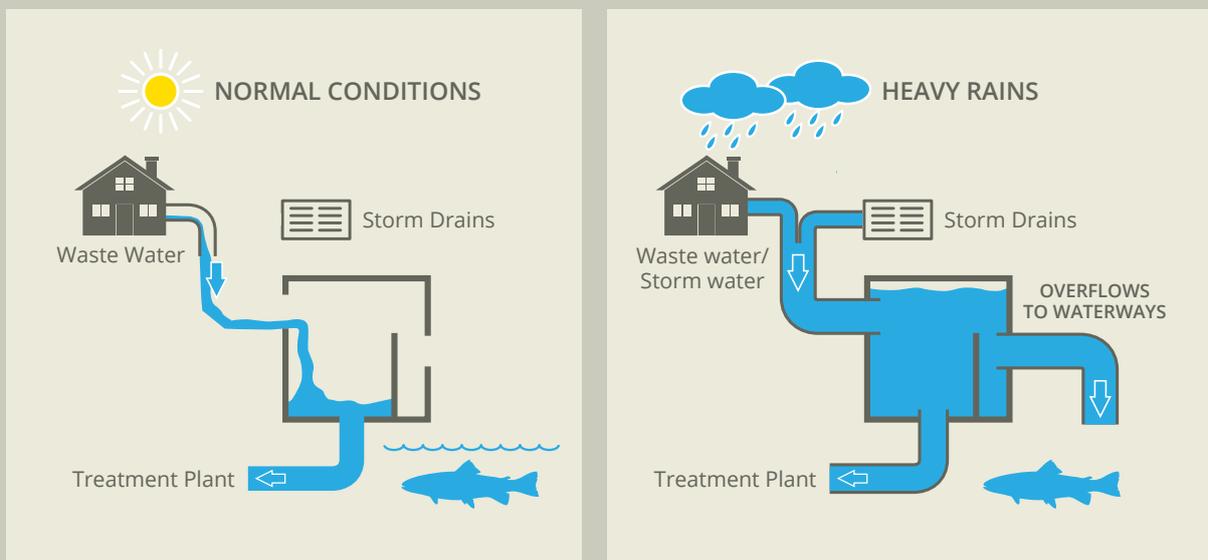


<sup>1</sup> Focus on Urban Wastewater Treatment in 2013. Publ. by the Environmental Protection Agency, Dec 2014.

## Combined Sewer Overflows (CSOs)

CSOs are an inherent and necessary part of our sewer network as constructed. They act as relief valves to the network during periods of heavy rainfall without which foul effluent would back-up the pipelines causing blockages and flooding of properties. While these discharges should only occur during heavy rainfall which results in dilution of the foul effluent prior to overflow many of the existing CSOs are inadequately designed to retain solid waste resulting in a threat to environmental standards.

A graphic of the operation of a CSO is presented below.



## What Our Customers Can Expect from Us

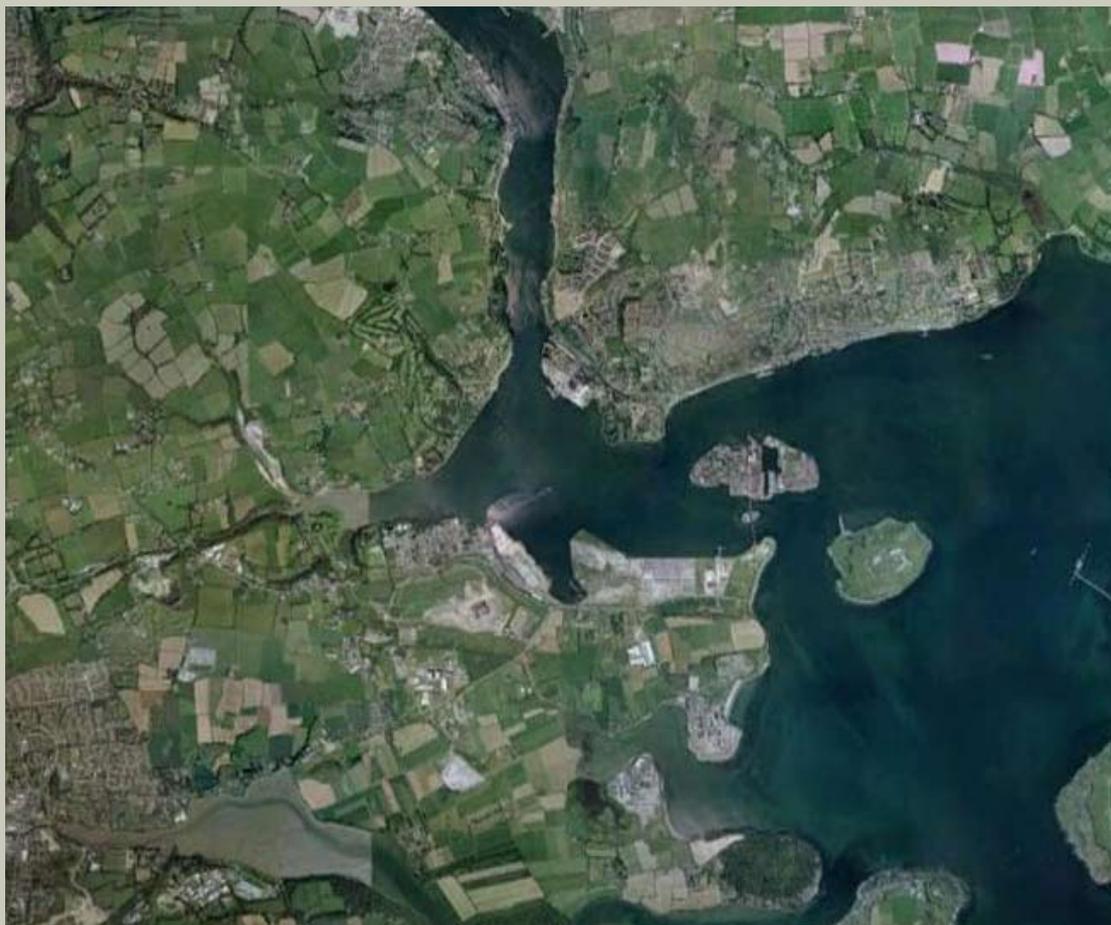
In the future our customers can expect us to provide an effective wastewater collection, treatment and disposal system, which protects human health and the environment whilst providing capacity for social and economic growth. Our objective is to ensure compliance with our discharge licences, with the Urban Wastewater Treatment Regulations and other relevant legislation for all of our wastewater discharges. Recognising that the scale of the challenge will require a number of investment cycles and will involve major investment, we must ensure that the solutions are appropriate and cost effective. However, any treatment plants which are currently non-compliant with the requirements of the UWWTD or are at risk of becoming non-compliant will be included in the next Capital Investment Plan (2017– 2021) where these are not already included in the current CIP.

## Case Study

# Lower Cork Harbour Main Drainage Scheme

The Cork Lower Harbour Main Drainage Scheme includes the population/industrial centres of Cobh, Carrigaline, Crosshaven, Passage West, Monkstown, Glenbrook, Ringaskiddy, Shanbally and Coolmore. The existing sewer network serving the Lower Cork Harbour area comprises mainly combined sewer systems. Wastewater from Cobh, Carrigaline, Passage West/Monkstown and Ringaskiddy is currently discharged following preliminary screening or untreated into the Harbour. This is in breach of the Urban Wastewater Treatment Directive.

Wastewater from the Cork Lower Harbour area will now be transferred to a new wastewater treatment plant at Shanbally (north west of Carrigaline) and treated effluent discharged utilising the existing IDA outfall discharging to the Harbour at Dognose Bank. The scheme includes the construction of associated pumping stations and new/upgraded sewers, rehabilitation of existing sewers and surface water separation where economically viable. The scheme has been approved by An Bord Pleanála and construction is due to commence in 2015.



## Objectives and Strategies

The proposed strategies and performance targets to achieve this objective are summarised in the table below and are detailed in the remaining sections of this chapter.

Strategy	Purpose
<b>Aim WW1 - Manage the operation of wastewater facilities in a manner that protects environmental quality</b>	
WW1a	Prepare and implement a Wastewater Compliance Strategy.
WW1b	Produce appropriate guidance documentation and Standard Operating Procedures.
WW1c	Develop and implement Capital Investment Plans on a prioritised basis to progressively achieve compliance.
WW1d	Manage the wider potential environmental impacts associated with the construction and operation of wastewater systems
<b>Aim WW2 - Manage the availability and resilience of wastewater services now and into the future</b>	
WW2a	Implement risk assessments for all agglomerations in terms of short, medium and long term risks to customer service.
WW2b	Manage existing wastewater assets and plan for new assets based on short, medium and long term sustainability.
WW2c	Identify properties at risk of flooding from combined sewers, and implement measures to reduce risk on a phased basis.
WW2d	Identify and manage critical wastewater assets.

Strategy	Purpose
<b>Aim WW3 - Manage wastewater services in an efficient and economic manner</b>	
WW3a	Adopt an asset management based approach to capital maintenance and capital investment. To optimise the lifecycle of assets, extend asset life and reduce operating costs.
WW3b	Develop and implement strategies and standards to minimise the unit costs of wastewater treatment including standardising treatment processes. To optimise costs and meet the various appropriate discharge requirements by availing of the best technologies and extending the usage of standardisation, automation and control systems.
WW3c	Optimise energy consumption in wastewater treatment plants and collection systems. To reduce energy consumption across all installations thereby reducing operating costs through efficient plant and process selection and maximising energy recovery opportunities.
WW3d	Ensure adequate governance and control of discharges to the sewer network, having regard for best practice and value. To ensure that discharges from the trade sector are controlled and managed to minimise loads at source, thereby reducing loads to treatment.
WW3e	Engage with regulators and stakeholders. To give certainty with regard to customer charges and to develop strategies for future growth and investment in infrastructure.
WW3f	Optimise capital and operational investments in wastewater services. To minimise costs while maintaining a compliant and sustainable level of service.

## **WW1: MANAGE THE OPERATION OF WASTEWATER FACILITIES IN A MANNER THAT PROTECTS ENVIRONMENTAL QUALITY.**

### **[WW1a] Prepare and implement a Wastewater Compliance Strategy.**

We will develop a Wastewater Compliance Strategy setting out a pathway to ensure that the discharges from the wastewater treatment plants and networks that we manage comply with the water quality standards required by the Urban Waste Water Treatment Directive (UWWTD) and support the objectives of the Water Framework Directive. We will continue to investigate all wastewater treatment plants that are failing or at risk of failing to meet the UWWTD and prioritise these for remedial work or upgrades.

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Combined sewer overflows (CSOs) will be addressed as a component of the Wastewater Compliance Strategy. We will look to international best practice to guide us in the development of design standards and will use network modelling simulation where appropriate to determine the performance and operation of CSO structures. We will then develop plans for remedial measures where required. Remedial measures will include for separating stormwater and wastewater where this is the optimal solution. Waste Water Discharge Licences control all discharge points from the agglomeration including CSOs. We recognise the challenge of achieving compliance within available funding and the need to prioritise in the early investment periods to secure the maximum environmental benefit.

In our programme for short term investment, we are prioritising meeting the requirements of the UWWTD including solutions to address the requirements highlighted in the Infringement Case taken by the European Commission on the 71 agglomerations, together with the full list of urban centres currently without treatment and a number of high priority sites identified by EPA where serious pollution is noted and where designated bathing areas are affected by wastewater discharges.

### **[WW1b] Produce appropriate guidance documentation and Standard Operating Procedures.**

There are currently no national Standard Operational Procedures (SOPs) to carry out maintenance, inspection and operational duties on wastewater treatment plants. This has led to inconsistencies in treatment plant performance and variations in operational costs due to the different approaches used previously by local authorities. We will develop national rules for effective wastewater system management in accordance with international best practice and will prepare SOPs including staff training and maintenance regimes across the range and scale of our wastewater treatment plants and collection networks. In developing these, we are drawing on proven processes developed in other high performing water utilities which we will adapt for Irish conditions during 2015.

Unexpected wastewater incidents (for example blockages, pollution, public complaints) require planned management to correct and minimise the impact of an event. We will develop, update and maintain Wastewater Incident Response Plans for all our wastewater systems which will be managed locally through the service level agreements with local authority staff. These plans will document the procedures, processes and information to support the management of an incident. We will develop and maintain an Emergency Response Plan with regard to provision of wastewater services, in accordance with 'A Framework for Major Emergency Management' published by the Inter-Departmental Committee on Major Emergencies, so that we can respond when called upon to support the principal response agencies in reacting to and managing major emergencies.

### **[WW1c] Develop and implement Capital Investment Plans on a prioritised basis to progressively achieve compliance.**

Where non-compliance arises from inadequate treatment processes or capacity constraints we will need to plan the necessary capital works to increase capacity and efficiency of treatment plants. Where feasible, minor capital investments focusing on process upgrades and bolt on solutions will be deployed as permanent or interim measures. Where larger capital works are required, we must have regard to the priority of compliance with the UWWTD standards, growth, available funding and the need to achieve optimum environmental benefit.

We recognise that we cannot address all of the compliance issues in the short term due to funding constraints and the need for a much greater understanding of the wastewater asset base and receiving environments on which they impact. This will require major surveys of our assets and the development of models of both the networks and the receiving water bodies. By adopting this approach future investments will be targeted and efficient and will deliver optimum benefit.

We will also rehabilitate, upgrade and replace wastewater collection pipelines that have significant structural and service defects which can be identified through surveys and investigations. This will be a long term programme having regard to the scale of the works, the lack of data on sewer condition and the need to prioritise critical infrastructure.

