Uisce Éireann
Irish Water

Report: May 2026

Draft Galway Wastewater Strategy

Tionscadal Éireann
Project Ireland
2040

6 CLEAN WATER AND SANITATION

Safeguarding our water for our future

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Draft Galway Wastewater Strategy	
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1. Executive Summary

Overview of Uisce Éireann and Our Vision

Uisce Éireann, formerly known as Irish Water, became Ireland's national public water services provider on January 1, 2014, following the Water Services Act (No. 1) 2013. The organization is responsible for:

- Providing public water and wastewater services nationwide
- Managing Ireland's water resources
- Ensuring safe drinking water supply and proper wastewater treatment
- Supporting sustainable social and economic growth

Uisce Éireann is regulated by the economic regulator Commission for Regulation of Utilities (CRU) and the environmental regulator Environmental Protection Agency (EPA). Uisce Éireann's vision is to create a sustainable Ireland where water is respected and protected for all life forms and the planet. We address historical underinvestment through capital investment programmes and infrastructure maintenance. Our 25-year Water Services Strategic Plan outlines objectives and implementation strategies, including the development of a Wastewater Strategy Framework.

Galway Wastewater Strategy study area

The Galway Wastewater Strategy (GWS) study area comprises the Galway Metropolitan Area (GMA), Athenry, and Moycullen. The study area includes Galway city and its suburbs, including six towns and villages. There are four Wastewater Treatment Plants (WWTPs) in the study area including Athenry, Moycullen, Claregalway, and Mutton Island, the largest WWTP in the region. Uisce Éireann's wastewater system in the region includes wastewater collection networks that comprise of more than 50 pumping stations and 29 storm water overflows, the majority of which are located within Galway City.

Galway Wastewater Strategy Need

The Galway Metropolitan Area, Moycullen and Athenry, is experiencing sustained population growth and economic development. This growth places significant demands on wastewater collection networks and treatment plants, particularly within Galway City where the majority of pumping stations and stormwater overflows are located. A wastewater strategy is needed because the existing and aging wastewater system is under increasing pressure from population and commercial growth, regulatory requirements, climate change, and environmental constraints. A strategy is needed to plan upgrades and new infrastructure that are resilient, adaptable and capable of performing under future climate conditions.

Galway Wastewater Strategy Objective

The draft GWS assesses the existing wastewater treatment and network infrastructure in the Galway Metropolitan Area, Athenry, and Moycullen to determine what future investment will be required in the medium and long term, to support sustainable growth, climate resilience and environmental protection and to identify sustainable drainage strategies and solutions for the Study Area.

The draft GWS sets out a long-term plan for how wastewater treatment and sewerage infrastructure should be developed across the study area. It assesses the performance of existing infrastructure and identifies the investment needed over the medium and long term to support planned growth, protect the environment and ensure compliance with regulatory requirements. Adequate wastewater infrastructure is essential to support housing delivery, economic development and sustainable communities in Galway.

The draft GWS identifies preferred solutions to improve treatment capacity and network performance, with investments prioritised across three planning horizons: short-term (2040), medium-term (2055), and long-term (2080) to ensure that wastewater services for Galway are resilient, adaptable and fit for purpose over the long term.

Consideration was also given to needs and risks that would emerge prior to 2040. The strategy's primary objectives include identifying sustainable options to address wastewater needs aligned with European and National legislation, supporting economic and population growth, enhancing environmental protection, and improving infrastructure resilience to climate change.

The draft GWS adopts a strategic approach that incorporates stakeholder needs, supports economic growth, addresses climate change challenges, meets growing population demands, and ensures long-term sustainability. Key considerations include infrastructure capacity, expansion, rationalisation of treatment plants and network enhancements to meet standards.

The draft GWS aims to protect public health, safeguard the environment, and facilitate population and economic growth. It provides an understanding of investment needs, proposes enhanced treatment capacity, and strengthens infrastructure resilience to climate change, ultimately supporting the region’s long-term development and environmental objectives.

The GWS is a forward-looking plan designed to ensure the long-term sustainability and efficiency of wastewater management in the region and is not intended to function as an operational or project-specific delivery tool but instead establishes a strategic framework to guide the long-term development of wastewater conveyance and treatment infrastructure across the study area.

Detailed or concept-level engineering design, statutory planning, and comprehensive economic appraisal are intentionally deferred to future implementation phases, including the Preliminary Business Case (PBC) stage, in line with the Infrastructure Guidelines.

Our Legal Context

Uisce Éireann plans, develops and operates our water service functions in line with the requirements of prevailing relevant national and European legislation. Some of the most pertinent legislation in the context of the operations covered by this plan include the Water Services Act (and amendments), Water Framework Directive (WFD), Urban Wastewater Treatment Directive (UWWTD) and the recast UWWTD (rUWWTD), EU Bathing Water Directive, and the Wastewater Discharge (Authorisation) Regulations 2007 (as amended), European Communities Environmental Objectives (Surface Water) Regulations 2009, River Basin Management Plan, and the EU Habitats Directive.

Environmental Assessments

UÉ carried out detailed environmental assessments to ensure the Strategy protects the natural environment while supporting sustainable growth across the study area.

UÉ developed this draft GWS applying the requirements of the Strategic Environmental Assessment (SEA) Regulations and the EC Birds and Natural Habitats Regulations. This involved undertaking relevant environmental assessments at each stage of the process, including preparation of an SEA Environmental Report. This report documents the environmental assessment of the draft GWS which examines how the Strategy could affect the environment, including water quality, biodiversity, climate change resilience, recreation and human health. This assessment helped identify potential environmental risks at an early stage and ensures that environmental considerations are integrated into decision-making throughout the Strategy.

The SEA cumulative effects assessment determined that with mitigation and monitoring measures (which are outlined in the SEA Environmental Report), adverse combined effects during construction of the GWS are unlikely. The SEA cumulative effects assessment also found that many combined effects involving the operational phase of the GWS will have positive environmental effects.

The Natura Impact Statement (NIS) assessed whether the draft Strategy could have potential effects on Natura 2000 sites, which are designated to protect important habitats and species under European legislation. Where any potential risks were identified, measures were incorporated into the Strategy to avoid or reduce these impacts, safeguarding Galway's sensitive coastal and inland environments. The NIS concluded that through incorporating the avoidance and mitigation measures detailed in the NIS, adverse effects on the integrity of European Sites are not anticipated at Plan-level, alone or in-combination with other Plans or Projects.

Mitigation and enhancement measures identified through the environmental assessments are incorporated into the GWS implementation approach (Refer to the Multi Criteria Decision Analysis (MCDA) section in Appendix 5). The proposed monitoring plan in the SEA Environmental Report forms part of the overall monitoring and feedback and review process applied to inform adaptive management, identify the need for changes and inform future iterations of the strategy.

By assessing potential environmental impacts at this stage, the Galway Wastewater Strategy provides a robust framework to support future growth while protecting water quality, biodiversity and the natural environment of the Galway area.

Benefits of the Strategy

The draft GWS provides a clear, long-term framework to ensure that wastewater infrastructure across the study area can sustainably support population growth, environmental protection and economic development. By assessing existing wastewater treatment and network capacity and identifying future investment needs, the strategy delivers the following key benefits:

- **Regulatory compliance**

  Ensures wastewater services are fully aligned with European and national legislation, providing confidence to regulators, stakeholders and communities that Galway's wastewater infrastructure meets statutory requirements.

- **Capacity to support future growth**

  Identifies the wastewater drainage and treatment capacity required to accommodate planned and projected growth in Galway City and County, consistent with Development Plans, the National Planning Framework, the Regional Spatial and Economic Strategy, and long-term development potential up to 2080.

- **Protection and enhancement of the environment**

  Supports the effective management of wastewater to protect receiving waters and sensitive environments, while aligning with the Uisce Éireann Water Services Strategic Plan and the Government of Ireland Water Services Policy Statement.

- **Climate resilience and adaptability**

  Integrates climate change considerations into wastewater planning, ensuring infrastructure solutions are resilient to future climate impacts and capable of adapting to changing environmental conditions.

- **Robust and flexible long-term strategy**

  Develops an adaptable approach that can respond to a range of future population, climate and development scenarios, ensuring the strategy remains effective and relevant over time.

- **Best value, evidence-based solutions**

  Evaluates alternative wastewater solutions and identifies optimum options based on whole life cost, environmental performance and long-term sustainability.

- **Clear and deliverable investment programme**

  Translates strategic recommendations into a prioritised, phased delivery programme of clearly defined projects, providing measurable outcomes and a practical roadmap for implementation.

The draft GWS seeks to create a resilient, adaptable, and compliant wastewater management system. This approach aims to ensure the long-term sustainability and effectiveness of wastewater services in the study area, protecting public health and safeguarding the environment while supporting economic and population growth for generations to come.

Methodology

The Galway Wastewater Strategy employs a structured methodology aligned with established wastewater management frameworks. Key components of the strategy include:

- Evaluating existing infrastructure to identify current performance and material risks using consistent performance metrics and risk bands
- Projecting growth and its impact on wastewater systems using network and water quality models at discrete horizons to determine needs (2040, 2055, 2080)
- Identifying root causes of risks (with internal subject matter experts) to define needs going into optioneering
- Developing and evaluating strategic options through optioneering, MCDA, and shortlisting of feasible options, with environmental assessment (SEA/AA) applied.

The methodology also emphasises stakeholder engagement, delivered through statutory public consultation, with a second public consultation underway in May, June and July 2026 so the public can review and comment on the draft GWS and associated environmental and ecological reports. The final GWS will be published in Autumn 2026 and it will provide a sustainable roadmap for wastewater management in the Study Area through to 2080.