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## **[WW1d] Manage the wider potential environmental impacts associated with the construction and operation of wastewater systems.**

The construction and operation of our wastewater treatment plants and networks can result in environmental impacts due to noise, dust, odour and other factors. These can be mitigated by utilising appropriate design, construction and operational standards. Irish Water will follow a best practise standardised approach to the planning and execution of our works, including a high level of public engagement at key stages in the process.

The planning and construction of all new wastewater infrastructure will undergo appropriate environmental assessment as part of the relevant statutory processes. These studies will optimise site selection, identify site specific constraints associated with sensitive receptors (for example plants, animals, built heritage and humans) and develop mitigation measure to be adopted during the construction and operation of the new plant. Robust and well-engineered solutions which are sensitive to the environmental context will enable Irish Water to develop wastewater systems that can be built and operated without excessive adverse impact on communities and the wider environment.

## **WW2: MANAGE THE AVAILABILITY AND RESILIENCE OF WASTEWATER SERVICES NOW AND INTO THE FUTURE.**

### **[WW2a] Implement risk assessments for all agglomerations in terms of short, medium and long term risks to customer service.**

We will prepare risk assessments for all agglomerations served by our wastewater treatment systems to determine short, medium and long term risks to the effective provision of wastewater services. Risks include the flooding of properties, equipment failure, non-compliance of discharges, environmental pollution and capacity constraints. These risk assessments will be used to plan investment and mitigation measures.

As we obtain data regarding our below ground assets, we will develop hydraulic models of all our networks so that we can simulate high flow conditions and identify bottlenecks within the system which need to be addressed. We will supplement these with internal CCTV surveys and other investigations to identify critical defects.

The most persistent risks to disruption of wastewater services, particularly in urban areas, are blockages due to the accumulation of grease or non-biodegradable material. We are developing a national fats, oils and greases (FOG) strategy to effectively manage these discharges and seek to eradicate them at source.

### **[WW2b] Manage existing wastewater assets and plan for new assets based on short, medium and long term sustainability.**

We will work with the EPA and other stakeholders in a catchment based approach to ensure sustainable wastewater management. This approach will consider all effluent discharges into each catchment's water bodies (both from our wastewater discharges and from others) and the ability of the water body to receive treated effluent whilst achieving the water body objectives under the WFD.

This approach recognises that water quality in catchment is impacted by multiple pressures, from various sources. Our objective will be for a balanced approach between the sectors, with impacts from wastewater services being addressed as part of a coordinated approach in each catchment, towards the achievement of agreed water body objectives.

### **[WW2c] Identify properties at risk of flooding from combined sewers, and implement measures to reduce risk on a phased basis.**

Rain falling on roads, roofs and other impermeable surfaces, runs down gutters and drain pipes and into the storm drainage system. In older urban areas, developed pre 1970s, it was common to combine all drainage (foul and rainfall runoff) into a single combined sewerage system. Even where separate storm drainage is provided, it is common that a proportion of runoff is connected to the foul sewer, so that all sewerage systems have increased flows in times of rainfall.

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Increasing urbanisation combined with more frequent and intense rain storms (due to climate change) can result in the capacity of some combined sewers being exceeded. This can cause flooding of properties causing distress to some customers.

Irish Water is committed to implementing mitigation measures to either reduce the probability that a combined sewer will flood or reduce the severity of the flooding where long term protection solutions aren't economically feasible.

We are putting in place a publically available register to gather and record information on flooding events from combined sewers caused by inadequate capacity and due to other causes (blockages, collapses and equipment failures). The register will catalogue the extent, frequency and cause of flooding. It will inform our investment to enable us to prioritise areas that flood more frequently and to reduce the number of incidents of flooding caused by blockages, collapses and equipment failures.

Irish Water is committed to working with the key stakeholders (planners, land managers and developers) in developing long term sustainable solutions.

In the longer term, Irish Water will focus on research and development, improve sewer network models and investigate (in collaboration with local authorities) the use of sustainable urban drainage systems in combined sewer areas. These measures will enable Irish Water to promote an integrated urban drainage approach and to provide a more cost effective and more sustainable wastewater collection system.

This work will be carried out in close collaboration with local authorities and the OPW with whom Memoranda of Understanding are being developed. This will recognise that the operational response to flood events must be coordinated, to be led generally by the local authority, with Irish Water support. We will work with the CER to agree investment in flood risk abatement measures with a view to systematically reducing the numbers of properties at risk of flooding from our systems through each investment cycle. We will cooperate with other authorities when flood relief schemes are being developed to ensure that solutions are coordinated for effective relief for urban communities.

### **[WW2d] Identify and manage critical wastewater assets.**

Sustained environmental performance depends on the reliability and robustness of each treatment plant and its associated network. Critical elements of both plants and networks have the potential to cause major impacts on services and the environment if they fail. We will identify these critical assets and prioritise their maintenance and management.

## **WW3: MANAGE WASTEWATER SERVICES IN AN EFFICIENT AND ECONOMIC MANNER**

### **[WW3a] Adopt an asset management based approach to capital maintenance and capital investment.**

We recognise that robust and reliable information on wastewater infrastructure is vital to inform future investment plans and target improvements where they are most needed. Having inherited the wastewater services infrastructure from the local authorities, we have commenced the integration of wastewater asset records to our GIS system and we are in the process of collating existing hydraulic models and other records (CCTV files) where they exist. These are being assessed for reliability and we are scoping the on-going studies which will gradually improve the extent and accuracy of these vital data and analysis systems.

As we develop our data systems, we will collect workflow data from the field, in conjunction with our operational and maintenance activities, which will inform the system data to enable a whole life asset management approach to strategic planning and investment decisions.

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### **[WW3b] Develop and implement strategies and standards to minimise the unit costs of wastewater treatment including standardising treatment processes.**

We will develop a number of cost reduction strategies as part of our focus on minimising the unit cost of delivering wastewater services whilst meeting environmental standards.

We will strive to standardise treatment processes countrywide using best-in-class, value-for-money technology and control systems. Standardisation will support our strategy of modular development of treatment plants in sync with growth of demand.

This will also enable more cost effective planned maintenance, use of spare parts and skills requirements in their operation. We will combine this approach with remote monitoring of all plants, recording critical parameters, flows, energy consumption and process indicators, enabling us to target where interventions are required and minimise plant downtime.

### **[WW3c] Optimise energy consumption in wastewater treatment plants and collection systems.**

We will prepare and implement a Sustainable Energy Strategy, as outlined in under Aim EN1b of this document. Due to the energy intensive nature of pumping and wastewater treatment, we intend to implement measures to reduce power costs and carbon emissions including the delivery of “greener” technologies where possible. We will target replacement of older inefficient plant (pumps, air blowers), include variable speed controls and look to optimise energy recovery from wastewater sludge digestion.

### **[WW3d] Ensure adequate governance and control of discharges to the sewer network, having regard for best practice and value.**

We will develop and publish a Wastewater Source Control and Licensing Strategy in Q1 of 2016 to regulate and license the volume and quality of wastewater that commercial customers discharge into our collection network. We will work with local authorities and the EPA in relation to granting and approval of industrial discharge licence applications currently covered by Section 16 licences and Section 99e consents to ensure that the discharged load is within the capacity of the network and treatment plant and that, where necessary, additional capacity can be planned and implemented.

We will survey the wastewater treatment loads and operational practices of our industrial customers and will provide advice on initial treatment of effluent and the means of meeting their operational wastewater requirements. We recognise the need for greater control of waste loads to our sewers and plants to prevent corrosion of our assets, failure of our treatment processes and issues with extreme odour generation.

We will also develop and implement a management system for the regulation of discharges of Fats, Oils and Greases (FOGs) to our networks. This will include public education and information campaigns to inform customers of the impacts of fats, oils and greases and inappropriate material such as pharmaceuticals, baby wipes, nappies and sanitary towels being discharged into the wastewater system.

### **[WW3e] Engage with regulators and stakeholders.**

Through our project planning and development processes we will engage with all stakeholders including our regulators, planning authorities, landowners, our customers and other interested parties.

We must balance the requirements set by both of our regulators: meeting our requirements under the UWWTD and WFD for the EPA and ensuring that our customers are receiving a quality of service in an efficient and economic manner as prescribed by the CER. To achieve these we will work together in a collaborative manner. We will agree a balanced approach to the delivery of services to both protect the customer and meet environmental objectives. This will be set out in our Wastewater Compliance Strategy.

### **[WW3f] Optimise capital and operational investments in wastewater services.**

We will develop detailed cost benefit analysis and prioritisation models for all works and strategies agreed with our regulators. We will promote the use of the most cost effective measures, and timing, in planning to achieve required wastewater discharge quality, with investments benefiting from best combination of capital and operational responses. In the first instance, we will seek to maximise the capacity of existing assets through operational improvements supported by targeted capital investment.

## Indicators and Targets

Indicators and targets for the effective management of wastewater are presented in the table below.

PROVIDE EFFECTIVE WASTE WATER MANAGEMENT					
Indicators	Definition	Current Baseline	End of 2021 Target	End of 2027 Target	2040 Target
AIM WW1	Manage the Operation of Wastewater Facilities in a manner that Protects Environmental Quality				
Waste Water Treatment - Compliance with UWWTD Requirements	% of total Population Equivalent (PE) served by **WWTP compliant with the UWWTD	39%* (based on EPA's Focus on urban waste water treatment report for 2013)	 90%	 99%	 100%
Urban Waste Water Treatment	Provide the appropriate level of wastewater treatment to the areas from which raw sewage is discharged (List in Appendix 2)	44 Agglomerations discharging raw sewage to the environment (List Appendix 2)	 100%	 100%	 100%
Waste water Treatment - Compliance with discharge Emission Limit Values (ELVs) to achieve WFD Objectives	% of WWTPs serving >500 PE - compliant with EPA discharge licenses ELVs	33%* (based on based on Annual Environmental Reports (AER) 2013)	  60%	 90%	100%
Pollution Incidents caused by Irish Water Waste Water Treatment Systems	Number of Category 2 (localised) pollution incidences reported to the EPA	    168	  75	 20	 20
** Refers to large urban areas WWTP > 10,000 PE discharging to all waters and > 2000 PE discharging to freshwater bodies or estuaries. Includes WWTP discharging "raw sewage"					

PROVIDE EFFECTIVE WASTE WATER MANAGEMENT					
Indicators	Definition	Current Baseline	End of 2021 Target	End of 2027 Target	2040 Target
AIM WW2	Manage the Availability and Resilience of Wastewater Services now and into the Future				
Sewer Flooding; flooding which occurs when the capacity of sewers is exceeded due to heavy rainfall, resulting in flooding inside and outside of buildings.	Number of incidents of sewer flooding of properties	 Not available. Develop register to record number, cause and extent of flooding	 Accurate register of number of properties at risk of flooding from sewers. Historic, high priority flood sites addressed	 The reduction by 25% number of the properties which flood frequently (> once in 10 years)	 The reduction by 80% number of the properties which flood frequently (> once in 10 years)
AIM WW3	Manage Wastewater Services in an Efficient and Economic Manner				
Licensed Trade Effluent Discharges to Sewers	% of national trade effluent licensable load discharged to sewers under conditions determined by Irish Water in accordance with the polluter pays	 Not available. Commence establishment of register of trade effluents producers & attribute a risk weighting to each	 50% of trade effluent load licensed, prioritised using a risk based approach	 75% of trade effluent load licensed using a risk based approach	 >95% of trade effluent load licensed (allowing for turnover of small businesses)



# Chapter 6

Objective:

# Protect and Enhance the Environment



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## Our Strategic Aims

- Ensure that Irish Water services are delivered in a sustainable manner which contributes to the protection of the environment.
- Operate our water services infrastructure in a manner that supports the achievement of water body objectives under the Water Framework Directive and our obligations under the Birds and Habitats Directives.
- Manage all our residual waste in a sustainable manner.

### Introduction

Protecting and improving the future, long term quality of the water environment is fundamental to providing safe water services and for the protection of human health and biodiversity. The water environment is inextricably linked to the wider environment and it is important to consider protection of the environment in a holistic way. Irish Water protects the water environment in its role in delivering water services, but also the broader environment in terms of the impacts of our activities, for example in our use of energy and our carbon footprint.

An enhanced water environment results in a reduced requirement for water treatment and supports recreational activities, biodiversity, tourism and the natural character of our countryside.

The need to protect and improve the water environment and the environment generally has been recognised in a number of European Directives that afford special protection to identified areas that are important for drinking water supply, nature conservation, bathing and fisheries. Examples include the Birds Directive, Habitats Directive, Bathing Water Directive and the Water Framework Directive (WFD). The WFD is the overarching Directive within which all matters impacting the water environment are managed.

This chapter will consider the implementation of sustainable strategies and measures to support our objectives in protecting and enhancing the environment.

### Our Legal Obligations

Irish Water has multiple environmental obligations which regulate its water services functions, operations and developments. The principal obligations result from Directives of the European Commission as detailed in the paragraphs below.

#### Birds and Habitats Directives

The Habitats Directive (92/43/EEC) placed an obligation on all Member States of the EU to establish the Natura 2000 network and require protection of defined habitats and species. The network is made up of Special Protection Areas (SPAs), established under the EU Birds Directive (79/409/EEC), and Special Areas of Conservation (SACs). The Directives were transposed into Irish national regulations and have been subsequently revised and consolidated in the European Communities (Birds and Natural Habitats) Regulations 2011.

Priority Habitats have been defined for Ireland that include amongst others raised and blanket bogs and turloughs which can be impacted by water abstraction and wastewater discharges. Over 400 SACs and about 150 SPAs have been designated to date in Ireland. Article 6 of the Habitats Directive requires member states to establish necessary conservation measures to protect sites and to take appropriate steps to avoid the deterioration of (or restore) natural habitats and species. Natural Heritage Areas (NHAs) have a national designation and protect features not covered by the Directives.

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As a public authority, Irish Water has duties under the above regulations “to take the appropriate steps to avoid, in European Sites, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated in so far as such disturbance could be significant in relation to the objectives of the Habitats Directive.”

### Water Framework Directive

The Water Framework Directive (WFD) establishes a catchment based approach to the protection, improvement and sustainable use of rivers, lakes, transitional waters (estuaries), coastal waters and groundwater. It adopts the ‘polluter pays’ principle and will, over time, integrate the requirements of a number of existing directives for the protection of the water environment. It seeks to develop a holistic approach to sustainable water use, balancing social and economic factors with the need to protect and improve our water environment.

The WFD is implemented through river basin management plans which assess the current status of our inland and coastal water bodies (known as characterisation and classification). Where the status of a water body is less than “Good” (for example from pollution or over-abstraction), remedial actions or measures must be proposed and implemented to achieve the objectives set for each water body. Collectively, these are known as “programmes of measures”. The river basin management plans are currently being updated and will be published in 2017.

The Water Policy Regulations (S.I. No. 722 of 2003), Surface Waters Regulations (S.I. No. 272 of 2009) and Groundwater Regulations (S.I. No. 9 of 2010) govern the shape of the WFD characterisation, monitoring and status assessment programmes in terms of assigning responsibilities for the monitoring of different water categories, determining the quality elements and undertaking the characterisation and classification assessments.

The Surface Waters Regulations institute a wide-ranging set of environmental standards for Irish surface waters. The Groundwater Regulations establish environmental objectives to be achieved in groundwater bodies and include groundwater quality standards and threshold values for the classification of groundwater and the protection of groundwater against pollution and deterioration in groundwater quality.



Irish Water’s key objectives in relation to the WFD will be the implementation of measures to reduce the impact of our wastewater discharges and thus improve water quality. Our discharge licences will be reviewed on a six yearly basis (by the EPA) and will be targeted to contribute to the delivery of the programmes of measures mentioned above. Where an urban wastewater discharge is the single significant pressure on a water body in relation to achieving its quality status, compliance with our discharge licence requirements should ensure that the water body achieves “Good” status. However, where there are other significant pressures effecting water quality, compliance with the wastewater discharge licence alone may not deliver “Good” status and thus all stakeholders causing significant pressures must play their part in reducing their impact in order to improve water quality. Irish Water will also actively participate in measures aimed at protecting drinking water supply zones and in ensuring ecological flows are maintained in the water bodies we abstract water from. We will undertake monitoring of water bodies used for the abstraction of public drinking water supply and assist stakeholders in the identification of significant pressures on these water resources.

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## The Current Situation

The current State of the Environment Report published by the EPA (2012) reports that 29% of rivers and canals and 53% of lakes were not Good or High status under the WFD and therefore required improvement. The recent trend in river water quality indicates an overall increase in the length of river channel which is slightly polluted which is mainly due to eutrophication (over-enrichment of nutrients resulting from agriculture and other land use). However, the number of seriously polluted river sites has decreased significantly since monitoring began, reflecting investment in basic wastewater treatment and improved environmental management of agriculture and other land use activities. The number of High status water bodies with sensitive and rare ecology like the Freshwater Pearl Mussel has declined in recent years and site specific, targeted work is required to remediate these and prevent further loss.

Groundwater is faring better with 85% of groundwater bodies being at good status. The principal reasons for failing groundwater bodies resulted from nutrient loading resulting from agricultural practices. A small number of water bodies failed due to site specific contamination from historical mining or other sources. There has been a general reduction in nitrate concentration in groundwater since monitoring commenced, attributed to reductions in the use of inorganic fertilisers and restrictions on land spreading in agriculture.

The EPA is responsible for licensing wastewater discharges from treatment plants for large towns, and for certification of discharges from treatment plants for smaller agglomerations (under 500 Population Equivalent). Currently, water abstractions are not licenced or regulated by the EPA. Compliance with wastewater discharge licences and certificates will continue to drive improvements in treatment and water quality. The current status of wastewater compliance is outlined in Chapter 5 (Provide Effective Management of Wastewater).

Irish Water is a high energy user with an annual cost estimated at €60M. In general, energy efficiency has not been a primary consideration in the construction and operation of water and wastewater treatment infrastructure in the past.

## What our Customers can Expect from Us

Our Customers should expect that in the future, following a period of sustained increased investment, all of our operations will meet their statutory compliance requirements, in particular our wastewater discharges. We will work closely with our environmental regulator, the EPA, and other environmental stakeholders and the general public to participate fully in the process of developing river basin management plans and the associated programmes of measures in the implementation of the WFD in Ireland.

## Key Challenges

Nationally, discharges from wastewater and agriculture are the principal activities currently impacting on the quality of the water environment and therefore we have a significant role in the protection of catchments.

A balance needs to be struck between our activities that impact on the environment and the ability of the environment to sustain these impacts over both the short and longer terms. Meeting the requirements of the WFD programmes of measures with regard to the sustainability of our abstractions, discharge licences and input to catchment management planning will be a significant challenge to our new organisation.

There are risks to water ecosystems outside our control from invasive species and from climate change which need to be considered in the future planning of our infrastructure.

With water and wastewater services delivered across local authorities there was previously no national sustainability policy or guidance on operations. Each local authority had its own policy with regard to works design and procurement.

With an ageing infrastructure, meeting our obligations for energy efficiency will require significant investment, in both the upgrade and replacement of inefficient systems whilst ensuring the best whole life options are selected for new capital investments.

The provision of water and wastewater services generates a significant volume of both water and wastewater sludge which is dispersed around the many water and wastewater treatment plants and other sites we operate. Effective and safe management of this sludge, utilising its potential for energy generation or reuse where feasible, is a key challenge.

## Objectives and Strategies

The proposed strategies to achieve this objective of protecting and enhancing the environment are summarised in the table below and are detailed in the remaining sections of this chapter.

Strategy	Purpose
<b>Aim EN1 – Ensure that Irish Water services are delivered in a sustainable manner which contributes to the protection of the environment</b>	
EN1a	Implement a Sustainability Policy and Sustainability Framework
EN1b	Prepare and implement a Sustainable Energy Strategy.
EN1c	Prepare and implement a Climate Change Adaptation and Mitigation Strategy.
EN1d	Adopt a Green Procurement Approach and drive efficient use of all our resources.
EN1e	Adhere to environmental and planning legislation when planning and developing water services assets.



Strategy	Purpose	
<p><b>Aim EN2 - Operate our water services infrastructure in a manner that supports the achievement of water body objectives under the Water Framework Directive and our obligations under the Birds and Habitats Directives</b></p>		
EN2a	Work effectively with other stakeholders to support a catchment based approach.	To contribute to the achievement of water body objectives under the Water Framework Directive.
EN2b	Manage the operation of our water and wastewater infrastructure towards the achievement of water body objectives and the conservation of protected sites and species.	To ensure that the operation of our water and wastewater infrastructure assists the achievement of water body objectives under the WFD and the conservation of protected sites and species under the Birds and Habitats Directives.
<p><b>Aim EN3 – Manage all our Residual Waste in a Sustainable Manner</b></p>		
EN3a	Develop and implement a Corporate Waste Management Strategy.	To ensure Irish Water meets its corporate sustainability responsibilities.
EN3b	Develop and implement a National Wastewater Sludge Management Plan.	To reduce the environmental impacts from wastewater treatment by re-use and renewable energy generation, where feasible.
EN3c	Develop and implement a National Water Treatment Plant Sludge Management Plan.	To reduce the environmental impacts from water treatment processes.



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## **EN1: ENSURE THAT IRISH WATER SERVICES ARE DELIVERED IN A SUSTAINABLE MANNER WHICH CONTRIBUTES TO THE PROTECTION OF THE ENVIRONMENT.**

### **[EN1a] Implement a Sustainability Policy and Sustainability Framework**

Water services face a range of environmental challenges from changing climate and extreme weather events, escalating energy costs and the impacts of demands of other stakeholders on water resources. It is important that Irish Water implements all of its operations in a way that enables long term sustainability (i.e. in a way that can continue indefinitely without long term harm to the environment).

Irish Water will prepare and implement a Sustainability Policy and a Framework to support the policy. These documents will represent our long term commitment to protecting and enhancing the environment in relation to the construction and operation of our infrastructure and the delivery of our services. The eight key framework components are Resource Efficiency, Climate Change, Habitats & Wildlife, Equity & Economic Development, Health, Amenity, Social Impact and Culture & Heritage. Our commitments under each of these headings will be established and documented. We aim to continually improve our environmental performance and will ensure that its requirements are communicated to all our employees and those working on our behalf.

### **[EN1b] Prepare and implement a Sustainable Energy Strategy**

The National Energy Efficiency Action Plan (NEEAP) is the Government policy setting out plans and actions to achieve energy efficiency savings across the economy. The action plan was updated in 2014 (NEEAP3) to take account of the Communication from the European Commission setting out its ambition for a 2030 Climate and Energy Policy Framework. The Commission's proposals for 2030 include a reduction in greenhouse gas emissions (GHG) by 40% below the 1990 level, an EU-wide binding target for renewable energy of at least 27% and renewed ambitions for energy efficiency policies. The review of the Energy Efficiency Directive, published in July 2014, calls for an efficiency target of 30% in 2030.

Irish Water is the largest single public user of electricity in Ireland. Our sustainable energy strategy will document how Irish Water will achieve energy efficiency through the use of technologies and initiatives designed to improve energy efficiency. The use of renewable energy sources will be considered where appropriate and economically viable. We intend to target asset investment and operational changes to meet targets for energy use, consumption and efficiency.

Irish Water's target is an improvement in energy efficiency by 33% by 2020 from the 2009 baseline. Irish Water has entered into an energy partnership with SEAI to avail of their support, resources and expertise in meeting this target.

### **[EN1c] Prepare and implement a Climate Change Adaptation and Mitigation Strategy**

Climate change impacts in Ireland are expected to include more intense rainfall events as well as periods of increased drought along with a rise in sea level. These events will impact on water services through increased risk of sewer flooding, possible inundation of treatment plants and other assets; deterioration in water quality in our rivers and lower dry weather river flows reducing the water available for abstraction or for diluting treated effluent.

Adapting to climate change will require careful planning, preparation, investment and management. Our strategy will address the vulnerability of water services and associated environment (including protected sites) to climate change events and identify actions to modify our infrastructure or operations. This could include, for example, the relocation of abstractions to larger more sustainable water sources, the blending of multiple sources and the implementation of flood protection measures.

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## **[EN1d] Adopt a green procurement approach and drive efficient use of all of our resources.**

We will implement a 'green procurement' approach and seek to reduce and remove wastage in our investment and operations decisions. We will work to ensure all goods and services are procured in accordance with the Green Procurement Guidelines. We will adopt a low carbon approach and consider the whole life carbon cost of all new investments. We will implement annual reporting of the actions being taken to improve energy efficiency. We will consider the carbon footprint in the design of our future infrastructure and seek, through value engineering, to minimise the embodied energy of each development.

Irish Water will optimise use of chemicals in our treatment processes and review the use of chemicals that have the potential to impact negatively on the environment. We will strive to support the purchase of energy-efficient products and services, where possible and applicable. We will ensure that significant new capital projects are designed and optimised for energy performance as far as possible.

## **[EN1e] Adhere to environmental and planning legislation when planning and developing water services assets.**

All Irish Water projects follow a systematic process to determine the appropriate strategy, option, design and method of implementation prior to construction and operation of new assets. This approach includes extensive consultation, where appropriate, with relevant planning authorities (local authorities, regional planning agencies, An Bord Pleanála) and our regulators (the Commission for Energy Regulation and the Environmental Protection Agency) in addition to key stakeholders such as government departments, non-governmental organisations, special interest groups and the general public.

All our projects are designed and developed in accordance with statutory planning processes and environmental regulations from the outset. We will comply with the statutory processes relevant to our programmes and projects, including Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA) and Appropriate Assessment (AA) under the Habitat's Directive, ensuring the avoidance of potential significant adverse effects on biodiversity (including protected sites), human health, water, air quality, cultural heritage (including archaeology), soil and landscape and visual amenity as a result of the upgrade to/construction of new infrastructure, including potential transboundary effects.

## **EN2: OPERATE OUR WATER SERVICES INFRASTRUCTURE IN A MANNER THAT SUPPORTS THE ACHIEVEMENT OF WATER BODY OBJECTIVES UNDER THE WATER FRAMEWORK DIRECTIVE AND OUR OBLIGATIONS UNDER THE BIRDS AND HABITATS DIRECTIVES.**

### **[EN2a] Work effectively with other stakeholders to support a catchment based approach.**

We will participate in river basin management planning at an international, national and river basin level for the development and implementation of programmes of measures in relation to water services in support of the WFD. We consider that each programme of measures should be proportionate to each sector, based on the polluter pays principle, and planned over a timescale which is affordable.

We will work with the EPA and other relevant stakeholders to identify 'on-the-ground' measures to be implemented. Our approach will focus on holistic solutions for the management of the catchment which will consider impacts from all catchment land uses including water services, tourism, agriculture and industry.

We will develop, collaboratively where feasible, catchment based assessments of receiving waters, identifying the impact of our operations and other impacts on water status and assess the environmental benefit of options available to us.

### **[EN2b] Manage the operation of our water and wastewater infrastructure towards the achievement of water body objectives and the conservation of protected sites and species.**

Delivery of water services, particularly the abstraction of water for supply and discharges from our wastewater and water treatment plants, directly interact with the water environment which the Water Framework Directive (WFD) seeks to protect and enhance. We will plan for the development and management (construction and operation) of our water

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supply and wastewater infrastructure taking into account the whole water cycle and will target investment to meet the agreed Programmes of Measures related to treated effluent discharges set for specific water body objectives under the WFD, prioritising the greatest environmental benefit from the funding available.