Recommendations

Based on the assessment undertaken as part of the draft GWS, it is recommended that:

- a **new Regional Galway East Wastewater Treatment Plant** (WWTP) and a new marine outfall are progressed to meet the long-term wastewater treatment needs of the study area and to provide sufficient capacity, resilience and environmental protection up to 2080.
- **Enhancements to treatment capacity at Mutton Island and Athenry** Wastewater Treatment Plants in the short term to meet population demands. Works on these plants is planned within the 2040 investment cycle.
- Once the new Regional Galway East plant is commissioned, and new wastewater network infrastructure is constructed, there will be a **gradual transfer of loads from Mutton Island and Athenry** to reduce loading pressures on the existing plants and manage long term regulatory risk. Mutton Island plant will continue to operate at a reduced capacity and Athenry plant will become a pumping station to transfer load to the new Regional Galway East plant.
- Decentralised treatment at **Moycullen and Claregalway Wastewater Treatment Plants will be maintained** with any future upgrades informed by population and economic growth projections.

Galway Wastewater Strategy Infrastructure Upgrade

Uisce Éireann Irish Water

The **STUDY AREA** includes the Galway metropolitan area, Moycullen, and Claregalway in **COUNTY GALWAY**

Challenges to wastewater Infrastructure

TREATMENT CAPACITY in two of the four treatment plants expected to be exceeded by 2040

ECONOMIC DEVELOPMENT will require a **139%** increase in wastewater treatment capacity

Environmental **PROTECTION**

Climate Change **RESILIENCE**

AGEING Infrastructure

Currently

MUTTON ISLAND (GALWAY CITY) Plant serves the Galway Metropolitan Area

ATHENRY Plant

MOYCULLEN Plant

CLAREGALWAY Plant

WASTEWATER COLLECTED CURRENTLY 160,300PE

Strategy Recommendations

ENHANCEMENTS to treatment capacity at Mutton Island (Galway City) Plant

REDUCE treatment capacity and **ENHANCE** effluent quality in Mutton Island (Galway City) Plant

1 new Regional East Galway wastewater treatment plant

1 new Marine Outfall

ENHANCEMENTS to treatment capacity at Athenry Plant

TRANSFER of load from Galway City East & Athenry to the new plant

DECOMMISSION Athenry Plant

MAINTAIN wastewater treatment capacity at Moycullen and Claregalway Plants

1 new pumping station in Athenry

FUTURE UPGRADES to Moycullen and Claregalway Plants

WASTEWATER COLLECTED 2080 383,300PE

Benefits

Increased treatment **CAPACITY & EFFICIENCY**

Supports future **POPULATION GROWTH & ECONOMIC** development

Proactive **PROJECT PLANNING**

SAFEGUARDING Public Health

ENHANCED Water Quality

Conclusions

The development of the Regional Galway East WWTP will:

- Enable the diversion of wastewater load from the eastern part of Galway City away from the existing Mutton Island Wastewater Treatment Plant, thereby relieving pressure on existing infrastructure, improving system resilience, and supporting future growth in a sustainable manner.
- Facilitate the decommissioning of the existing Athenry Wastewater Treatment Plant, with wastewater flows from Athenry to be pumped to the new Regional Galway East WWTP, providing a more sustainable, efficient and resilient regional wastewater solution.

To support delivery of the recommended Regional Galway East WWTP, two discharge outfall options are identified for further assessment and consideration.

- **Option 1:** A discharge outfall located in the eastern part of Galway Bay, approximately 3.5 kilometres from the shore.
- **Option 2:** A discharge outfall located in the western part of Galway Bay, approximately 1 kilometre from shore.

Progression of these options to the next stage will enable more detailed assessment, including environmental, technical and deliverability considerations, to inform the identification of a preferred solution.

These options represent the **most viable and robust strategic solutions** identified through the Strategy's optioneering and assessment process. Both outfall options can meet the Strategy's objectives, achieving long-term regulatory compliance, protecting the receiving environment, and providing a resilient wastewater service over the planning horizon to 2080.

2. Introduction

2.1 Who we Are and Our Vision

2.1.1. Our Purpose and vision and Values

On the 1st of January 2014, through the Water Services Act (No. 1) 2013, Uisce Éireann (UÉ) (at the time known as Irish Water) assumed statutory responsibility for the provision of public water services and management of water and wastewater investment. UÉ's role, as Ireland's national public water services provider, is to provide public water and wastewater services throughout the country. We are the custodian with the responsibility to manage Ireland's precious water resources and, with our Local Authority partners, secure it for future generations. It is our responsibility to ensure that all our customers receive a safe and secure supply of drinking water and have their wastewater collected, appropriately treated and returned to the environment. UÉ supplies 1.7 billion litres of drinking water to our customers every day and collects and treats more than 1.2 billion litres of wastewater before we safely return it to the environment. We support Ireland's social and economic growth in a sustainable manner through appropriate investment in water services and strive to protect the environment in all our activities. Our vision is of a sustainable Ireland where water is respected and protected, for the planet and all the lives it supports.

2.1.2. Our policy and regulatory framework

UÉ is regulated by the following:

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

2.2 Our Long-Term Plan

The water industry is facing several challenges out to 2080, including pressures associated with climate change, population growth, loss of biodiversity, ageing infrastructure, changes to legislation and policy, and economic conditions. To find suitable options which offer the best value for customers and the environment, we need a step change in how we plan for the long-term.

In July 2025 we published our Water Services Strategic Plan 2050[1], which is our long-term strategic plan. It sets out our long-term vision, our objectives, and how we aim to achieve them in the context of the significant challenges we are likely to face over the next 25 years (see Figure 2-1). Our vision is: "A sustainable Ireland where water is respected and protected, for the planet and all

[1] Water Services Strategic Plan 2050, Uisce Éireann, July 2025.

the lives it supports". Our purpose is to "rise to the challenge of delivering transformative water services that enable communities to thrive".

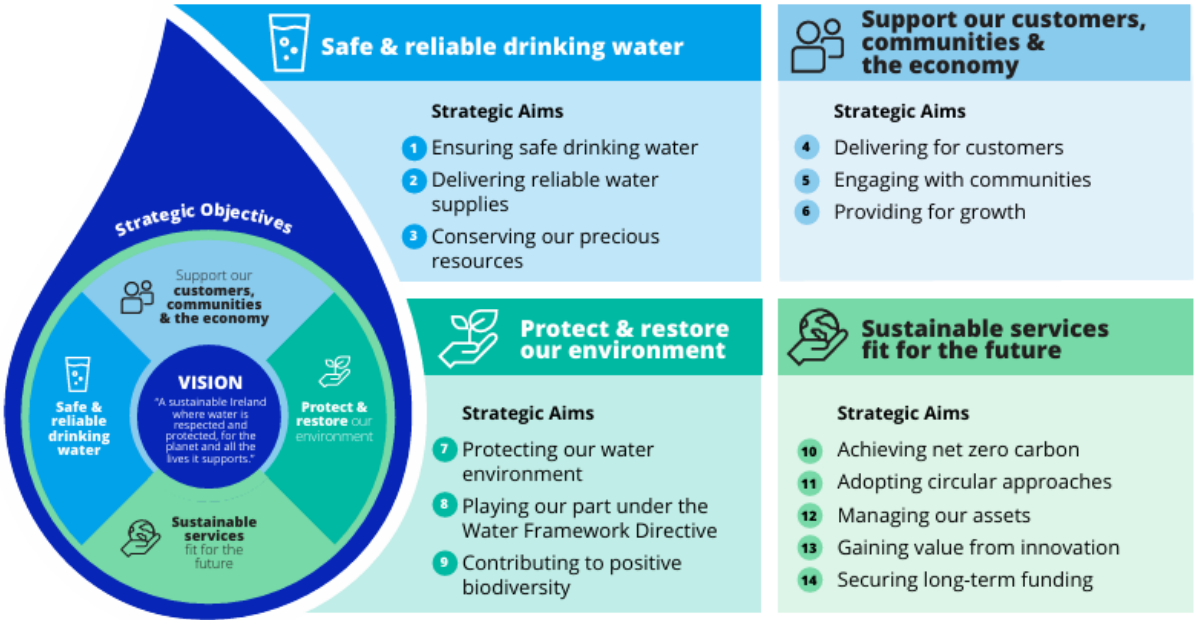


Figure 2-1 The Strategic Aims and Objectives set out in the Water Services Strategic Plan 2050

Key challenges and strategic objectives outlined in the Water Services Strategic Plan (WSSP) cascade down to inform the Galway Wastewater Strategy (GWS). We have adopted a regional focus, which sets the direction for future investment and planning, supported by more detailed analysis undertaken at an agglomeration level. This approach has enabled us to produce a strategy which delivers resilient wastewater services in the long-term, while still ensuring that the operational needs and requirements of the short term are met.

UÉ has been progressively addressing a legacy of underinvestment through capital investment programmes and maintenance of existing infrastructure. The Water Services Strategic Plan 2050 (WSSP) (Tier 1) sets out UÉ's long-term objectives and how these will be achieved over the next 25 years. The WSSP identifies a requirement for a Wastewater Strategy Framework (Tier 2) to address the strategic, long-term planning of wastewater services across regions.

The Galway Wastewater Strategy (GWS) forms part of this framework and considers how these challenges are addressed for the Greater Galway study area, including Galway City and surrounding agglomerations. Figure 2-1 below illustrates the UÉ framework hierarchy and shows the GWS positioned within Tier 2, beneath the Tier 1 Water Services Strategic Plan 2050.