As part of the Wastewater Licencing process undertaken by the EPA for all of Irish Waters discharges, an Appropriate Assessment is carried out where necessary by the Competent Authority (i.e. the EPA) to ensure that our discharges do not impact on Natura 2000 sites and their nature conservation interests (including the Freshwater Pearl Mussel).

We will manage our water abstractions sustainably to minimise impact on water body status, protected habitats and species and use by other stakeholders (for example, maintaining minimum environmental and navigation flows), and in accordance with current and future legislation.

We will work towards meeting the requirements of the Priority Substances Directive which sets environmental quality standards (EQS) for the specified substances (i.e. pollutant chemicals) in surface waters (river, lake, transitional and coastal) and will include for targeted monitoring and compliance (where applicable) in our detailed plans and programmes. We will target our efforts in this respect to wastewater discharges to drinking water protected areas and shellfish waters. We will, where appropriate, regulate the discharge of such priority substances to our collection systems and hence to our treatment works under our trade effluent licences.

### **EN3: MANAGE ALL OUR RESIDUAL WASTE IN A SUSTAINABLE MANNER**

#### **[EN3a] Develop and implement a Corporate Waste Management Strategy.**

Irish Water will develop and implement a Corporate Waste Management Policy and Plan as part of the resource efficiency element of our Sustainability Framework [Strategy EN1a].

We will manage waste generation and waste streams within the organisation to promote reduction, reuse and recycling of materials. Our plans will propose suitable transportation and disposal routes for waste and require annual reporting of the waste generated and recycled onsite with on-going targets for reduction.

#### **[EN3b] Develop and implement a National Wastewater Sludge Management Plan.**

Irish Water will prepare and implement a national plan to manage all wastewater sludges generated by our treatment processes and where feasible, sludges generated by septic tanks serving domestic residences..

The wastewater treatment process generates sludges which require further treatment prior to re-use or disposal. There is a deficit of sludge management facilities nationally and additional facilities are required to manage wastewater sludge.

We aim to treat all wastewater sludges to meet the requirements of the DECLG Code of Practice for re-use where possible as fertilizer and soil conditioner. This requires a stable pasteurised product, complying with chemical standards for safe use in agriculture or equivalent use.

Irish Water will accept wastewater sludges generated by septic tanks serving domestic residences from licenced contractors at specific sludge management facilities subject to appropriate commercial agreements. The acceptance of sludge from septic tanks will depend on suitable import facilities and spare capacity being available at the WWTP where sludge is accepted. At present there is insufficient capacity to accept all the septic tank sludge generated within Ireland. Where IW does not currently have capacity to meet the demand for accepting septic tank sludge, we will investigate the feasibility of developing this capacity on a commercial basis. Development of additional capacity for septic tank sludge would be dependent on IW having secure and sustainable outlets for all IW generated sludges in the first instance.

Transport and re-use/disposal of all wastewater sludges will be managed by Irish Water to ensure compliance with our standards for treatment and disposal by registered Contractors with full traceability. This will include any imported sludge from septic tanks accepted at Irish Water facilities. Re-use in agriculture or forestry will be managed in accordance with Nutrient Management Plans to ensure compliance with nitrogen and phosphorus controls.

Irish Water will work with industry to develop alternatives for the beneficial re-use of wastewater sludge and the possible recovery of energy and/or constituents in a sustainable and economically viable manner. Anaerobic digestion plants reduce the organic solids and create biogas which can be used to generate electricity for use in the treatment plants. These will be developed where feasible and economically viable.

## [EN3c] Develop and implement a National Water Treatment Plant Sludge Management Plan.

Sludges are also generated from the water treatment process through the removal of colour and fine sediments from the abstracted water using chemicals. These sludges contain aluminium, ferric salts or other chemical residues from the purification process and require dewatering prior to disposal. To date the sludges have limited re-use and have principally been disposed at landfill.

Irish Water will work with industry to develop alternatives for the beneficial re-use of water treatment residual sludge and the possible recovery of constituents in a sustainable and economically viable manner. Landfill disposal will continue to play a major role in managing these sludges. We will ensure that transport and disposal of these wastes are carried out in compliance with waste legislation and with least environmental impact.

### Indicators and Targets

Indicators and targets for Irish Water to protect and enhance the environment are presented in the table below.

PROTECT AND ENHANCE THE ENVIRONMENT					
Indicators	Definition	Current Baseline	End of 2021 Target	End of 2027 Target	2040 Target
AIM EN1	Ensure that Irish Water Services are Delivered in a Sustainable Manner which contributes to the Protection of the Environment				
Water and Wastewater Residual Sludge Disposal	% compliance of treatment and disposal of sludges with Irish Standards	 96% (Best estimate based on available data)	 99%	 100%	 100%
Energy Efficiency	% increase in overall energy efficiency at Irish Water facilities	 Baseline 2009	 33% energy efficiency improvement over baseline (by 2020)	 Meet relevant targets that will be established by national energy policy	 Meet relevant targets that will be established by national energy policy
AIM EN2	Operate our water services infrastructure in a manner that supports the achievement of water body objectives under the Water Framework Directive and our obligations under the Birds and Habitats Directives				
Appropriate & Effective Wastewater Treatment	Achieve Targets for Aim WW1				
Sustainable Water Supply	Achieve Targets for Aim WS3				

# Chapter 7

Objective:

# Support Social and Economic Growth



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## Our Strategic Aims

- Support National, Regional and Local Economic and Spatial Planning Policy.
- Facilitate growth in line with national and regional economic and spatial planning policy.
- Ensure that water services are provided in a timely and cost effective manner.

### Introduction

The delivery of appropriate infrastructure to meet the required demand where and when it is needed is fundamental to supporting social and economic growth. Water and wastewater capacity is an important factor in maintaining Ireland's competitiveness for industry and commercial activity and as a destination for foreign direct investment. Water stress is an increasingly critical issue in many parts of the world, whereas Ireland has an abundance of water resources, provided we manage them appropriately.

Irish Water must assess where the demands for water services are most likely to arise based on national and regional spatial planning policies and plans, together with population and economic growth predictions. We will plan to ensure continuous service to all Irish Water's existing customers whilst providing additional capacity to meet future population growth and industrial development.

### Our Legal Obligations

The Department of Environment, Community and Local Government (DECLG) sets policies in relation to spatial planning and economic development. The DECLG also sets policy in relation to water services and the protection of the environment. Under sections 33 and 34 of the Water Services (No. 2) Act, 2013, Irish Water must be consistent as far as is practicable with national & regional spatial planning policy and have regard to local spatial planning policy when developing strategies and planning investment in water services. These sections also require Irish Water to be consistent as far as is practicable with and take account of the River Basin Management Plans in relation to the implementation of the WFD. In addition, these sections require that Irish Water consults with its economic and environmental regulators and with regional and local planning authorities before preparing its strategic and investment plans.

As per the Planning and Development Regulations, 2001 (as amended) Irish Water is a prescribed body for the purpose of the making of Regional Planning Guidelines (new Regional Spatial and Economic Strategies), county development plans, local area plans and planning schemes. Irish water is also a prescribed body for development management.

The DECLG will prepare Ministerial Guidelines under section 28 of the Planning and Development Act, 2000 (as amended) to guide the engagement between Irish Water and local government at a regional and local level to ensure that water services provision is aligned with the country's spatial planning policy.

### The Current Situation

Some 62% of Ireland's population currently live in urban areas, with Dublin and the Mid-East being the most urbanised regions in the country. The Greater Dublin Area is the most significant area in terms of population concentration. However, in line with the objective of the current national spatial planning policy (National Spatial Strategy, NSS) for balanced regional development, economic development and growth is promoted across all regions. The NSS identifies a settlement hierarchy strategy of gateways, hubs and other towns for focused development and growth with appropriate infrastructure services.

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In rural areas away, from these settlements, the population is dispersed resulting in a large number of water supply zones and wastewater networks serving small populations. Many rural households are served by small private individual water and wastewater systems (wells and septic tanks respectively for the most part). Private Group Water Schemes have also been developed in rural areas. These private systems (individual or group) are outside the scope of Irish Water's remit.

Population growth targets for each of the state's 8 regions under the NSS were set by the Department of Environment, Community and Local Government (DECLG) in 2010, based on a balanced regional development policy. Each of the regional authorities subsequently set population targets to 2022 for each county within their region through their Regional Planning Guidelines (RPGs). All County Development Plans prepared since 2011 have based population growth targets for their settlement strategies on the relevant RPG.

The Central Statistics Office has published population growth forecasts at a national scale to 2046 and at a regional scale to 2031 based on the results of the 2011 census. These projections indicate that the national population will grow from 4.5 million in 2011 to between 5 million and 6.7 million by 2046, depending on the growth scenario used. Growth will vary across regions, with the Dublin/Mid East region likely to experience the greatest growth and the Western and Border Regions likely to experience the least growth. These forecasts indicate that in some areas, RPG targets to 2022 are unlikely to be achieved, while in other areas, targets will be surpassed.

The Department of Environment, Community and Local Government (DECLG) will be preparing a new National Planning Framework to replace the NSS in the near future and the three new regional assemblies (identified in "Putting People First") will subsequently prepare Regional Spatial and Economic Strategies to replace the existing RPGs by 2016.

Irish Water will regularly review and update our Water Services Strategic Plan to take account of the prevailing national, regional and local spatial planning policy and demographics.

## Key Challenges

The key challenges and uncertainties in the provision of water and wastewater services to support social and economic growth are:

- Uncertainty in the rate of population (domestic) growth and changing demography.
- Uncertainty in non-domestic demand, from general commercial development which usually follows domestic growth, from agriculture and from industrial development which can have significant "one-off" demands for large water and/or wastewater capacity.
- Balancing investment for growth with investment priorities for compliance, security of supply and operational efficiency.
- The extended timetable required for the planning and implementation of new strategic water and wastewater capacity.
- Funding availability for strategic capacity provision.
- Impacts of climate change and socio-economic factors on the demand for water services.
- Meeting environmental compliance whilst providing for growth.

## What our Customers can Expect from us

Our primary objective is to support population and economic growth in line with national and regional spatial planning policies and objectives. Our approach to planning and providing water services for growth will be evidence based. We will focus on utilising the capacities of our existing treatment facilities and networks to best effect while matching delivery of new capacity with realistic projections of demand based on appropriate planning horizons. We will aim to provide adequate spare capacity (headroom) in strategic level infrastructure to cater for variability in demand arising from factors such as weather and operational risk and some upward variation around projected development demand. We will seek to ensure that the standard of water services to our existing customers is maintained.

## Case Study

# Supporting Growth in the Greater Dublin Area

Over the past decade, water supply availability has regularly exceeded demand requirements in the Dublin Water Supply Zone by just 1%-2% (20% excess over seasonal peak would constitute normal best practice for a large urban area). The Dublin Water Supply Zone serves 84% of the population of the Greater Dublin Area (based on the 2011 Census population).

There have been three significant disruption 'events' in the past five years which have highlighted how finely balanced the supply-demand position is; the exceptional water demand at the time of severe cold weather in the winter of 2010, the algal bloom experienced on the Vartry Reservoir in May of 2013, and the operational problems experienced with raw water chemistry at the Ballymore Eustace plant in late October 2013 (at the time the Web Summit was hosted in Dublin). Each of these events resulted in supply interruptions and restrictions across the supply area, with negative economic and reputational impacts for the area and the country.

Over 84% of Dublin's water treatment capacity is now dependent upon the River Liffey, and this fact illustrates the vulnerability of the service, with negligible headroom, and the need for new long term sources in planning to manage risks such as unexpected population growth or migration, economic growth or risks from climate change and pollution.

Population in the Dublin Water Supply Zone is projected to reach 1.64m by 2021\*, from 1.52m in the 2011, and is forecast to grow to 2.15m\*\* by 2050. (The population in the GDA itself is projected to be 1.95m by 2021\*). Despite expected reductions in leakage and developing existing sources to their sustainable limits, increasing population and economic growth and security of supply will result in a need for a new source by the early 2020's. Similar considerations apply to wastewater capacity provision in the Greater Dublin Area.



*Leixlip Water Treatment Plant on the River Liffey. Photo: Irish Water*

\*based on the 2011 Census figures and the CSO's "most likely growth scenario" (Modified M2F2) identified in their Regional Population Projections

\*\* Project Need Report (2015) for the Eastern and Midlands Region Water Supply Project

## Objectives and Strategies

The proposed strategies to meet the above challenges and to achieve this objective are summarised in the table below and are detailed in the remaining sections of this chapter.

Strategy	Purpose
<b>Aim SG1 - Support National, Regional and Local Economic and Spatial Planning Policy</b>	
<b>SG1a</b>	<p>Liaise with national, regional and local government bodies and potential customers to anticipate and plan water services in line with the statutory planning policy.</p> <p>To ensure that we plan and advise coherently on future development and that our infrastructure development strategies are consistent as far as is practicable with national and regional planning policy and plans and have regard to local development policy and development proposals.</p>
<b>Aim SG2 – Facilitate growth in line with national and regional economic and spatial planning policy</b>	
<b>SG2a</b>	<p>Maximise capacity of existing assets through effective asset management and optimised operation.</p> <p>Minimise requirement for additional infrastructure.</p>
<b>SG2b</b>	<p>Plan water service infrastructure at national, regional and river basin level.</p> <p>To ensure water services are planned at a strategic level and can be provided where needed in line with development plans.</p>
<b>SG2c</b>	<p>Invest in the development of strategic networks and treatment works.</p> <p>To meet projected demand for our water services.</p>
<b>SG2d</b>	<p>Maintain appropriate headroom in strategic water services infrastructure.</p> <p>To facilitate growth between investment periods.</p>
<b>SG2e</b>	<p>Provide a high quality customer service for new customers.</p> <p>To promote Irish Water as a modern utility meeting published service standards to its new customers.</p>

Strategy	Purpose
<b>Aim SG3 - Ensure that water services are provided in a timely and cost effective manner</b>	
SG3a	Plan for water services infrastructure development to meet projected demand facilitating delivery on a phased basis.
SG3b	Ensure that new assets are constructed to match demand and that assets are proportionate in size to the short and medium term demand projections.
SG3c	Balance investment for growth in demand with other priorities to ensure best outcome for customers.
SG3c	Operate an equitable New Connections Charging Policy that ensures efficient service provision to new customers with full cost recovery on a least cost basis.
	To ensure that the cost of connecting new developments to Irish Water's networks is efficient and is not a burden on existing customers.

**SG1: SUPPORT NATIONAL, REGIONAL AND LOCAL ECONOMIC AND SPATIAL PLANNING POLICY**

**[SG1a] Work with national, regional and local bodies and potential customers to anticipate and plan for water services for growth in line with the statutory planning process.**

Irish Water will actively engage with national, regional and local government bodies and its economic and environmental regulators in the planning and development of our strategies for the delivery of water services and our investment plans.

Our method of engagement will follow the direction of the Ministerial Guidelines to be prepared by the DECLG under section 28 of the Planning and Development Act, 2000 (as amended) and the requirements of Planning and Development Regulations 2001 (as amended).

We will support a collaborative approach with national, regional and local planning bodies to promote proper planning and co-ordinated development which is environmentally and economically sustainable. Water is a valuable asset necessary for the life, wellbeing and wealth of our nation. With the creation of Irish Water, we provide a coherent national focus in the discussions regarding regional and national spatial planning and in the provision of critical national water infrastructure to underpin the economy and support growth. We are committed to fulfilling our role as a statutory consultee in the preparation of regional, county and local development plans.

We will support the objectives of the Government's strategic approach to housing identified in Construction 2020<sup>1</sup> and will continue our participation in the Housing Supply Co-ordination Task Force for Dublin (established by the DECLG as an action under Construction 2020).

We will engage with potential new industrial and commercial customers and key stakeholders such as the IDA, Enterprise Ireland, trade representative bodies and government organisations to anticipate and deliver water services infrastructure to support industrial development and job creation. We will engage directly with all inquiries for possible development and will seek to provide accurate and timely information on the capacity and likely cost of meeting requirements for water services. We recognise the need to build confidence in our ability to cater for such development, responding efficiently to opportunity, as it arises.

<sup>1</sup> Construction 2020; A strategy for a renewed construction sector; May 2014; Government Publication; 2014

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## **SG2: FACILITATE GROWTH IN LINE WITH NATIONAL AND REGIONAL ECONOMIC AND SPATIAL PLANNING POLICY.**

### **[SG2a] Maximise capacity of existing assets through effective asset management and optimised operation.**

Irish Water has established an asset management approach to water services investment planning, which involves mapping and modelling our existing systems in the first instance and implementing management and operational policies to ensure that they operate effectively to their design capacity. This forms the basis on which all capacity planning is carried out, with scenarios examined which take full account of how existing assets can be utilised to their optimum and how they might be cost effectively upgraded to meet the capacity need and maintain a safe headroom.

### **[SG2b] Plan water service infrastructure at national, regional and river basin level.**

We are committed to providing strategic capacity to cater for domestic demand arising from population growth and non-domestic demand associated with this growth (e.g. demand from education, hospital and commercial facilities serving these populations). The objectives of the Government's strategic approach to housing identified in Construction 2020 must be provided for in terms of both treatment and network capacity. In addition, we are committed to facilitating the requirements of commercial and industrial development for water services on the basis of full cost recovery, based on the least cost principle (lowest cost of available options to meet the capacity need).

In order to deliver on this commitment we will take a national, regional and river basin perspective on the development and management of water services to meet existing and planned for demand. Through the preparation of national implementation plans such as the National Water Resources Plan we will ensure that the strategies identified in this Water Services Strategic Plan are implemented through a programme of works and subsequently through individual projects identified in our Capital Investment Plans.

In the development of the National Water Resources Plan we will target a rationalised approach towards fewer schemes based on larger and more sustainable sources to provide reliability of service, network resilience and value for money to our customers. Our objective is to optimise the resources available to us, including consideration of sustainable catchment transfers, where necessary, for adequacy and security of service.

Our Wastewater Compliance Strategy will focus on ensuring that wastewater treatment is provided where and when it is required and that our treatment plants achieve compliance with the requirements of the Urban Wastewater Treatment Directive and support the achievement of the quality objectives of the Water Framework Directive on a prioritised phased basis. Where investment in infrastructure is necessary in order to achieve water quality standards and wastewater compliance, we will include additional capacity to meet future planned demand where there is evidence that this demand is likely to be realised.

### **[SG2c] Invest in the development of strategic networks and treatment works.**

We will adopt a strategic planning perspective in respect of the delivery of strategic infrastructure. Strategic water and wastewater service plans will be prepared to quantify existing asset capacity and utilisation and assess how future demands will impact on our assets. This assessment will be completed under various growth scenarios, based on development plan projections. The scenarios will include short, medium and long term growth horizons. Appropriate design solution options to address these impacts will be generated, evaluated and costed, based on asset management principles.

A key element will be active engagement with planning authorities at an early stage in their planning process to facilitate appropriate consideration of water services and, in particular, to ensure awareness of water service related constraints that might impact on size, scale, cost and location of proposed development centres, including environmental impact.

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## **[SG2d] Maintain appropriate headroom in strategic water services infrastructure.**

A key element of Irish Water's strategy for meeting demand is the maintenance of an acceptable level of headroom (available capacity over current demand) in our systems to allow for growth potential and capacity risks. This is a key parameter in managing risks to service and takes account of the likelihood and consequences of failure from scheme to scheme. Once this headroom falls below the specified level, it acts as a trigger to provide a further increment of capacity.

Many water supply schemes currently have insufficient headroom to provide an acceptable protection against occasional loss of supply. For example, the Greater Dublin Area has regularly operated historically at headroom levels of 1-2%. Appropriate and timely investments are required to keep capacity abreast of demand and to maintain headroom for security of supply.

The capacity of most systems can be increased by extending existing treatment works and upsizing key pipelines and pumping stations. It is our long-term objective to provide for and maintain capacity headroom based on the size of the settlement served, the economic and social impact of failure and likely growth potential in line with the settlement hierarchy identified in the NSS and its successors as follows:

- Large urban settlements (Dublin, Cork, Limerick/Shannon, Galway and Waterford); 20% headroom.
- Regional Gateways; (Dundalk, Sligo, Letterkenny/Derry and Athlone/Tullamore/ Mullingar); 15% headroom.
- Other towns; 10% headroom.

If new industries require large one-off demands, then this would be provided for by utilising available reserves coupled with upsizing of treatment plants and networks to restore system capacity. The actual cost incurred in restoring the headroom would be recovered in full from that industry in accordance with provisions of our New Connections Charging Policy.

For water and wastewater networks we will develop hydraulic models to enable us to establish available capacity for growth and existing deficiencies. We will prepare strategic network development plans e.g. drainage area plans on phased basis for larger settlements which will set out how we will address existing deficiencies in capacity and cater for anticipated future growth. Growth provision will align with the prevailing "core strategies" in local authority development plans.

We commit to a long term objective to maintain and publish a treatment **headroom capacity register** on an on-going basis.

## **[SG2e] Provide a high quality customer service for new customers.**

Irish Water will provide a high quality service to new customers through our Connections and Developer Services Team which will have representatives located in each of our regional offices. Our team will consult with the developer/new customer to provide a detailed connection offer and will sign a connection agreement with the customer should the offer be acceptable. We will provide a clear set of design standards for water services infrastructure which must be implemented by the developer and inspected by Irish Water, where not directly provided by our contractors under the agreement, prior to any connection taking place.

Where we receive requests for connections from beyond our networks for existing developments served by private treatment facilities (for example ribbon development served by septic tanks) we will consider these with the CER based on the costs of service and the willingness of the property owners to sign development agreements and meet the costs involved. We will work with Group Sewerage Schemes to avail of grant support from the DECLG Rural Water Programme where relevant and will cooperate in 'Taking in Charge' connections infrastructure constructed to our requirements and meeting all prescribed tests on completion.

## **SG3: ENSURE THAT WATER SERVICES ARE PROVIDED IN A TIMELY AND COST EFFECTIVE MANNER**

### **[SG3a] Plan for water services infrastructure development to meet projected demand facilitating delivery on a phased basis.**

All Irish Water's assets are targeted to provide an appropriate return on investment to ensure that charges to our customer base are kept as low as possible. A balanced and timely approach to meeting existing and emerging demands is required to ensure that investment is not wasted on the development of premature and oversized water services. This requires that our forward planning is comprehensive and based on accurate knowledge of our system capacity across all of our schemes.

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When planning strategic infrastructure we must take an appropriate view of the cost of future upsizing of major infrastructure. Therefore, when planning for certain “one-off” infrastructure such as long distance pipelines, outfalls or strategic crossings (rail, motorway) we will take a long term view of likely future demands based on the fact that its future upsizing is not practical or economical.

Where possible, Irish Water will develop infrastructure assets, including critical national infrastructure, according to the following principles:

- We will develop water services demand forecasts taking cognisance of population/growth projections and national spatial and economic planning policies. Some large scale assets, which are ‘one off’ in nature, will be delivered on the basis of long term growth forecasts.
- We will review headroom in strategic infrastructure on a regular basis and consider upgrading the infrastructure if capacity has fallen below the target headroom for that facility. We will include a planned upgrade of the facility in our next Capital Investment Plan to cater for a projected growth for 5-10 years from the planned completion date of the upgrade.
- Treatment plants and major pumping facilities will be planned based on a modular design and a phased approach to construction. Capacity for growth would be added in time to support development. This has the benefit that our capital is used to best advantage and provides better value for money to our customers. The land requirement to accommodate the ultimate capacity of the plant will be considered such that land availability will not compromise the development of the plant to full capacity.
- New major pipelines need to be of sufficient size (diameter) so that they do not require to be augmented in the short to medium term.
- Outfalls from treatment plants and combined sewer overflows may be required to be constructed on a ‘one-off’ basis, similar to major pipelines.
- Crossings of major infrastructure, such as motorways, railways, or canals may also be sized for long term capacity, to avoid repeated and socially expensive disruption.
- We will work with local authorities, local development groups and private investors to ensure that smaller towns and villages are appropriately supported by water services infrastructure in line with:
  - Planned demand;
  - Identification of funding sources;
  - Selection of appropriate technical solutions; and
  - Growth opportunities in towns and villages on a cluster basis.

### **[SG3b] Balance investment for growth in demand with other priorities to ensure best outcome for customers.**

Irish Water faces many challenges in providing an appropriate level of water services to our customers, in achieving compliance with statutory standards and legislation and in facilitating growth while ensuring that our services are provided in an efficient and economic manner to existing and new customers.

We are required to operate in a commercially viable and environmentally responsible manner and must take this into consideration when considering priorities for investment.

As a national body we have the opportunity to align our capital investment in a national context and to balance our investment priorities to ensure the best outcome for our existing customers while facilitating future growth as far as is practicable.

To achieve this balance we will engage with the EPA and CER to create alignment and agree priorities which support national planning policy and provide best outcomes for our customers.

## [SG3c] Operate an equitable New Connections Charging Policy that ensures efficient service provision to new customers with full cost recovery.

Prior to the establishment of Irish Water, each local authority set their own connection charging policy in terms of a Connection Fee and Planning Levies. Irish Water will operate a New Connection Charging Policy at a national level which clearly sets out our charges for all new customers based on full recovery of the cost to Irish Water of connecting customers to a public water/wastewater system. Our New Connection Charging Policy will be fully approved by the CER and we expect a uniform approach across the country.

Irish Water will work to ensure, through our New Connection Charging Policy and our investment plans, that the cost of developing water services and connecting to the Irish Water network is equitably apportioned between new and existing customers.

### Indicators and Targets

Indicators and targets for the objective to support social and economic growth are presented in the table below.

Primary Objective	SUPPORT SOCIAL AND ECONOMIC GROWTH				
Indicators	Definition	Current Baseline	End of 2021 Target	End of 2027 Target	2040 Target
AIM SG2	Facilitate Growth in line with National and Regional Economic and Spatial Planning Policy				
Availability of Headroom at Water & Wastewater Treatment Plants to meet Core Strategies	% of treatment plants with 20% capacity headroom in large urban areas, 15% headroom in Regional Gateway Towns, 10% headroom at all other plants	 Establish a register of current available headroom against required headroom by 2016.	 60% of plants meet headroom target	 75% of plants meet headroom target	 100% of plants meet target
Capacity in Strategic Networks to Support Growth	Availability of hydraulic models and strategic network development plans	 Establish a register of strategic networks and current availability of hydraulic models for water and wastewater networks by 2016	 Have hydraulic models and strategic network development plans for large urban areas & Gateway Towns	 Have hydraulic models and strategic network development plans for settlements > 2000 population	 Have hydraulic models and strategic network development plans for settlements > 2000 population

# Chapter 8

Objective:

# Invest in Our Future



## Our Strategic Aims

- Manage our assets and investments in accordance with best practice asset management principles to deliver a high quality secure and sustainable service at lowest cost.
- Invest in our assets while maintaining a sustainable balance between meeting customer standards, protecting the environment and supporting the economic development and growth of the country.
- Establish a sustainable funding model to ensure that Irish Water can deliver the required capital investment in order to achieve the required outcomes.
- Promote research and proven, innovative technical solutions to meet standards set by our regulators including our objectives for cost and energy efficiency.