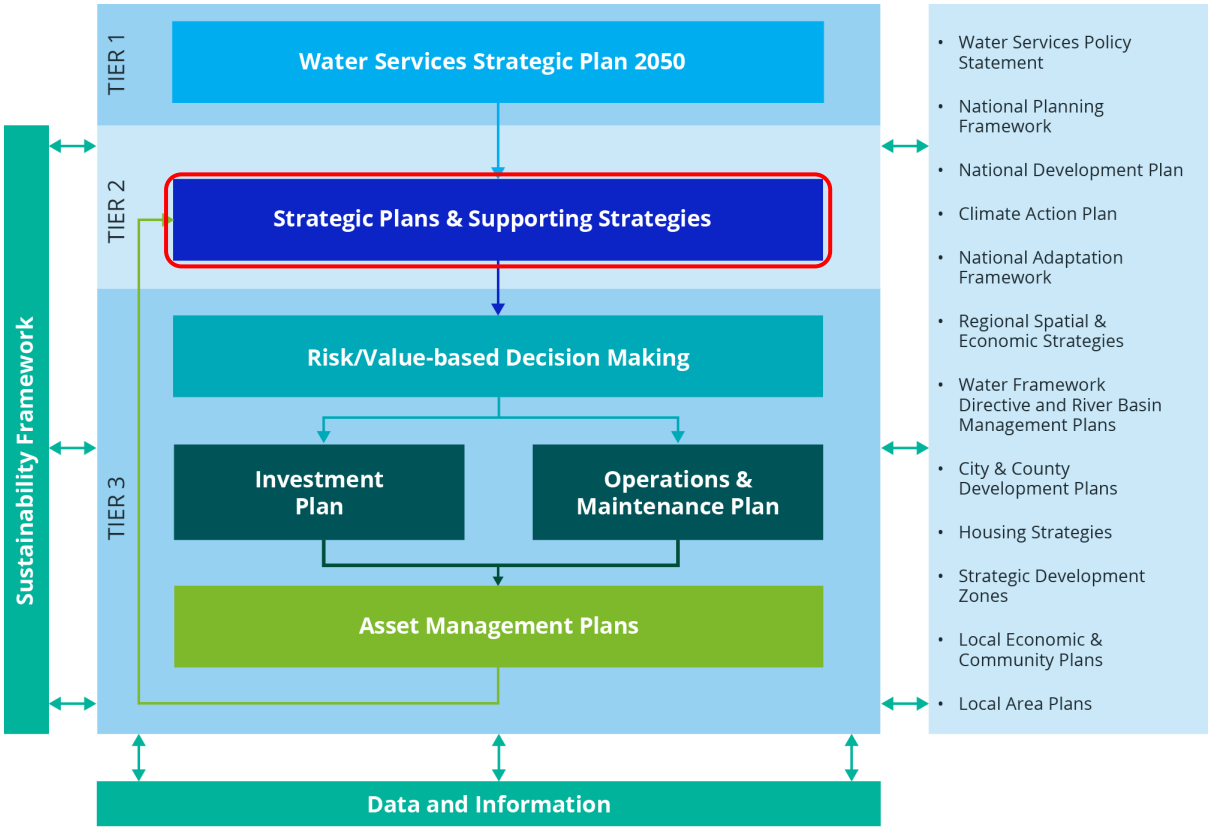


Figure 2-2: Uisce Éireann Framework and where the GWS Lies

2.3 The Need for a Wastewater Strategy for Galway

As our population and economy grows, so does the volume of wastewater. We must collect and treat this wastewater so that the treated water can be safely returned to the environment. The purpose of a Wastewater Strategy is to assess wastewater treatment and network infrastructure in a defined geographic area to identify what future investment will be required in the medium and long term. Having adequate wastewater infrastructure is essential to facilitate housing provision and commercial development and to support sustainable growth, while protecting the environment.

The strategic needs and drivers for these assets in this area were determined to identify the root cause of emerging issues. Considering these needs over different time horizons and taking account of the uncertainties in long-term forecasts, enabled us to identify where future needs are more and less certain. This enabled us to promote low- and no-regrets investment options and we employed a more adaptive route where there was greater uncertainty. This approach was used to guide the development of the GWS.

2.3.1. The region

The Greater Galway area is a key regional growth centre, identified within national and regional planning policy, including the National Planning Framework (NPF) and the Regional Spatial and Economic Strategy (RSES), as a driver of sustainable economic, environmental and social

development in the west of Ireland. The Galway Wastewater Strategy (GWS) has been prepared to provide a long term, integrated framework for wastewater infrastructure planning across this strategically important area.

The GWS study area encompasses the Galway Metropolitan Area, including Galway City and its suburbs, together with a number of surrounding towns and villages that are functionally linked to the metropolitan area and its wastewater infrastructure. In total, the study area includes 6 towns and villages and 4 wastewater treatment plants, namely Mutton Island (Galway City), Athenry, Claregalway and Moycullen, which together serve the core urban area and its immediate hinterland.

For the purpose of this strategy, the study area includes Galway City (served by Mutton Island WWTP), Athenry, Claregalway and Moycullen, reflecting existing service boundaries and future growth considerations (See **Error! Reference source not found.**).

Figure 2-3: Galway Wastewater Strategy Overview

As indicated in Figure 2-3, the wastewater network within the Greater Galway study area extends to approximately 392 km of wastewater infrastructure, supported by more than 50 wastewater pumping stations and 29 storm water overflows.

Consistent with national and regional growth objectives, the Greater Galway area is expected to accommodate continued population and economic growth over the coming decades. This growth will place increasing pressure on the existing wastewater collection and treatment infrastructure, which in parts of the study area is already operating close to capacity. The Galway Wastewater Strategy therefore seeks to identify sustainable, long-term options to ensure that wastewater

infrastructure can support future residential, commercial and industrial development, while maintaining environmental compliance and protecting sensitive receiving waters.

2.3.2. Future Challenges

Population growth, combined with economic expansion will continue to increase the demand on our existing infrastructure and services in Galway. The Greater Galway area has already seen significant economic expansion, with projections indicating further population growth accompanied by planned urban expansion, housing delivery targets, and broader economic growth. This will lead to increased demands placed on the network and treatment works to 2080.

In addition to these demands, changes to weather patterns caused by **climate change** are predicted to lead to drier summers, wetter winters, and more intense rainfall in Ireland[2]. This will mean that our wastewater networks will need to handle periods of more intense rainfall and greater surface runoff. Our wastewater treatment works will need to manage a load envelope with a greater range of volume and concentration, in addition to the environmental risk posed by lower river flows and levels caused by drier summers. As a coastal location, we must also assess the risk posed by sea level rise and ensure that our assets are resilient to such changes.

The draft GWS is aligned with UÉ's **Biodiversity** Action Plan which sets out our commitment to delivering water and wastewater infrastructure in a way that protects ecosystems and, where possible, improves biodiversity. We manage infrastructure that is located within a range of habitats, and our infrastructure often interacts directly with freshwater, estuarine, marine and terrestrial habitats. There are likely to be tighter environmental standards in the future, to further protect habitat and biodiversity loss. The Galway area has several protected water bodies, including Galway Bay which offers marine and terrestrial habitats for a diverse range of species.

The **average age of assets** managed by UÉ is getting older, and while infrastructure is regularly maintained, the assets cannot be repaired indefinitely. Value-based decision making across the lifecycle of assets will help us to identify the most cost-effective intervention. Where feasible, we will also seek opportunities to use nature-based solutions instead of traditional 'grey' options, which can offer more sustainable options for society.

European policy and legislation will drive new requirements that will impact significantly on the services we deliver in the coming decades. The new recast Urban Wastewater Treatment Directive (rUWWTD) is an example, which is driving improved environmental outcomes through tighter regulatory and treatment standards. These changes have future implications for the WWTPs in the study area, and we will need to manage wastewater services at these sites to ensure regulatory requirements are met.

Both national and global **economic conditions** can impact on the delivery of wastewater services, e.g., energy price hikes will have a material impact on the cost of services (especially where there is reliance on pumping) in addition to driving up the cost of materials. These risks will be considered in the context of delivering the strategy, but also in informing choices throughout the

[2] Current Climate and Projected Climate Changes in Ireland (summary of Chapter 3), Dept. of Transport, June 2025

strategy. The operating costs and needs of different options can have a long-term impact on the region, and these should be clearly considered and articulated.

To respond to the scale of future challenges and ensure that we can continue to provide the Galway region with resilient wastewater services to 2080, we need to develop this long-term strategy that targets local issues and can adapt to the uncertainties of the future. This document sets out how we have considered the principal risks and challenges for the region and developed robust options to tackle them. We have considered wastewater needs across the short-, medium- and long-term to develop a strategy that can be adapted over time.

2.4 Strategy Aims and Objectives

We have reflected our national priorities in this strategy, to ensure that we support customers, communities, and the wider economy; protects and enhance the natural environment; and deliver resilient, future-ready wastewater services. Based on these requirements, we have identified the following six aims for the GWS, and the objectives to achieve the aims:

1. **Comply with Legislation -** Develop a sustainable wastewater strategy for the GWS study area which achieves compliance with current European and National legislation.
2. **Meet Growth Demands –** Identify ways of meeting the current and future growth demands of the GWS study area, considering Development Plans, the National Planning Framework (NPF), Regional Spatial and Economic Strategy (RSES), and anticipated development up to 2080.
3. **Safeguard the environment and protect public health –** Adopt a strategy which protects and enhances the environment and public health, consistent with UÉ Water Services Strategic Plan (WSSP) and the Government of Ireland Water Services Policy Statement (WSPS).
4. **Adapt to Climate Change –** Ensure the strategy is resilient to the likely effects from climate change.
5. **Adaptable -** Develop an adaptable strategy that can respond to different future scenarios, ensuring that the strategy remains effective in the long-term.
6. **Develop a delivery timeline** – Produce a prioritised delivery timeline that translates the draft GWS recommendations into clearly timed, actionable projects with measurable outcomes.