### The Current Situation

An historic under-investment in our water and wastewater networks and treatment facilities means that we now have to secure significantly increased levels of funding in order to achieve adequate standards of drinking water and wastewater compliance, to provide for renewal of assets and to support the growth of the country. A particular challenge is the lack of knowledge of the condition and risk of failure of critical assets in the system. Examples of such assets which pose a threat to service reliability and standards are:

- Nineteenth century water treatment plants such as those at Roundwood (Vartry) and Cork City (Lee Road) where the original assets remain in service.
- Strategic water supply pipelines in cast iron, asbestos cement and concrete construction are in service beyond the normal design life and critical to customer service.
- Combined sewers in large urban centres of brick or masonry construction are known to be leaking, admitting fresh and salt water ingress, and structurally unsound (for example, Limerick and Cork City centre sewers).

Irish Water has been established as a customer focussed and asset management driven organisation, in line with best international practice in the water utility sector. In developing its capability, a key focus is an asset management approach to provide a radical transformation in the water services planning and delivery model in Ireland. On the basis of a sustainable funding model, Irish Water will target the necessary levels of investment to secure the condition of our critical assets to enable the required standard of quality and reliability in water services for our customers and the national economy. An informed evidence based approach to asset management will deliver the benefits of this investment, at lowest cost.

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## Key Challenges

Our key challenges are:

- Overcoming a deficit in knowledge of our assets location, condition, performance and life expectancy.
- Implementing an asset management strategy, with a detailed asset register and clearly defined critical assets.
- Investing in fixing current issues with water supply and wastewater service, targeting minor capital and improved operating programmes to overcome shortfalls and remove risks.
- Engaging with our customers, regulators and other stakeholders to ensure there is a sustainable balance between the interests of our customers, the environment and the need to support the economic development and growth of the country.
- Establishing a sustainable funding model to ensure that Irish Water can deliver the required capital investment in order to achieve the required outcomes for our customers, the environment and the national economy.
- Implementation of innovation, research and development in support of better asset performance and least costs new infrastructure.



## What our Customers Can Expect from Us

In the future, our customers can expect us to manage and obtain the best value from our existing assets and to deliver our commitments to safe water supply, environmental compliance, resilient capacity and energy efficiency. We will utilise best international practice in the delivery of our water and wastewater services, applying innovative and state of the art solutions to upgrade our assets and provide new infrastructure where these have been proven to deliver.

## Objectives and Strategies

The proposed strategies to meet the above challenges and achieve this objective are summarised in the table below and are detailed in the remaining sections of this chapter.

Strategy	Purpose
<p><b>IF1 – Asset Management</b> - Manage our assets and investments in accordance with best practice asset management principles to deliver a high quality secure and sustainable service at lowest cost.</p>	
IF1a	<p>Implement asset management systems including comprehensive asset data collection and modelling tools.</p> <p>To enable the optimisation of asset performance through the optimum balance of operational, maintenance and capital investment for delivery of services at lowest long term costs.</p>
IF1b	<p>Develop long term asset strategies and implementation plans (Tier 2).</p> <p>To deliver operational cost efficiencies, meet capacity and performance needs and improve system resilience, through rationalisation and strategic forward planning.</p>
IF1c	<p>Development of initiatives such as asset standards and improved supply chain management.</p> <p>To deliver continuous improvement in value for money and reduce the cost of future investment to customers from standardisation of approach.</p>
<p><b>IF2 – Balanced Sustainable Investment</b> - Invest in our assets while maintaining a sustainable balance between meeting customer standards, protecting the environment and supporting the economic development and growth of the country.</p>	
IF2a	<p>Engage with our customers, including households, commercial and industrial customers.</p> <p>To develop a balanced picture of customer concerns, issues and priorities to inform our strategy and deliver optimal outcomes which meet customer needs.</p>
IF2b	<p>Engage collaboratively with key stakeholders including CER, EPA, DECLG, HSE, regional and local authorities.</p> <p>To achieve optimum investment outcomes for customers, the environment and the national economy which satisfy national policy and growth projections.</p>
IF2c	<p>Apply clear and transparent investment prioritisation criteria.</p> <p>To ensure an appropriate balance between the interests of our customers, the environment and the need to support balanced regional development.</p>

Strategy	Purpose	
<p><b>IF3 - Sustainable Funding Model</b> - Establish a sustainable funding model to ensure that Irish Water can deliver the required capital investment in order to achieve the required outcomes.</p>		
IF3a	Transform the water industry in Ireland to an efficient water utility model within a regulated framework.	To deliver a sustainable funding model including off balance sheet funding as required, while achieving efficient capital and operational delivery.
IF3b	Work with regulators to achieve optimum balance of cost and service standards taking into account regulatory requirements.	To ensure that funding and investment plans deliver the best possible outcomes taking account of cost to customers and the state as a key issue.
IF3c	Deliver on Irish Water's commitments to raise public awareness of the value of water and achievements delivered.	To raise public awareness of the value of water resources and the benefits to customers, the environment and the national economy which Irish Water delivers.
<p><b>IF4 - Research and Innovation</b> - Promote research and proven, innovative technical solutions to meet standards set by our regulators including our objectives for cost and energy efficiency.</p>		
IF4a	Actively pursue research and development in water services and track opportunities to develop and adopt new technologies.	To adopt new technologies and innovation which will improve quality of service and/or reduce cost and carbon footprint.
IF4b	Engage effectively with universities, Institutes of Further Education, colleges and industry.	To ensure that opportunities for innovation through existing and on-going research and development are fully exploited.
IF4c	Develop knowledge management capability and implementation processes.	To maximise the benefits from innovative solutions.

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**IF1: ASSET MANAGEMENT - Manage our assets and investments in accordance with best practice asset management principles to deliver a high quality, secure and sustainable service at lowest cost.**

**[IF1a] Implement Asset Management Systems including comprehensive asset data collection and modelling tools.**

Asset management is the internationally accepted basis for cost effective management of extensive and spatially distributed assets in order to deliver a consistent and adequate level of service to all connected customers.

Asset management is based on robust and reliable information on infrastructure which is vital to inform critical maintenance and future investment plans and to target improvements where they are most needed. Irish Water has developed a national spatially referenced asset database in GIS format drawing together, for the first time, all available records from each of the 31 local authorities. To bring this knowledge up to the level required for asset planning and modelling, and combine this into consistent, accurate databases, we commenced a national asset data gathering and asset condition exercise in 2014 which is to be completed by 2018.

In addition, the asset management function will develop consistent standards, specifications, operation and maintenance programmes to manage the asset base. This has commenced with review of relevant international practise documents from high performing water companies, which are being adapted for Irish application. We are similarly developing the technologies required for remote monitoring of critical plants and network service indicators in order to support operating staff and response to incidents.

We are seeking to implement a strategy that optimises the life of our assets; balancing capital investment with maintenance and operation of the assets and thereby improving the life and safety of the assets and reducing performance risk.

**[IF1b] Develop long term asset strategies and implementation plans (Tier 2 plans).**

In order to deliver on the objectives of this WSSP, Irish Water will develop a series of implementation plans defining the programmes of work to be implemented. These plans will develop the range of scenarios and options from which the optimum approaches and prioritisation will be determined. The plans will take full account of the asset standards and policies adopted by Irish Water in shaping the strategic solutions. Where required, the plans will be subjected to Strategic Environmental Assessment and Appropriate Assessment, including public consultation. The plans will include:

- National Water Resources Plan, to assess present and future needs and resources at a regional level, taking account of resource constraints, and including sustainable inter-catchment or inter-regional transfers where required for secure resilient water supplies.
- Wastewater Compliance Plan, to determine the optimum strategies towards meeting compliance with license requirements while catering for future needs.
- National Wastewater Treatment Sludge Management Plan to define the optimum strategy for the re-use of sewage sludge, recovery of energy and disposal of waste residues.
- National Water Treatment Sludge Management Plan to develop an optimum national approach to water treatment process sludge disposal, in a sustainable cost effective manner.

All of these Implementation Plans (Tier 2) will require collection of relevant data, consideration of all relevant EU and National standards and policies, development of models and consideration of all technical, environmental and economic parameters.

**[IF1c] Development of initiatives such as asset standards and improved supply chain management.**

Asset standards are the technical standards used in the design and operation of water and wastewater infrastructure, which aim to ensure that the best solutions are adopted for new assets.

## Case Study

# Asset Management

Irish Water is responsible for operation and maintenance of several hundred thousand individual mechanical and electrical pieces of equipment across around 7,000 sites required to deliver water and wastewater services. Best practice asset management involves the care and maintenance of the assets based on comprehensive asset data so that the best value is obtained from the assets and water services are delivered at least cost.

Irish Water has developed an assets register down to individual component level, against which individual standards will be put in place. Our immediate priority is the identification of Critical Assets, being those assets whose failure would give rise to high customer impact on a large scale. The priority is to address the condition and likelihood of failure and its consequences. Investment plans must address the management of these key risks.



*Water Supply Pumping Station: Photo: Maurice O'Connell*

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We will develop and adopt a single set of national asset standards that will be periodically updated to reflect new innovative technology and changes in legislation. The benefits of having Irish Water asset standards will include standardisation, the selection of optimum solutions for new investment, reduced design costs and lower maintenance costs.

Irish Water has established central procurement for all goods and services required in the operation and investment in the services. We will use our national buying power to procure goods and services, standardising what we buy and ensuring that our supply chain is aligned to our requirements, particularly our adopted standards for quality, reliability and energy efficiency. We will procure goods and services in the competitive market place based on international best practice complying with procurement legislation. We will purchase goods and services using frameworks (longer term relationships), call off contracts (purchasing one item at a time) or discrete one off contracts where it is commercially beneficial to do so.

**IF2: BALANCED SUSTAINABLE INVESTMENT - Invest in our assets while maintaining a sustainable balance between meeting customer standards, protecting the environment and supporting the economic development and growth of the country.**

**[IF2a] Engage with our customers, including households, commercial and industrial customers.**

We will consult regularly with our customers and stakeholders and provide information so that all interested parties will be informed of our activities. As we develop our strategies and plans, these will be subject to consultation as appropriate, including the preparation of Strategic Environmental Assessments and Appropriate Assessments as required.

Our approach to investment in infrastructure, operations and maintenance, will be directed to achieving our key objectives which are based on delivery of services to our customers. We will engage with our customers to outline the issues, explain the options and ascertain feedback and input to assist us to determine preferences.

**[IF2b] Engage collaboratively with key stakeholders including CER, EPA, DECLG, HSE, regional and local authorities.**

Our operations are regulated by both CER for economic matters and the EPA for environmental matters and water quality standards. We will liaise closely with the DECLG in relation to matters of national policy and with the Health Service Executive (HSE) in regard to public health issues. Other key statutory consultees will include the National Parks and Wildlife Service, the regional and local authorities, IDA and the Health and Safety Authority (HSA). Consultation with special interest groups and the general public will be undertaken where they are affected.

**[IF2c] Apply clear and transparent investment prioritisation criteria.**

When the level of available funding is less than the investment needed, then prioritisation criteria are required to decide which capital projects can proceed and which must be deferred until funding becomes available. We will develop clear and transparent prioritisation criteria for agreement with CER, EPA and DECLG. This should ensure that the best outcomes are delivered for our customers, the environment and the national economy.

**IF3: SUSTAINABLE FUNDING MODEL - Establish a sustainable funding model to ensure that Irish Water can deliver the required capital investment in order to achieve the required outcomes.**

**[IF3a] Transform the water industry in Ireland based on an efficient water utility model within a regulated framework**

There has been a significant under-investment in water services infrastructure in Ireland over many decades which has resulted in current problems with water quality and reliability, high levels of leakage and below standard wastewater management across many parts of the country. From the first National Public Health Acts in 1878, to the setup of Irish

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Water, the responsibility for water services rested with Ireland's local authorities. In that period, the requirements evolved from a low technology, labour intensive enterprise to a modern, high technology industry. The need for a national approach with central and regional structures is evident from:

- The need for an integrated national set of asset data, technical models and development strategies on which all operational and investment decisions can be based.
- The need to integrate capital and operational investment decision making within an asset management framework, supported by high technology analytical systems to ensure the best service outcomes at the least cost.
- Developing the required technical competencies and specialisations (e.g. asset planning, process control, leakage reduction, trade discharge control, new connections and energy management) by combining local resources at central and regional sites.
- Delivering economies of scale by combining procurement of both goods and services and capital delivery. We expect that this approach will enable much more effective performance in areas such as leakage reduction and energy management.
- Achieving better outcomes from existing assets by introducing standard ways of working and maintaining assets and resolving customer problems.
- Using detailed workflow data (capturing all operational activity onto the asset database) to transition from reactive maintenance (in response to failure) towards greater planned maintenance, which ultimately greatly reduces asset risk and therefore improves outcomes.
- Deliver maximum savings in operation based on the best balance of staffing, technologies and asset maintenance, assuming that the critical investment needs are provided and the organisational transformation is completed.

To address the acknowledged infrastructure deficit, capital investment of around €600M per year will be required for a sustained period, probably several decades. One of the main elements of the Government's Water Sector Reform Programme was the establishment of a sustainable funding model which would enable this necessary capital investment to be put in place over the coming years. The main components included the establishment of Irish Water as an independent state-owned water utility, the introduction of a sustainable funding model including domestic water charges and independent regulation of water services by the CER.

Irish Water is committed to continuing to work with the local authorities under the Service Level Agreements (SLA's) to continue the industry transformation, including regional shared working across county boundaries and implementation of those initiatives required for service improvement and cost reduction.