2.5 Roadmap

The development of the strategy is informed by engagement from local authorities, environmental experts, and the public. The result is a long-term strategy to guide sustainable wastewater investment in the study area through to 2080. The strategy roadmap for the development of the draft GWS is summarised in Figure 2-4.

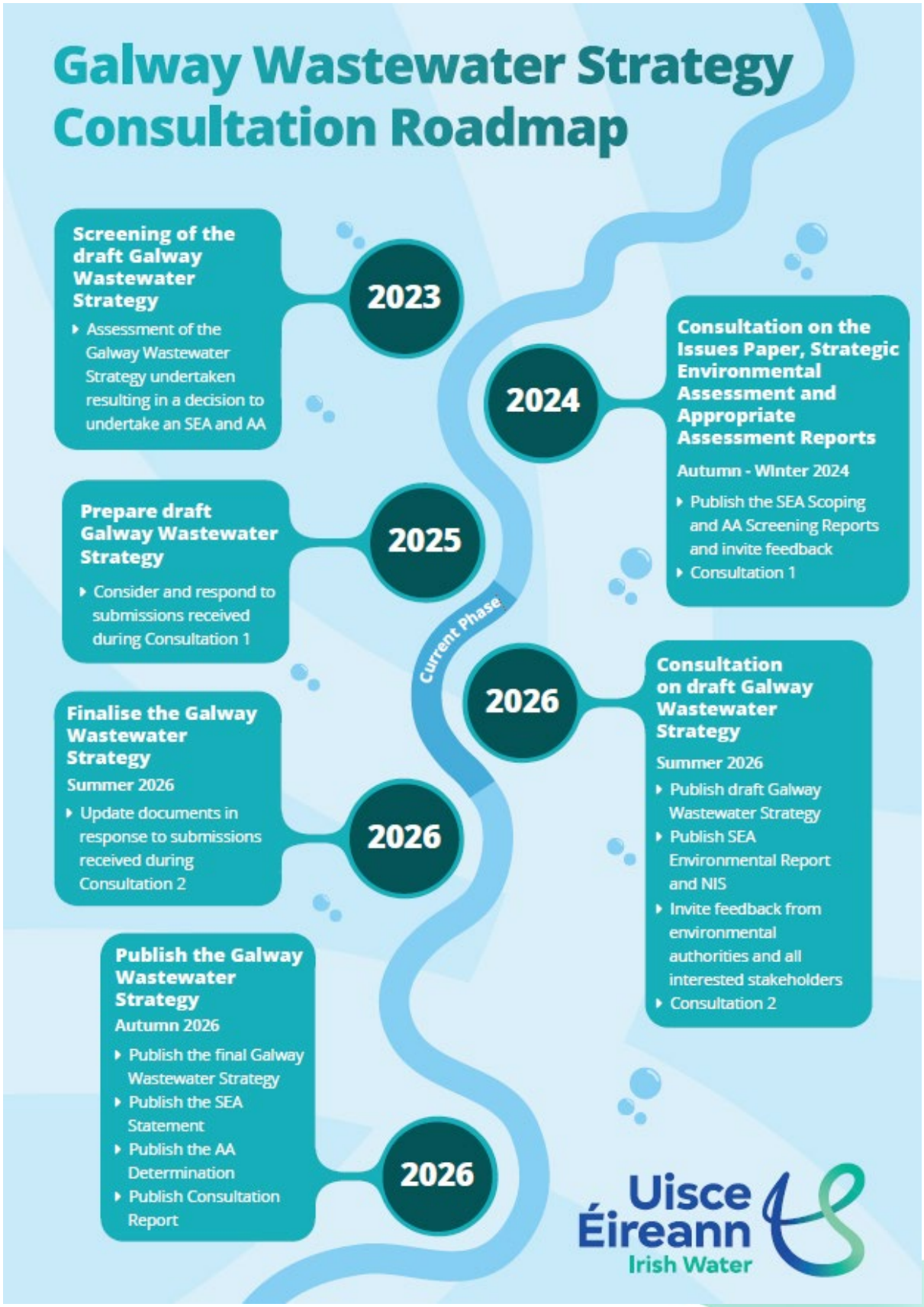


Figure 2-3: Draft GWS Roadmap

2.6 GWS Structure

This report serves as the overarching draft GWS document and is supported by a suite of appendices which can be referenced for further detail (as outlined in **Error! Reference source not found.**). The structure is designed to provide a clear and logical flow of information, ensuring a comprehensive understanding of the GWS.

Figure 2-4: Galway Wastewater Strategy Documentation

2.7 What is not included in the Strategy

The draft GWS has been developed as a high-level, long-term plan. It sets out strategic objectives and future priorities for wastewater infrastructure which will require detailed designs, cost assessments, and further environmental studies for individual projects. This will ensure that local conditions, community input, and planning requirements can be considered in the future.

To ensure clarity around its intended use and limitations, the following areas are explicitly excluded from the scope of the GWS.

Localised, Short-Term Asset Planning: The Strategy does not cover day-to-day asset management activities, such as maintenance scheduling, routine inspections, or minor infrastructure repairs. These are instead addressed through UÉ's ongoing operational and maintenance programmes.

Pollution incidents caused by operational issues (e.g. blockages, collapses, pumping station failure) are not included as part of the assessment.

Detailed or Concept-Level Engineering Design: The Strategy does not include technical drawings, design specifications, or construction-ready documentation for individual assets such as pipelines, pumping stations, or treatment plants. These tasks will be addressed in future project delivery phases, such as Preliminary and Detailed Design.

Comprehensive Economic Appraisal: Although the Strategy identifies and qualitatively assesses a range of wastewater management options, it does not provide detailed cost-benefit analyses, life-cycle costing, or full business case development for each scenario. Robust economic evaluation, including financial modelling, net present value analysis, and funding strategy, will be undertaken during the Preliminary Business Case stage and subsequent project planning processes.

More detailed planning activities - such as economic assessments and detailed engineering appraisals - are intentionally deferred to future implementation phases, where they will be addressed at the asset or scheme level. This allows for compliance with statutory planning requirements and the integration of local data, stakeholder input, and environmental assessments.

The draft GWS remains focused on guiding large-scale infrastructure investment, ensuring environmental compliance, and building long-term resilience to climate change. It does not replace operational processes or deliver construction-ready designs. Instead, it offers a strategic framework aligned with national and regional policies, providing the foundation for informed, adaptive planning and phased delivery over the coming decades.

3. Strategic Challenges

Our strategy needs to take account of the key pressures that are going to impact the wastewater system and assets out to 2080. The strategic challenges that our strategy will address are set out below:

- **Growing population and economy -** Ireland has the third fastest growing population in Europe and our economy is continuing to expand.
- **Climate Change -** Climate change projections indicate Ireland will experience drier summers, wetter winters, and more intense rainfall.
- **Legislation, regulation and policy -** European policy and legislation significantly influence how we deliver our business, and it is continuously evolving.
- **Environmental and biodiversity -** The scale and speed of our response for environmental and biodiversity changes may be insufficient to meet long-term EU and national environmental objectives.
- **Economic conditions -** Global factors can heavily influence economic conditions, which can in turn impact on the delivery of water services.

3.1 Sustainable Growth

To support Galway's continued economic development, it is essential that wastewater infrastructure evolves in step with projected population growth, shifting land-use patterns, and increased commercial and industrial activity. As the region continues to grow, timely and strategic upgrades to the wastewater network are critical to avoid limits or constraints on future developments. Without sufficient wastewater capacity, planning objectives may be difficult to achieve and the region's competitiveness and attractiveness for inward investment could be compromised.

The Galway Metropolitan Area is not only a major regional hub but is also identified as a key driver of Ireland's economic, environmental, and social development under the National Planning Framework (NPF[3]) and the Regional Spatial and Economic Strategy (RSES[4]) 2020-2032. These frameworks emphasise the region's role in enabling sustainable progress and fostering long-term resilience.

We have aligned the draft GWS with these planning frameworks for the Northern and Western Region, and local development plans for Galway City and County. These sources underpin the growth forecasts used within the strategy and ensure that infrastructure planning is appropriately scaled to support housing delivery, employment hubs, and inward investment across the study area. Similarly, these should be evaluated as the Strategy progresses through its lifespan.

The draft GWS has explored growth pressures by modelling future wastewater generation across multiple growth scenarios, extending to 2080. This long-term outlook enables UÉ to identify

[3] https://www.npf.ie/

[4] https://www.nwra.ie/rses/

infrastructure needs well in advance and to prioritise investment in a phased, cost-effective, and resilient manner. By aligning wastewater infrastructure planning with spatial development strategies and economic projections, the draft GWS provides a robust framework to facilitate sustainable growth while safeguarding public health and environmental quality. It ensures that wastewater services in Galway do not risk being an inhibitor to a thriving, well-serviced region capable of meeting the demands of future generations.

The section below outlines the local development plans that were considered during the development of the strategy. More details on our population growth projections are set out in Section 7 and in *Appendix 1 – Managing Growth*.

3.1.1. Local Plans

Local plans have also helped shape the GWS. Regional projects offer real opportunities for partnership working and the integration of national drivers which stakeholders can work together on in smarter ways. Below we have outlined some of the key regional developments that have been considered.