Because of the very high levels of investment required in water services infrastructure and also the significant constraints on Government borrowing, the Water Sector Reform Programme had at its core a sustainable funding model whereby Irish Water would be able to raise finance in its own capacity.

In order for Irish Water to be able to raise significant finance at favourable interest rates, it will be necessary for Irish Water to demonstrate that it is an efficient water utility company operating within a stable regulatory framework with secure revenue streams. It is a core objective of Irish Water to deliver continuous improvement in water services delivery combined with cost efficiency to match international benchmark levels when the necessary structural reforms supported by investment in systems are in place. This should facilitate raising finance at favourable rates while ensuring that the overall cost is minimised.

### **[IF3b] Work with regulators to achieve optimum balance of cost and service standards taking into account regulatory requirements**

For Irish Water's investment plans to be sustainable they must be efficiently delivered at the least cost of service on a whole life basis. This consideration has to be balanced with ensuring sufficient funding to deliver the service levels required, taking account of the state of the assets and the committed costs inherited from the local authorities.

To this end, Irish Water will work closely and collaboratively with our regulators, CER and EPA, to agree priorities for the available funds to enable us to deliver the best possible outcomes in terms of drinking water quality, water services reliability, environmental protection and provision for growth.

### **[IF3c] Deliver on Irish Water's commitments to customers and the country and raise public awareness of the value of water and achievements delivered.**

Ireland's plentiful water resources are one of our most valuable national assets which provide tremendous economic, environmental and amenity value to our citizens and visitors. This natural resource, provided it is effectively managed,

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can also give us a significant advantage as we compete internationally for investment and job creation particularly in water dependant sectors of the economy.

Provision of safe, secure drinking water and effective wastewater management and treatment involves complex processes and requires significant investment in capital works as well as operation and maintenance. For a modern water utility, this requires the use of modern technologies in treatment, network management and energy efficiency. It also requires an asset management capability driving workflow activity, tracking outcomes and targeting all investments with the benefit of full asset data supporting decision making.

It is an objective of Irish Water to achieve public awareness of the value of water and the complexity of water services delivery. This will identify, over time, the benefits which Irish Water delivers in terms of drinking water safety and security, environmental protection and support for economic growth and development. This requires a secure revenue stream from customers which will in turn support the sustainable funding model to deliver the required levels of investment in our water services infrastructure.

#### **IF4: RESEARCH AND INNOVATION - Promote research and proven, innovative technical solutions to meet standards set by our regulators including our objectives for cost and energy efficiency.**

##### **[IF4a] Actively pursue research and development in water services and track opportunities to develop and adopt new technologies.**

Innovation in the provision of water services will be integral to delivering benefits in efficiency, customer service and water and environmental quality. This will enable the application of the most appropriate and sustainable solutions, drawing on best international practice and the required automation and instrumentation for central monitoring and control of asset condition and performance.

In addition to constant review of international practice, we will support local research and development to achieve the best outcomes for our customers and the environment.

We will pursue innovation in three ways:

- Collaboration with government organisations, academic institutions and other organisations to pursue research and innovation opportunities in solving technical challenges;
- Research and pilot innovative technologies, processes and systems for local application to meet specific quality needs and deliver cost effectiveness; and
- Collaboration with other water utilities and become a “fast follower” (i.e. learn best practices).

We will investigate alternative and innovative solutions in relation to both new projects and for the upgrading of existing plants and networks. Investment decisions will be based on solutions that provide the lowest whole life cost whilst also meeting our energy and carbon commitments.

##### **[IF4b] Engage effectively with universities, Institutes of Further Education, colleges and industry.**

We intend to engage actively with universities, colleges and industry to ensure that new technologies and innovative techniques are given due consideration on all our projects. We will work to achieve enduring relationships with the universities and technical colleges around shared objectives.

Innovation developed by industry for water services both here in Ireland and internationally can accelerate efficiencies in the delivery of our water services. Examples of this might be improvements to pump design resulting in energy efficiency, development of new wastewater treatment techniques or the reuse of chemicals to reduce our use of resources. We will work to ensure that our procurement approach is open to proven innovative options.

## Case Study

# Ringsend Wastewater Treatment Plant

The Ringsend Wastewater Treatment Works was designed for a capacity of 1.64 million Population Equivalent (PE) but is now operating just slightly over that capacity. To cater for the existing load and accommodate growth in the region, it is necessary to upgrade and expand the treatment works to its maximum capacity, which is estimated to be c. 2.1 million PE. The proposed upgrade must also achieve improved treated effluent quality in terms of nitrogen and phosphorus standards in order to conserve good water quality in the Liffey Estuary and Dublin Bay, based on their current designations. A scheme to expand and upgrade the treatment works has been approved by An Bord Pleanála.

Expansion and upgrading of the Ringsend Wastewater Treatment Plant is an urgent priority for Irish Water and a revision to the approved scheme to achieve required outcomes at least cost is currently being evaluated in partnership with Dublin City Council. Irish Water is proposing an innovative wastewater treatment technology for the upgrade and this innovative solution can result in a higher treatment standard to the benefit of Dublin Bay and a cost saving of €170 million compared to previous project proposals. Any proposed revisions to the approved scheme will be subject to environmental/planning approvals as appropriate.



*Ringsend Wastewater Treatment Plant and Power Station. Photo: Irish Water*

## [IF4c] Develop knowledge management capability and implementation processes.

Knowledge management is the process of capturing, developing, sharing, and effectively using organisational knowledge. It refers to a multi-disciplined approach to achieving organisational objectives by making the best use of knowledge by all parts of the organisation, including the local authority staff working under the SLAs.

The management and sharing of the combined knowledge and expertise within Irish Water and the local authorities is a key objective that will lead to improved performance, innovation, the sharing of lessons learned, integration and continuous improvement of the delivery of water services.

The use of knowledge management within Irish Water will mean that the benefits from innovative solutions will be adopted across the country and this will generate efficiencies and value for water customers.

### Indicators and Targets

Indicators and targets for this Objective to Invest in Our Future are presented in the graphic below.

Primary Objective	INVEST IN OUR FUTURE				
Indicators	Definition	Current Baseline	End of 2021 Target	End of 2027 Target	2040 Target
AIM IF2	Balanced Sustainable Investment				
Outcomes of Capital Investment Plans	Capital Investment Plans delivered (on time and within budget) within the investment period	 Establish baseline conditions of critical assets by 2018	 100% Delivery of Outcomes identified in Capital Investment Plan 2017 - 2021 as agreed with the CER	 Deliver IW objectives through balanced investment at least cost within approved funding model	 Deliver IW objectives through balanced investment at least cost within approved funding model
AIM IF3	Sustainable Funding Model				
Operational and Capital Efficiency	Meet CER's requirements for operational and capital efficiency	 Develop Best Practice Asset Management Principles and Systems	 Meet 100% of the requirements identified by CER with respect to operational and capital efficiency	 Meet 100% of the requirements identified by CER with respect to operational and capital efficiency	 Meet 100% of the requirements identified by CER with respect to operational and capital efficiency

# Glossary and Abbreviations



*Children on Beach*  
*Photo: Sinead McGinley*

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# Glossary and Abbreviations

Abbreviations	
CER	Commission for Energy Regulation
DECLG	Department of Environment, Community and Local Government
EPA	Environmental Protection Agency
RBMPs	River Basin Management Plans
RBD	River Basin District
UWWTD	Urban Wastewater Treatment Directive
WFD	Water Framework Directive
WSZ	Water Supply Zone

Glossary	
Abstraction	The removal of water from a river, lake or groundwater usually with the use of a pump.
Agglomeration	An urban settlement (village, town or city area) which is connected through a pipe network to a wastewater treatment plant. Agglomeration areas are defined on maps and used to plan wastewater services infrastructure.
Asset	Infrastructure (e.g. buildings, treatment plants) and equipment (e.g. pumps, screens, treatment units, disinfection systems and control panels) controlled and operated by Irish water to deliver water and wastewater services. We divide these into Below Ground Assets such as pipework and valves and Above Ground Assets such as treatment plants.
Borehole	A vertically drilled hole into the subsoils and/or bedrock which is used to monitor or abstract groundwater. A borehole is usually lined with a casing and/or screen to prevent it from collapse.
Biodiversity	The variety of all living things.
Catchment	The area of land where surface water from rainfall converges to a single point at a lower elevation, usually a point in a river, lake or an estuary. The catchment includes all drainage channels, tributaries (smaller streams) and floodplains.
Catchment Boundary or Watershed	The topographic line defining the catchment.
Discharge	Treated effluent from a wastewater treatment plant which is returned to the water environment. This is usually from a pipe and outflow structure into a river or the sea.
Drinking Water Regulations	European Union (Drinking Water) Regulations 2014 - S.I. No. 122 of 2014.
European Directive	A legal act of the European Union which requires member states to achieve a particular result. Examples are the Drinking Water Directive, Urban Wastewater Treatment Directive and the Water Framework Directive.
Groundwater	Water located beneath the ground surface in soil and rock pore spaces and fractures within rock formations.
Headroom	Spare capacity in water and wastewater infrastructure (treatment plants and networks) to cope with adverse weather conditions or unplanned incidents such as a break in a trunk main or equipment failures at a treatment plant.

Glossary	
Network	The interconnection of pipes and pumping stations used for the distribution of treated water and the collection of wastewater.
Plumbosolvency	The ability of water to dissolve lead into water supplies from lead pipes.
Population Equivalent (PE)	Wastewater treatment plants are described in terms of their designed treatment capacity, which is generally expressed as population equivalents (PE). This is a measurement of total organic biodegradable load, including industrial, institutional, commercial and domestic organic load, on a wastewater treatment plant, converted to the equivalent number of population equivalents (PE). One person is considered to generate 60g of BOD per day (BOD is the 5 day biochemical oxygen demand); and 1 PE is defined as being equivalent to 60g of BOD per day.
Raw Water	Water abstracted for drinking water purposes before treatment.
Regional Planning Guidelines	Regional Planning Guidelines (RPGs) are policy documents which aim to direct the future growth of a region over the medium to long term. They appraise the critical elements involved in ensuring sustainable and good planning in the right places, and though the protection of sensitive or environmentally important locations. The Guidelines inform and direct the City and County Development Plans of each of the Councils. The Planning and Development Act, 2000 (as amended) requires that all Regional Authorities shall at the direction of the Minister make Regional Planning Guidelines. Eight Regional Authorities were set up in 1994 under the Local Government Act 1991 (Regional Authorities) Establishment Order 1993. However, the 8 Regional Authorities have been reconfigured to 3 Regional Assemblies under the Local Government Reform Act, 2014 and the RPGs will be replaced by Regional Spatial and Economic Strategies to be published in 2016.
Resilience	The ability of a system (e.g. water supply zone or wastewater network) to cope with change or stress. In a water services context stress to the system or network could result from increased demand, partial failure of operating plant, climate change or local contamination of water sources.
River Basin District	A group of catchments which are defined within River Basin Management Plans prepared under the Water Framework Directive.
River Basin Management Plans	A plan for a group of catchments which contains a range of measures (proposals) aims at protecting and improving the use of the water environment.
Standard Operating Procedures	Detailed, written instructions and rules for managing and operating assets.

## Glossary

Sustainable Economic Level of Leakage	The level of leakage from underground pipes where it becomes economically and environmentally unsustainable to invest in further reductions in leakage. The cost (financially and environmentally) to fix the leakage is greater than the cost of water being lost.
Water Body	A defined section of river, lake or groundwater identified in the water body characterisation of the River Basin Management Plans developed under the Water Framework Directive.
Water Body Objectives	Environmental objectives set for each water body assessed within the River Basin Management Plans. The objectives could relate to achieving Good Status for the water body (requiring improvements to water quality, ecology, channelisation or other factors) or to no deterioration in status.
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.

# Appendix 1 - EPA Remedial Action List (2013)

## WATER SUPPLY

Local Authority		Name of Water Supply	Scheme Code
1.	Cavan Co.Co	Kingscourt	0200PUB1015
2.	Cork (West) Co.Co	Castletownbere New	0500PUB4205
3.	Cork (West) Co.Co	Drimoleague	0500PUB4103
4.	Cork (West) Co.Co	Kealkill	0500PUB4105
5.	Cork (West) Co.Co	Schull	050PUB4503
6.	Cork City Co.	Cork City Water Supply	0400PUB1001
7.	Donegal Co.Co	Cashilard	0600PUB1106
8.	Donegal Co.Co	Cresslough	0600PUB1075
9.	Donegal Co.Co	Fintown	0600PUB1065
10.	Donegal Co.Co	Glenties-Ardara	0600PUB1070
11.	Donegal Co.Co	Gortahork-Falcarragh	0600PUB1059
12.	Donegal Co.Co	Greencastle	0600PUB1015
13.	Donegal Co.Co	Owenteskna/Kilcar	0600PUB1091
14.	Donegal Co.Co	Letterkenny	0600PUB1110
15.	Donegal Co.Co	Portnoo-Narin	0600PUB1068
16.	Donegal Co.Co	Rathmullen	0600PUB1053
17.	Dublin City Co.	Ballyboden	0700PUB1002
18.	Dublin City Co.	Ballymore Eustace-Leixlip & Vartry/Ballymore Eustace	0700PUB1006
19.	Dublin City Co.	Vartry-Ballymore Eustace	0700PUB1007
20.	Dunlaoighre Rathdown Co.Co	Stillorgan	1000PUB1001
21.	Dunlaoighre Rathdown Co.Co	Roundwood	1000PUB1006
22.	Dunlaoighre Rathdown Co.Co	Church Road	1000PUB1007

## Appendix 1 - EPA Remedial Action List (2013)

### WATER SUPPLY continued

Local Authority		Name of Water Supply	Scheme Code
23.	Galway Co.Co	Ballinasloe Rws	1200PUB1004
24.	Galway Co.Co	Ballyconneely P.S	1200PUB1005
25.	Galway Co.Co	Carraroe PWS	1200PUB1009
26.	Galway Co.Co	Glenamaddy	1200PUB1021
27.	Galway Co.Co	Inishere P.S	1200PUB1025
28.	Galway Co.Co	Kilmor PWS	1200PUB1032
29.	Galway Co.Co	Kilkerrin/Moylough	1200PUB1031
30.	Galway Co.Co	Leenane P.S	1200PUB1035
31.	Galway Co.Co	Mid Galway	1200PUB1038
32.	Galway Co.Co	Portumna PS	1200PUB1042
33.	Galway Co.Co	Williamstown PS	1200PUB1049
34.	Kerry Co.Co	An Clochan 028D	1300PUB1027
35.	Kerry Co.Co	Ballinaskelligs 008H	1300PUB1049
36.	Kerry Co.Co	Ballymacadam 402F	1300PUB1102
37.	Kerry Co.Co	Barraduff 014A	1300PUB1015
38.	Kerry Co.Co	Caherdaniel 019H	1300PUB1051
39.	Kerry Co.Co	Caherciveen 017H	1300PUB1050
40.	Kerry Co.Co	Caragh Lake 022A	1300PUB1046
41.	Kerry Co.Co	Castlecove 023H	1300PUB1052
42.	Kerry Co.Co	Castlegregory 024D	1300PUB1026
43.	Kerry Co.Co	Cill Maoltheadair 047D	1300PUB1112
44.	Kerry Co.Co	Dingle 030D	1300PUB1034

## Appendix 1 - EPA Remedial Action List (2013)

### WATER SUPPLY continued

Local Authority		Name of Water Supply	Scheme Code
45.	Kerry Co.Co	Dun Chaoin 034D	1300PUB1035
46.	Kerry Co.Co	Glen 039H	1300PUB1098
47.	Kerry Co.Co	Inch PWS 044D	1300PUB1040
48.	Kerry Co.Co	Kenmare 045A	1300PUB1058
49.	Kerry Co.Co	Kilgarvan 046A	1300PUB1059
50.	Kerry Co.Co	Kilsarkin 403F	1300PUB1103
51.	Kerry Co.Co	Lauragh 051A	1300PUB1060
52.	Kerry Co.Co	Lisarboola 404F	1300PUB1105
53.	Kerry Co.Co	Lisloose Reservoir	1300PUB1106
54.	Kerry Co.Co	Lough Guitane 400F	1300PUB1016
55.	Kerry Co.Co	Maulin 066H	1300PUB1115
56.	Kerry Co.Co	Milltown (Poulgorum)	1300PUB1118
57.	Kerry Co.Co	Minard No.1 (Puck Island)	1300PUB1042
58.	Kerry Co.Co	Mountain Stage 062A	1300PUB1119
59.	Kerry Co.Co	Murreigh Ballydavid 063D	1300PUB1044
60.	Kerry Co.Co	Portmagee 064H	1300PUB1055
61.	Kerry Co.Co	Shrone 078A	1300PUB1121
62.	Kerry Co.Co	Templenoë 073A	1300PUB1062
63.	Kerry Co.Co	Ventry 074D	1300PUB1045
64.	Kerry Co.Co	Waterville 075H	1300PUB1057
65.	Kilkenny Co.Co	Inistioge WS	1500PUB1009
66.	Kilkenny Co.Co	Kilkenny City (Radestown) WS	1500PUB1010

## Appendix 1 - EPA Remedial Action List (2013) WATER SUPPLY continued

Local Authority		Name of Water Supply	Scheme Code
67.	Laois Co.Co	Portlaoise	1600PUB1004
68.	Leitrim Co.Co	South Leitrim Regional	1700PUB1100
69.	Longford Co.Co	Newtown Cashel	2000PUB1012
70.	Louth Co.Co	Omeath	2100PUB1012
71.	Louth Co.Co	Staleen	2100PUB1019
72.	Mayo Co.Co	Inishurk	2200PUB1031
73.	Mayo Co.Co	Kilmaine PS	2200PUB1016
74.	Mayo Co.Co	Kiltimagh	2200PUB1032
75.	Mayo Co.Co	Lough Mask	2200PUB1032
76.	Meath Co.Co	Ballinaclose	2300PUB2005
77.	Meath Co.Co	East Meath	2300PUB1008
78.	Meath Co.Co	Kells-Oldcastle	2300PUB1011
79.	Meath Co.Co	Navan & MidMeath PWS	2300PUB1016
80.	Meath Co.Co	Trim PWS	2300PUB1009
81.	Monaghan Co.Co	Carrickmacross	2400PUB1005
82.	Monaghan Co. Co	Lough Egish RWSS	2400PUB1001
83.	Roscommon Co.Co	Ballyfarnan	2600PUB1009
84.	Roscommon Co.Co	Ballinlough/Loughglynn	2600PUB1014
85.	Roscommon Co.Co	Boyle/Ardcarne	2600PUB1011
86.	Roscommon Co.Co	Boyle	2600PUB1023
87.	Roscommon Co.Co.	Castlerea Urban	2600PUB1016
88.	Roscommon Co.Co	Castlerea Regional	2600PUB1015

## Appendix 1 - EPA Remedial Action List (2013)

### WATER SUPPLY continued

Local Authority		Name of Water Supply	Scheme Code
89.	Roscommon Co.Co	North East RWSS	2600PUB1007
90.	Roscommon Co.Co	Roscommon Central	2600PUB1002
91.	Roscommon Co.Co	SRRWSS – Killeglan	2600PUB1004
92.	Roscommon Co.Co	SRRWSS - Lisbrock	2600PUB1022
93.	Roscommon Co.Co	NRRWSS	2600PUB1012
94.	Sligo Co.Co	Kilaraght Public Water Supply	2700PUB2714
95.	Sligo Co.Co	Lough Gill Regional Water Supply	2700PUB2710
96.	Sligo Co.Co	Lough Talt Regional Water Supply	2700PUB2702
97.	Sligo Co.Co	South Sligo Regional Water Supply	2700PUB2709
98.	South Tipperary Co.Co.	Burncourt	2900PUB0104
99.	South Tipperary Co.Co.	Carrick-on-Suir (Crotty's Lake)	2900PUB0118
100.	South Tipperary Co.Co	Carrick-on-Suir (Lingaun River)	2900PUB0150
101.	South Tipperary Co.Co	Clonmel Poulavanogue	2900PUB0109
102.	South Tipperary Co.Co	Cloran Regional	2900PUB0110
103.	South Tipperary Co.Co	Gortnapisha	2900PUB0137
104.	South Tipperary Co.Co	Graigue	2900PUB0205
105.	South Tipperary Co.Co	Mullenbawn	2900PUB0149
106.	Waterford Co.Co	Ballyhane	3100PUB1089
107.	Waterford Co.Co	Colligan	3100PUB1032
108.	Waterford Co.Co	Croan Upper	3100PUB1035
109.	Waterford Co.Co	Inchinleamy	3100PUB1054
110.	Waterford Co.Co	Ring/Helvick	3100PUB1084

## Appendix 1 - EPA Remedial Action List (2013)

### WATER SUPPLY continued

Local Authority		Name of Water Supply	Scheme Code
111.	Waterford Co.Co	Smoorebeg	3100PUB1092
112.	Waterford Co.Co	Tallow	3100PUB1095
113.	Wexford Co.Co	Sow Regional	3300PUB1641
114.	Wicklow Co.Co	Arklow Public Supply	3400PUB1004
115.	Wicklow Co.Co.	Aughrim/Annacurra	3400PUB1023
116.	Wicklow Co.Co	Avoca/Ballinaclesh Public Supply	3400PUB1024
117.	Wicklow Co.Co	Enniskerry Public Supply	3400PUB1024
118.	Wicklow Co.Co	Glenealy Public Supply	3400PUB1021
119.	Wicklow Co.Co	Wicklow Regional Public Supply	3400PUB1005
120.	Wicklow Co.Co	Windgates/Tempolecarrig	3400PUB1036
121.	Wicklow Co.Co	Bray Direct	3400PUB1001
122.	Wicklow Co.Co	Bray Reservoir	3400PUB1002
123.	Wicklow Co.Co	Greystones	3400PUB1003
124.	Wicklow Co.Co	Kilcoole	3400PUB1008
125.	Wicklow Co.Co	Kilmacanogue	3400PUB1009
126.	Wicklow Co.Co	Newtown Newcastle	3400PUB1010

## Appendix 2 - List of Areas from which raw sewage is discharged

### 7 LARGER URBAN AREAS, ABOVE THE DIRECTIVE THRESHOLDS, WITH NO TREATMENT OR PRELIMINARY TREATMENT ONLY AT THE END OF 2013

1.	Cork	Cobh	D0054-01
2.	Cork	Passage West/Monkstown	D0129-01
3.	Cork	Ringaskiddy/Crosshaven/Carrigaline	D0057-01
4.	Cork	Youghal	D0139-01
5.	Donegal	Bundoran	D0130-01
6.	Donegal	Killybegs	D0011-01
7.	Wicklow	Arklow	D0006-01

### 28 SMALLER URBAN AREAS, IN THE SIZE RANGE 500 P.E. UP TO THE DIRECTIVE THRESHOLDS, WITH NO TREATMENT OR PRELIMINARY TREATMENT ONLY IN 2013

	County/ Region	Urban Area	Licence Number
8.	Clare	Ballyvaughan	D0327-01
9.	Clare	Clarecastle	D0322-01
10.	Clare	Kilkee	D0078-01
11.	Clare	Kilrush	D0075-01
12.	Clare	Liscannor	D0430-01
13.	Cork	Ballycotton	D0516-01
14.	Cork	Castletownbere	D0297-01
15.	Cork	Castletownshend	D0468-01
16.	Cork	Ringaskiddy Village	D0436-01
17.	Cork	Timoleague	D0466-01
18.	Cork	Whitegate/Aghada	D0423-01
19.	Donegal	Falcarragh	D0343-01

## Appendix 2 - List of Areas from which raw sewage is discharged continued

20.	Donegal	Kilcar	D0520-01
21.	Donegal	Moville	D0212-01
22.	Donegal	Ramelton	D0341-01
23.	Donegal	St.Johnston	D0538-01
24.	Fingal	Rush	D0119-01
25.	Galway	Ahascragh	D0372-01
26.	Galway	Carraroe	D0388-01
27.	Galway	Kinvara	D0276-01
28.	Galway	Spiddal	D0396-01
29.	Kerry	Ballylongford	D0459-01
30.	Mayo	Bellmullet	D0074-01
31.	Mayo	Killala	D0067-01
32.	Waterford	Ardmore	D0162-01
33.	Waterford	Dunmore East	D0170-01
34.	Wexford	Duncannon	D0245-01
35.	Wexford	Kilmore Quay	D0232-01

## Appendix 2 - List of Areas from which raw sewage is discharged continued

### 9 CERTIFICATE OF AUTHORISATION AREAS (<500 P.E) WHERE WASTE WATER WAS DISCHARGED WITH NO TREATMENT

County/ Region		Certificate of Authorisation Site	Certificate Number
36.	Cork	Inchigeelagh	A0349-01
37.	Cork	Kilmacsimon	A0360-01
38.	Donegal	Burtonport	A0446-01
39.	Donegal	Coolatee Housing Scheme	A0525-01
40.	Donegal	Kerrykeel	A0445-01
41.	Galway	Roundstone	A0115-01
42.	Louth	Omeath	A0072-01
43.	Wexford	Arthurstown	A0243-01
44.	Wexford	Ballyhack	A0242-01

## Appendix 3 - Agglomerations identified in the European Commission Infringement Case against Ireland in respect of the Urban Waste Water Treatment Directive

1.	Abbeyfeale	23.	Cobh
2.	Abbeyleix	24.	Cork City
3.	Arklow	25.	Courtown/Gorey
4.	Athlone	26.	Dundalk
5.	Athy	27.	Dunmanway
6.	Ballincollig New	28.	Enfield
7.	Ballybofey/Stranorlar	29.	Enniscorthy
8.	Ballyragget	30.	Fermoy
9.	Blarney	31.	Kildare Town
10.	Borrisoleigh	32.	Kilkenny City and environs
11.	Callan	33.	Killarney
12.	Carlow	34.	Killybegs
13.	Carrickmacross	35.	Kingscourt
14.	Carrick-on-Suir	36.	Kinsale
15.	Carrigtwohill and environs	37.	Letterkenny
16.	Castlebar	38.	Lower Liffey Valley Regional Sewerage Scheme
17.	Castlebridge	39.	Lusk
18.	Castlecomer	40.	Mallow
19.	Castletroy	41.	Manorhamilton
20.	Cavan	42.	Midleton
21.	Clifden	43.	Monaghan
22.	Clonakilty and Environs	44.	Monksland Wastewater Treatment Works

## Appendix 3 - Agglomerations identified in the European Commission Infringement Case against Ireland in respect of the Urban Waste Water Treatment Directive continued

45.	Mountmellick	59.	Skibbereen
46.	Mountrath	60.	Swords
47.	Navan	61.	Templemore
48.	Nenagh	62.	Thomastown
49.	Passage/Monkstown	63.	Thurles
50.	Piltown	64.	Tralee
51.	Portarlinton	65.	Tubbercurry
52.	Rathcormac	66.	Tullamore
53.	Rathdowney	67.	Tullow Wastewater Treatment Plant
54.	Ringaskiddy	68.	Upper Liffey Valley Sewerage Scheme
55.	Ringsend	69.	Urlingford
56.	Roscommon	70.	Waterford
57.	Roscrea	71.	Youghal
58.	Shannon Town		