Plan	Description
Galway City Development Plan	The Galway City Development Plan (2023–2029)5 is a strategic framework designed to guide the city's growth and development over a six-year period. It aims to balance urban expansion with environmental sustainability, economic vitality, and community well-being, ensuring Galway develops as a resilient and inclusive city. The plan sets ambitious housing targets in addition to providing commercial office space to support Galway's expanding economy. It includes measures to enhance green spaces and biodiversity throughout the city.
Galway Metropolitan Area Strategic Plan (MASP)	This Galway MASP provides a response to the national planning objective (NPO 67) set out in the NPF and provides a coordinated framework for the sustainable development of Galway City. The MASP has a goal to deliver at least 50% of all new homes within the existing built-up footprint of Galway City and suburbs. This approach aligns with compact urban growth. The plan further identifies Garraun and Briarhill as key strategic growth areas. The MASP serves as a guide for local authorities, planners, and developers and helps us understand where demand is likely to increase.
Galway County Development Plan	The Galway County Development Plan 2022–2028 serves as the statutory blueprint guiding sustainable growth and development across County Galway, excluding the Galway City area. The plan sets out strategic objectives covering housing, infrastructure,

[5] https://www.galwaycity.ie/services/planning/development-plan-2023-2029

	economic development, tourism development, and environmental sustainability to manage projected population growth and evolving community needs. A key focus of the plan is housing delivery to accommodate population growth through a settlement hierarchy that encourages compact urban development within the Galway MASP and supports rural communities.
Galway Drainage Area Plan	The Galway Drainage Area Plan (DAP) is a technical wastewater and stormwater study prepared for Galway City and its surrounding catchments. It is a structured assessment of the wastewater network and treatment infrastructure. It uses survey data and hydraulic modelling to identify problems such as flooding, pollution risks, lack of capacity, or climate-change vulnerability, and is used to plan future upgrades in a targeted way, to support growth, protect the environment, and ensure regulatory compliance.
Galway Docks Expansion Project	Major redevelopment initiative6 to extend the docks 935m out to sea, providing 660m of quay berth. The extension of the docks or changes to the channels in the bay, will have an impact on the water flows and subsequently our marine modelling. We will need to consider the impact of the extension and any potential impacts on how and where planned discharge locations fall.
The South Park & Public Realm Project7	Initiative led by Galway City Council to redevelop and revitalise the South Park area and surrounding public spaces, including the Claddagh Basin, Mutton Island Causeway, and Celia Griffin Park. Given the project's proximity to critical wastewater infrastructure, careful planning and alignment is required to optimise land use, enhance flood resilience, and safeguard environmental quality. This integrated approach will support both the functional objectives of the GWS and the South Park Public Realm Project.
The Galway City Ring Road (GCRR)8	Proposed 18-kilometre transport infrastructure project aimed at alleviating chronic traffic congestion in Galway City. Integrated planning between the GCRR and GWS is essential so that opportunities are taken to integrate and mitigate potential conflicts between infrastructure systems, but also to ensure that both projects contribute to Galway's long-term resilience, environmental protection, and strategic land use planning.

[6] https://theportofgalway.ie/port-of-galway-redevelopment/

[7] https://www.galwaycity.ie/news/2025/south-park-and-public-urban-realm-project-public-consultation-event

[8] https://www.n6galwaycityringroad.ie/

3.2 Climate Change

Climate Change impacts include wetter winters, more intense rainfall events, increased storm surges, rising sea levels, changes in river flows, as well as drier summers, warmer temperatures, and periods of drought. Network modelling allows for an understanding of the current and future performance of wastewater infrastructure under the influence of these effects. We have used industry-standard approaches to estimate the impacts of climate change under both Representative Concentration Pathways (RCP) 4.5 and RCP8.5, which represent a medium level of emissions and a high level of emissions, respectively. Refer to *Appendix 2 - Our Approach To Modelling and Climate Change* for more details.

The Galway City agglomeration is prone to tidal influence because it is situated alongside the coast. Rising sea levels affect coastal infrastructure and can lead to increased flood risks at key WWTPs. This is particularly relevant in the Galway region, where our principal WWTP is Mutton Island, which is situated on an island in Galway Bay. We have used tidal gauge data to inform current flows and rainfalls.

We anticipate that more intense rainfall events will lead to greater pressure on our network and treatment assets, resulting in a greater risk of more frequent storm water overflows and flooding. Inversely, there are also more likely to be longer periods of dry, hot weather, which will result in lower river flows. Both impacts are likely to result in a greater risk to our local environment and water bodies. Our modelling approach aims to identify the location of these impacts so that we can take steps to mitigate against this risk in the future.

Climate resilience has been embedded into the strategy through future-focused modelling of hydraulic and water quality performance under projected climate scenarios. The modelling approaches used are described in Section 7. These simulations ensure that recommended interventions will remain robust under a range of climate futures to 2080 and can be evaluated at key junctures within the GWS timeframe to take account of the latest climate science and projections.

3.3 Legislation, Regulation and Policy

We work within a regulated sector, which is supported by a robust legislative framework. We plan, develop and operate our water service functions in line with the requirements of prevailing relevant national and European legislation. In the development of a regional strategy which will span decades, it is important that we consider how legislation and regulation may evolve to ensure that we can continue to meet our duties. The table below outlines the key pieces of legislation that have informed our strategy.

Legislation	Description
Water Services Act, 2007 (and amendments)	Provides the legal framework for the delivery and regulation of water and wastewater services in Ireland. The legislation ensures that public water and wastewater services are managed in a safe, sustainable, and economically efficient way.

Water Framework Directive (WFD), 2000	The overarching Directive relating to water policy in the European Union (EU). It aims to protect and restore the water environment so that all water bodies are at 'Good Ecological Status' or better.
Urban Wastewater Treatment Directive (UWWTD) and the recast Urban Wastewater Treatment Directive, rUWWTD), 2025	Sets out requirements for the collection, treatment, and discharge of urban wastewater across the EU. The directive mandates that urban wastewater must be properly collected and treated to prevent pollution of the environment, particularly sensitive water bodies. It also requires that stormwater overflows are controlled and minimised to prevent environmental damage during heavy rainfall events. This directive has recently been revised at an EU Level and entered into force in January 2025. Member States are required to transpose it into national law by July 31, 2027. For more details see section 3.3.1
EU Bathing Water Directive, 2006	Requires Member States to monitor and assess designated bathing waters, classifying them as excellent, good, sufficient, or poor based on levels of faecal bacteria such as *Escherichia coli* and intestinal enterococci.
Wastewater Discharge (Authorisation) Regulations 2007, as amended	Under the Regulations, all wastewater discharges from agglomerations require a licence or certificate of authorisation issued by the Environmental Protection Agency (EPA). Licences specify pollutant limits such as biological oxygen demand (BOD), chemical oxygen demand (COD), nutrients, and microbiological contaminants. They also outline monitoring, reporting, and operational conditions to ensure ongoing compliance. The EPA monitors these discharges and enforces compliance, taking action when necessary.

The draft GWS aligns with a diverse range of national, regional, and UÉ strategies and initiatives, as well as broader infrastructure plans for the study area. This alignment ensures that wastewater management infrastructure is integrated within broader planning efforts to support economic growth and environmental sustainability. Key policies and plans considered include but not limited to the National Planning Framework, Regional Spatial and Economic Strategy for the Northern and Western Regional Assembly, National Biodiversity Action Plan, Climate Action Plan, and Uisce Éireann's Water Services Strategic Plan 2050.

Legislation	Description
National Planning Framework	The National Planning Framework (NPF)is the overarching policy for Ireland's social, economic, and cultural development. The NPF is a strategic development framework setting out the long-term context for Ireland's physical development and associated progress in economic, social, and environmental terms. It is being followed and

	underpinned by supporting policies and actions at sectoral, regional and local level. The revised NPF will integrate into the RSES, the Galway City Development Plan and the Galway County Development Plan. The NPF designates Galway City as a Regional City within the Northern and Western Region, identifying it as the primary urban driver for population, employment, and economic growth in the west of Ireland. Under the NPF and its revised implementation guidelines (approved 2025), Galway City and County are expected to accommodate significant population and housing growth aligned with national targets. Local authorities are required to ensure adequate zoned, serviced, and serviceable land, supported by enabling infrastructure such as water services, transport, and social infrastructure.
Regional Spatial and Economic Strategy for the Northern and Western Regional Assembly	The Northern and Western Regional Spatial and Economic Strategy (RSES) 2020-2032, was published in 2020, and it provides a strategic framework for regional development in line with the NPF. It mandates alignment between city and county development plans and the RSES to achieve balanced regional growth. The RSES is legally binding, requiring that city and county development align with its objectives. The RSES highlights the critical importance of wastewater infrastructure in supporting urban expansion, population growth, and economic development for the southern region. The RSES identifies Galway City and its Metropolitan Area as the primary regional growth driver for the Northern and Western Region. Galway is designated to accommodate a significant share of population and employment growth, supported by coordinated land-use planning, transport, and enabling infrastructure, including water and wastewater services.
National Biodiversity Action Plan	The National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The plan is made of five objectives and identifies urban wastewater and water/air pollution as one of the pressures driving biodiversity loss. The NBAP influences the GWS by adopting a whole-of-society approach to biodiversity, by emphasising that all sectors are to integrate biodiversity considerations into their operations. It also calls for immediate actions to conserve and restore biodiversity. The plan requires that the GWS incorporates biodiversity considerations, ensuring that wastewater infrastructure

	development and management contribute positively to the conservation and enhancement of Ireland's natural heritage.
Climate Action Plan	The Climate Action Plan (CAP) outlines Ireland's strategic direction to achieve a 51% reduction in greenhouse gas emissions by 2030 and net-zero emissions by 2050. It aligns with the legally binding economy-wide carbon budgets and sectoral ceilings that were agreed by the Government in July 2022. The CAP acknowledges that wastewater treatment is a large consumer of energy, and as such, climate mitigation measures should continue to be implemented to further reduce and mitigate greenhouse emissions. In addition, the CAP notes that sustainable development is key to meeting Ireland's climate targets. This includes the provision of sufficient network and treatment capacity to cater for the increasing population without damaging the environment. The GWS will set the context for subsequent implementation plans and projects that will detail the programmes of works to be completed in specific areas relevant to climate change adaptation and mitigation and wastewater compliance in accordance with the CAP.
Water Services Strategic Plan 2050	The Water Services Strategic Plan (WSSP 2050) is Uisce Éireann's long-term strategic plan which is required to be prepared under the Water Services No. 2 Act 2013. It sets out our objectives and the means by which we aim to achieve them in the context of the significant challenges we are likely to face between 2025-2050. The plan outlines our strategic direction and the actions we will implement to ensure sustainable public water services for Ireland. The WSSP 2050 provides the overarching policy framework within which all wastewater investment for Galway City and County will be planned and delivered.

3.3.1. Recast UWWTD

The recast Urban Wastewater Treatment Directive (rUWWTD) introduces stricter treatment standards, broader monitoring requirements, and clearer implementation timelines. Below we have set out the key changes which have informed the GWS.

Topic	Requirement
Nutrient removal	Stricter removal of nitrogen and phosphorus for agglomerations larger than 10,000 PE, particularly those discharging to areas sensitive to eutrophication.
Treatment Level	Tertiary treatment will be mandatory for WWTPs treating over 150,000 PE by 2039 and over 10,000 PE, discharging to sensitive

	areas, by 2045. Quaternary treatment, targeting micropollutants will be required for agglomerations over 150,000 PE (and conditionally over 10,000 PE by risk assessment) by 2045.
Storm Water Overflows	The rUWWTD contains an indicative future non-binding objective in Annex V, which sets out that storm water overflows (i.e., a discharge of untreated effluent caused by overloading of the network) "represents a small percentage that cannot be more than 2% of the annual collected urban wastewater load calculated in dry weather conditions"
Energy Target	Sites treating over 10,000 PE will need to achieve energy neutrality by 2045.
Integrated Urban Wastewater Management Plan (IUWWMP)	IUWWMP must be established for agglomerations of 100,000 PE and above by December 2033. For those agglomerations between 10,000 PE and 100,000 PE, where storm water overflow or urban runoff pose risks to the environment and/or public health, a list of "at risk" agglomerations must be established by no later than June 2028. An IUWWMP for the Galway City agglomeration will be required by the end of 2033. It will examine in detail how wastewater, stormwater and urban runoff interact within the study area and how they impact the receiving environment. Initial analyses have been undertaken to identify opportunities for incorporating blue-green infrastructure within the study area. These nature-based solutions not only help manage stormwater more effectively but also enhance biodiversity, improve water quality, and provide recreational and aesthetic benefits to local communities.

The GWS anticipates these evolving regulatory requirements to futureproof infrastructure investment, in particular, the stricter treatment requirements, monitoring, storm water overflow (SWO) objectives, and reporting obligations. The rUWWTD also places more focus on sludge management and recovering valuable resources, such as phosphorous from wastewater and sewage sludge and enhances monitoring requirements.

There are strict timelines for compliance with the Directive which will influence site selection, capacity planning, energy strategy, and adaptive pathways for long-term compliance. Given Galway's proximity to sensitive coastal waters and public bathing sites, the provisions on nutrient and micropollutant removal, SWO reduction, and public health monitoring are especially critical.

The draft GWS has considered all relevant legislation and developed a strategic response to these obligations. It identifies infrastructure gaps and proposes targeted investments to upgrade treatment capacity, reduce overflows, and improve system resilience. The draft GWS also anticipates future requirements under the forthcoming recast UWWTD, which will introduce more

stringent rules on stormwater management, real-time monitoring, and the integration of blue-green infrastructure. By aligning its approach with UWWTD goals, the draft GWS supports environmental protection, public health, and regulatory compliance for the long term.

3.4 Biodiversity

We recognise the urgent need to halt biodiversity loss and to better protect and enhance the natural environment. UÉ carried out detailed environmental assessments to ensure the Strategy protects the natural environment while supporting sustainable growth across the study area.

The draft GWS is aligned with UÉ's Biodiversity Action Plan which sets out our commitment to delivering water and wastewater infrastructure in a way that protects ecosystems and, where possible, improves biodiversity. The Biodiversity Action Plan also supports national climate objectives by promoting nature-based solutions that help reduce climate impacts, enhance carbon storage, and strengthen ecosystem health. In line with Ireland's commitment to achieving net-zero emissions by 2050, the water sector can contribute by improving energy efficiency, using low-carbon construction methods, and exploring opportunities for renewable energy within wastewater systems. This also includes using nature-based solutions where appropriate, minimising environmental impacts, and monitoring biodiversity outcomes over the life of the strategy.

3.5 Environmental and Ecological

The key pieces of environmental legislation that have informed our strategy are:

- The Habitats Directive (92/43/EEC) which has been transposed into Irish law by the Planning and Development Act 2000 (as amended),
- The European Communities (Birds and Natural Habitats) Regulations 2011, as amended (S.I. 477/2011),
- The Council Directive 2001/42/EC of the European Parliament and of the Council which has been transposed in Ireland under the European Communities (EC) (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. No. 435 of 2004), as amended, and
- The European Union (Land Use Planning – Strategic Environmental Assessment) Regulations 2025 (SI. 456/2025).

We developed this draft GWS applying the requirements of the Strategic Environmental Assessment (SEA) Regulations and the EC Birds and Natural Habitats Regulations. This involved undertaking relevant environmental assessments at each stage of the process, including preparation of an SEA Environmental Report which documents the environmental assessment of the draft GWS and examines how the Strategy could affect the environment, including water quality, biodiversity, climate change resilience, recreation and human health. This assessment helped identify potential environmental risks at an early stage and ensures that environmental considerations are integrated into decision-making throughout the Strategy.

The SEA scoping and Appropriate Assessment (AA) Screening were consulted on with Public Consultation 1 (PC1), launched in Autumn 2024, which included consultation on the Issues Paper, Strategic Environmental Assessment Environmental Report, and Appropriate Assessment Screening Reports, and responses have been fed into the draft GWS development and environmental assessment approach.

The Natura Impact Statement (NIS) assessed whether the draft GWS could have potential effects on Natura 2000 sites, which are designated to protect important habitats and species under European legislation. Where any potential risks were identified, measures were incorporated into the Strategy to avoid or reduce these impacts, safeguarding Galway's sensitive coastal and inland environments.

Mitigation and enhancement measures identified through the environmental assessments are incorporated into the draft GWS implementation approach (Refer to the Multi Criteria Decision Analysis section in Appendix 5). The proposed monitoring plan in the SEA Environmental Report forms part of the overall monitoring and feedback and review process applied to inform adaptive management, identify the need for changes and inform future iterations of the strategy.

By assessing potential environmental impacts at this stage, the draft GWS provides a robust framework to support future growth while protecting water quality, biodiversity, and the natural environment of the Galway area.

The Climate Action and Low Carbon Development Act 2015 (amended 2021) supports all sectors in contributing to national climate goals while adapting to changing environmental conditions. Ireland has a commitment to achieve net-zero emissions by 2050, and the water sector can support this by adopting low-carbon construction methods, maximising energy efficiency and exploring opportunities for renewable energy generation within wastewater systems.

For further detail, readers are referred to the *Strategic Environmental Assessment (SEA) Report* and the *Natura Impact Statement (NIS) and Appropriate Assessment (AA) Determination.* These assessments form the evidence base that underpins the draft GWS commitment to ensuring that wastewater infrastructure development proceeds in a way that protects, and where possible, enhances the natural environment for future generations.

3.6 Economic Conditions

Global factors such as war and pandemics can heavily influence economic conditions which can in turn impact on the delivery of water and wastewater services. Periods of economic downturn can limit the availability of funding for critical infrastructure projects and maintenance needs. There is also the risk that global, or national events have knock-on implications on our supply chain and energy costs. This can impact the availability of materials, products and chemicals. These events are inherently difficult to predict. However, there are steps we can take to mitigate against these risks.

Adaptive planning principles are used because external influences cannot be accurately predicted, and this draft GWS addresses these challenges by providing a structured yet flexible framework to manage uncertainty arising from external factors such as funding constraints and geopolitical change. These principles also enable a strategic focus on the progressive reduction of operational

emissions by ensuring that climate considerations are embedded in planning, investment, and operational decision-making. A systematic foresight and horizon-scanning process will be adopted to anticipate emerging risks and opportunities, inform strategic choices, and support resilient, low-carbon pathways over the long term. These processes will be integrated into the monitoring and governance framework to enable timely, evidence-based responses to change and to ensure continual alignment with strategic objectives.

4. A Collaborative Strategy with Community & Stakeholder Engagement

4.1 Introduction

Public consultation is a key element in ensuring members of the public and all interested parties have the chance to be part of the development of the GWS. Effective stakeholder engagement and consultation play a key role in the success of the strategy. Transparent communication, public consultations, and feedback mechanisms help incorporate diverse perspectives and foster community support for wastewater infrastructure projects.

The development of the draft GWS involves ongoing engagement with environmental authorities and the public to ensure a transparent, inclusive, and well-informed process. This engagement provides insights and data early in the process, while public consultation helps build understanding and support for wastewater management. The engagement strategy aims to address concerns promptly, promote UÉ's vision, and ensure the GWS reflects the needs of all stakeholders This engagement has already helped shape the GWS and will continue to guide its implementation in the years ahead.

4.2 Public Consultation 1

Error! Reference source not found. illustrates the timeline of public engagement activities, with Public Consultation 1 (PC1) launched in late 2024. This initial consultation phase played a vital role in shaping the draft by seeking public and stakeholder input at an early stage in the process.

Figure 4-1: Galway Wastewater Strategy Consultation Roadmap

4.2.1. Consultation 1 Engagement

The aim of PC1 was to engage with the public and our stakeholders to ensure we identified the issues important to them so that a robust draft GWS was developed to represent our shared values. Key stakeholders, UÉ regulators and statutory bodies were targeted on the Issues Paper and SEA Scoping Report and Appropriate Assessment Screening. The Issues Paper was prepared to support the development of the draft GWS. The topics identified in the Issues Paper, along with UÉ's vision, are the foundations that helped us define long-term objectives presented in the draft GWS.

The primary objectives of PC1 were to gather feedback on the emerging strategic challenges, the proposed guiding principles for the strategy, and the approach to environmental assessment. This included early screening under the Strategic Environmental Assessment Regulations and Habitats Regulations, ensuring that potential environmental impacts were considered from the outset.

This consultation was open to all interested parties, including members of the public, residents, environmental groups, planning authorities, statutory consultees and industry stakeholders. The feedback received helped inform the refinement of strategic options and confirmed the importance of a collaborative, transparent approach to long-term wastewater planning.

In order to assist stakeholders in making a submission as part of the public consultation, stakeholders were invited to provide feedback on the following consultation questions:

Question 1: *Do you have any suggestions that you would like Uisce Éireann to consider in the preparation of its Galway Wastewater Strategy?*

Question 2: *The Galway Wastewater Strategy study area comprises the Galway Metropolitan Area, Athenry, and Moycullen as well as receiving waters and Water Framework Directive waterbodies. Do you have any comments on this?*

Question 3: *Do you have any comments on the approach to the Strategic Environmental Assessment for the Galway Wastewater Strategy?*

Question 4: *Section 2.1 in chapter 2 of the SEA Scoping Report outlines the objectives of the Galway Wastewater Strategy. Do you have any comments on these objectives?*

Question 5: *Chapter 3 of the SEA Scoping Report sets out the current baseline environment conditions and future trends. The environmental issues are summarised in Table 3.20.1. Do you have any comments on these?*

Question 6: *Uisce Éireann has reviewed plans, policies, and programmes relevant to the Galway Wastewater Strategy in chapter 4 of the SEA Scoping Report. Are there any others that should be considered?*

Question 7: *Chapter 5 of the SEA Scoping Report sets out the environmental objectives that will be used to assess the Galway Wastewater Strategy and its potential effects on the environment. Table 5.2.1 summarises these objectives. Have you any comments on these?*

Question 8: *How would you like Uisce Éireann to communicate with you as the plan progresses?*

A number of communications tools were developed to promote the consultation and to raise awareness among the public, interested parties and environmental authorities and to encourage participation in the consultation process.

4.2.2. Consultation 1 Insights

14 No. submissions were received, eleven themes emerged and these were:

1. Legislative Compliance and Interactions with Plans, Programmes and Policies
2. Strategy and SEA interactions
3. Study area boundary
4. Planning for Future Development and Growth
5. Status of Existing UÉ Infrastructure
6. Timeline, resources and development ambition
7. Mutton Island Wastewater Treatment Plant (WWTP)
8. Water Quality and protection of the water environment
9. Monitoring and Reporting
10. Data Sources and knowledge gaps
11. Consultation and Communication

A detailed summary of the submissions received during PC1, along with our responses and how the feedback has been incorporated into this strategy, is provided in *Public Consultation 1 Responses.*

The Public Consultation 1 phase ensured the draft GWS reflects both expert insight and lived experience in the GMA, Athenry and Moycullen, and prioritised the incorporation of environmental safeguards and network resilience measures into the GWS, while ensuring compliance with statutory processes.

4.3 Public Consultation 2

A second round of public consultation is underway in May 2026 to July 2026 with the publication of this draft GWS. This phase provides an opportunity for all stakeholders to review and comment on the draft GWS, the SEA Report, and the NIS. Statutory stakeholders and relevant government departments will be actively engaged throughout this process.

We will host an in-person event and a webinar during the consultation period, and the draft GWS and its associated technical appendices have been made publicly available for review on the draft GWS website (www.water.ie/GWS).

In order to assist stakeholders in making a submission as part of this consultation, Uisce Éireann has invited feedback on the following questions, but feedback is not limited to them:

1. Strategic Approach and Recommended Options

The draft Galway Wastewater Strategy identifies the development of a new Regional Galway East Wastewater Treatment Plant (WWTP), with two associated discharge outfall options, as the recommended strategic approach.

Do you have any comments on this recommended approach or on the assessment process used to identify these options?

2. Methodology and Option Assessment

Sections 5 and 10 of the draft Galway Wastewater Strategy set out the methodology used to assess current wastewater infrastructure, identify future needs, and develop and evaluate strategic wastewater options for the study area.

Do you have any comments on this methodology?

3. Additional Information or Considerations

Are there any additional issues, information or local knowledge that you consider should be taken into account in the development of the Galway Wastewater Strategy?

4. Strategy Implementation

Section 12 of the draft Galway Wastewater Strategy outlines the proposed approach to implementing the Strategy.

Do you have any comments on the proposed implementation and delivery of the Strategy?

5. Environmental Assessment

Do you have any comments on the Strategic Environmental Assessment (SEA) Environmental Report and the Natura Impact Statement (NIS) that accompany the draft Galway Wastewater Strategy?

6. Additional Comments

Do you have any further comments on the draft Galway Wastewater Strategy?

Formal submissions can be made via a link on the website, via email to consult.water.ie or gws@water.ie, or via post to Uisce Éireann, Galway Wastewater Strategy, 1 Galway Business Park, Upper Newcastle Road, Dangan, Galway H91 A3EF.

Statutory stakeholders include the following:

- Environmental Protection Agency (EPA).
- Department of Agriculture, Food, and the Marine (DAFM),
- Department of Environment, Climate and Communications, and

- Department of Housing, Local Government and Heritage.

The Commission for the Regulation of Utilities as UÉ's regulator, will also be provided with an opportunity to receive briefings on the GWS. An Fóram Uisce and An Taisce will be offered briefings in regard to the draft Strategy, the SEA Environmental Report and the NIS.

All stakeholder feedback on the draft GWS, the SEA Environmental Report, and the NIS will be reviewed and considered as we finalise the Galway Wastewater Strategy. Each submission will be acknowledged, collated into a consultation 2 report, and responded to in the final Galway Wastewater Strategy. Submissions from individuals will be reported anonymously and feedback from organisations will be attributed to them.

The final GWS is set to be published in Autumn 2026. Recognising the dynamic nature of environmental and urban development challenges, UÉ has committed to conducting periodic reviews of the GWS every five years. This approach will ensure that the strategy remains relevant, effective, and adaptable to changing circumstances in the short, medium, and long term.

5. Our Approach to the Galway Wastewater Strategy

5.1 Our Approach

The purpose of the draft GWS is to assess and understand what is required to meet the needs for the study area across the planning horizons and identify options to meet those requirements. We assessed each of the four wastewater treatment plants in the study area, considering infrastructure performance, capacity, environmental sensitivity and future growth pressures. This enabled a targeted and evidence-based approach, ensuring that the specific needs, challenges and constraints were clearly understood and addressed through the recommended long-term wastewater solutions.

The draft GWS was developed using a clear, step-by-step process that follows national and international best practice. The approach included:

- Assessing current wastewater networks and treatment infrastructure to identify areas where performance issues and risks exist, using 2025 measured and modelled data.
- Projecting the future wastewater needs of the study area, taking account of population growth and climate change over the short, medium and long term with assessments at 2040, 2055 and 2080.
- Using advanced wastewater network and water-quality modelling to understand how the wastewater system performs over time and how it interacts with the receiving environment.
- Assessing risks to environmental compliance and system performance using consistent performance metrics and a Red–Amber–Green risk-based framework.
- Identifying the underlying causes of current and future risks through detailed analysis and expert input, to clearly define where investment is required.
- Developing and assessing a range of potential solutions through a structured optioneering and multi-criteria assessment process, leading to the identification of preferred strategic approaches and recommendations.
- Developing a shortlist of feasible options with a defined planning horizon, taking account of deliverability, alignment with long-term objectives, and integration with existing infrastructure.

Our strategic approach to long-term planning is illustrated in Figure 5-1. The section below sets out the process we have followed and how we have applied these principles to the development of the GWS.

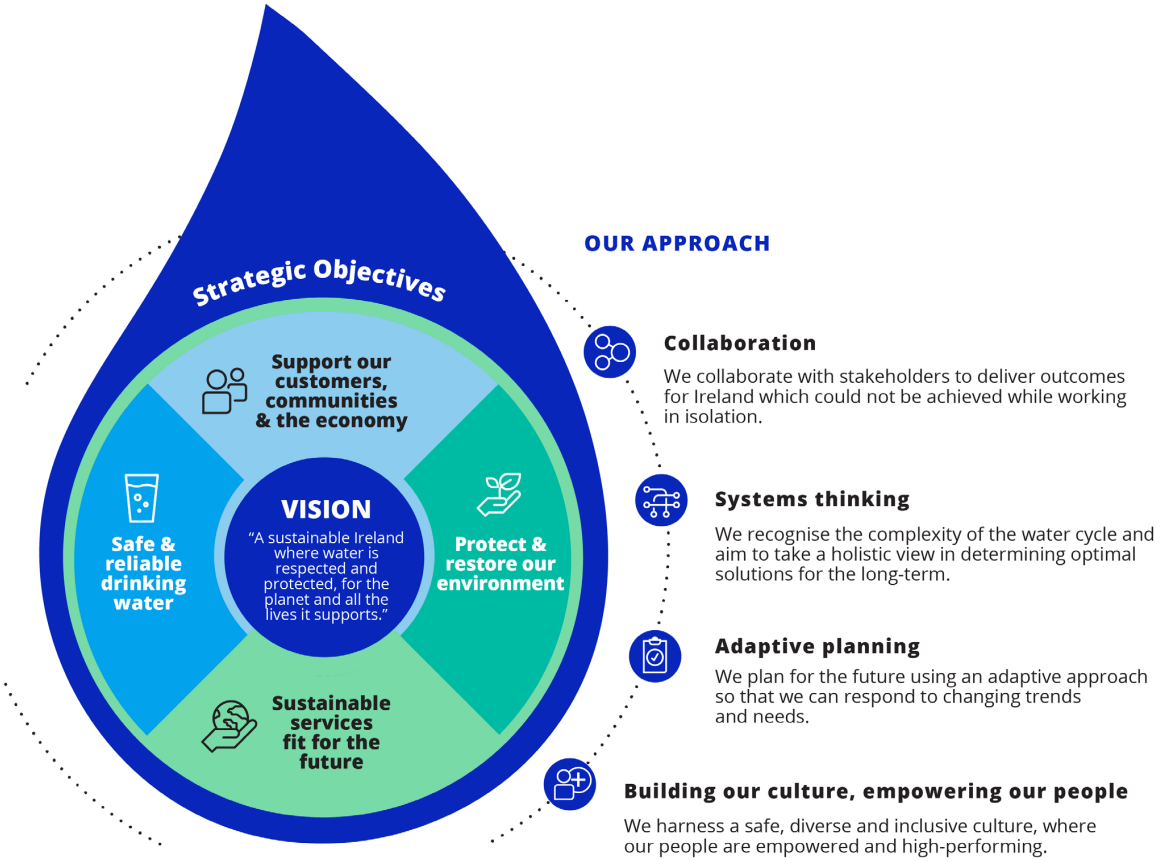


Figure 5-1: Our Strategic Approach

5.2 Alignment of the Strategy to the Drainage Area Plan

The draft GWS recognises the importance of shorter-term, tactical-level planning which is implemented through the Galway City DAP. The Galway City DAP operates at a more tactical, asset-level planning scale and will be informed by the strategic direction and preferred options identified within the GWS.

A core principle of this draft GWS is that interventions should be progressive, integrated, and resilient. Measures implemented today should be able to align seamlessly with those required in future planning epochs, avoiding the need for costly or disruptive redesigns. As such, steps will need to be taken to align the DAP with the high-level implementation of the Strategy.

5.3 Methodology

The approach comprises a structured five-step process designed to guide the development of sustainable, evidence-based, wastewater options for the Study Area. This methodology, illustrated in Figure 5-3, provides a clear and methodical framework for assessing current and future needs, identifying challenges and opportunities, and prioritising investment decisions that support long-term service resilience and environmental protection. A summary of the tasks carried out for each step is provided in the paragraphs below and for a detailed overview of this process, refer to *Appendix 5 - Optioneering and Feasible Option Development*.

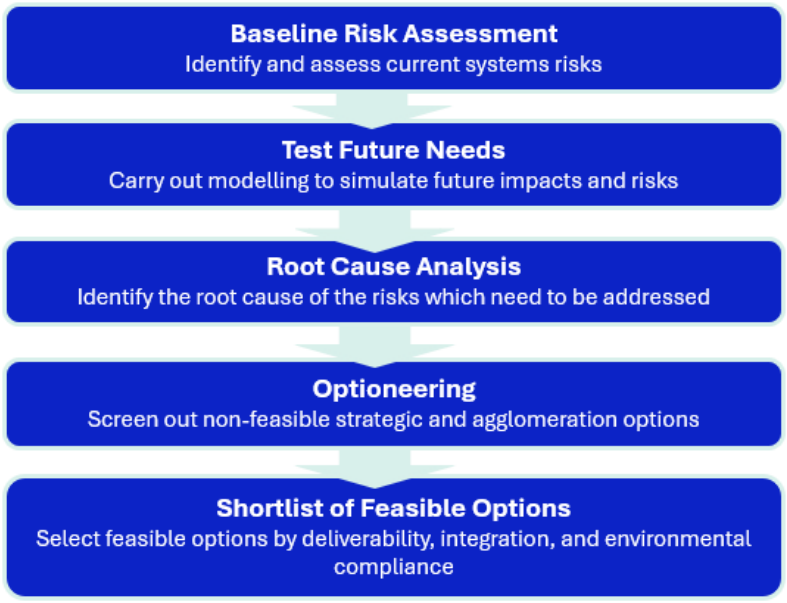


Figure 5-3: GWS Methodology

Baseline Risk Assessment: This stage focuses on evaluating the current performance of each agglomeration. The assessment is based on measured and modelled data using 2022 as the baseline. A range of performance metrics are assessed and assigned a risk status (Red, Amber, Green). This supports the identification of the more material issues which need to be resolved and while this type of classification is considered appropriate for strategic level planning, more refined risk assessments would be require at later more detailed design stages. The risk assessment looks at issues across wastewater assets, enabling us to apply systems-thinking and take a holistic view to identify the root cause of problems.

Test Future Needs: We built on the baseline risk assessment to identify long-term planning risks. Using network and water quality models, we projected the impact of growth and climate change on our networks and treatment works. We modelled the impacts and captured the anticipated performance at three discrete time horizons – 2040, 2055 and 2080. We predicted the performance of our assets using consistent metrics. We applied the same risk status as those used in the baseline risk assessment to provide us with a comparative assessment of where and when risks would emerge.

Root Cause Analysis: Using our baseline risk assessment and modelling, we interrogated the models and consulted internal subject matter experts to identify the root cause of identified risks. These root causes formed the basis of our needs list before we started the optioneering stage.

Optioneering: An initial, unconstrained long list of potential options was developed with stakeholders, which were then screened out at a strategic level (i.e., the GWS study area) and subsequently at an agglomeration level. This refinement was based on the technical feasibility and viability of each option to resolve the identified risk. This screening was finalised in a strategy workshop where modellers, planners, designers, engineers, scientists, network and plant operators, and technical specialists (e.g., Ecology, Hydrology) discussed and shortlisted the options. The resulting shortlist is a list of all options which could support the needs of the region.

Shortlist of Feasible Options: The options were further evaluated with a focus on deliverability, alignment with long-term objectives, and integration with existing infrastructure. The outcome was a shortlist of feasible options for each agglomeration and design horizon. Each feasible option was assessed from an environmental and ecological perspective to ensure consistency with regulatory requirements and sustainability principles as part of the SEA and AA process.

5.4 Strategic Environmental Assessment

The *Strategic Environmental Assessment (SEA) Environment Report* documents the environmental assessment of the draft GWS. The overarching objective of the SEA Directive is to ensure a high level of environmental protection by systematically integrating environmental considerations into the development, assessment, and adoption of plans and programmes, thereby promoting sustainable development and supporting informed, transparent decision-making.

The SEA process has influenced and helped shape the plan. For a detailed overview of this process, refer to the *Strategic Environmental Assessment (SEA) Environment Report*. We have further summarised the impact of the SEA in Section 10 of this report.

6. Current Performance Assessment

To identify the strategic needs and drivers across the wastewater system we implemented a consistent method of assessment across each of the future planning horizons. To support the identification of effective interventions, we identified the root cause of issues so that our options are targeted and cost effective.

We identified a range of indicators which identify current and emerging risks at the WWTPs, capacity limitations in the network and environmental risks. Our baseline assessment used current and recent data to inform our baseline view of performance. Our assessment of future risks and performance in the region is based on modelling outputs, which take account of growth and climate change projections (refer to Section 7 in this report).

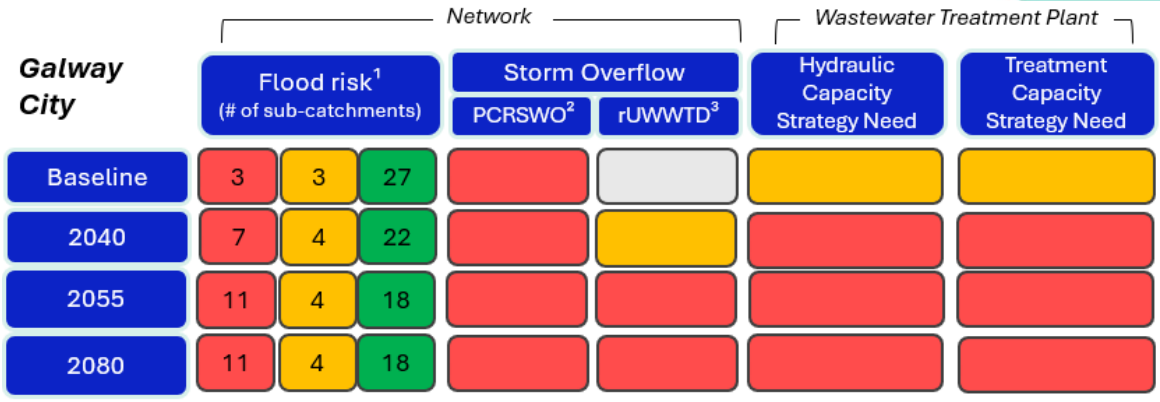
In the following sections we set out the identified performance indicators and the risk thresholds.

6.1 Performance Indicators

Our assessment of performance considered a holistic view of all wastewater assets and their impact on the environment. A series of metrics were used to capture the risks for each agglomeration within the study area. Performance indicators were selected based on the availability of data, the suitability of the data as an indicator of performance and the impact on customers or the environment. Refer to *Appendix 3 - Status and Performance of the Wastewater System* for details.

The performance indicators for each agglomeration are illustrated below.

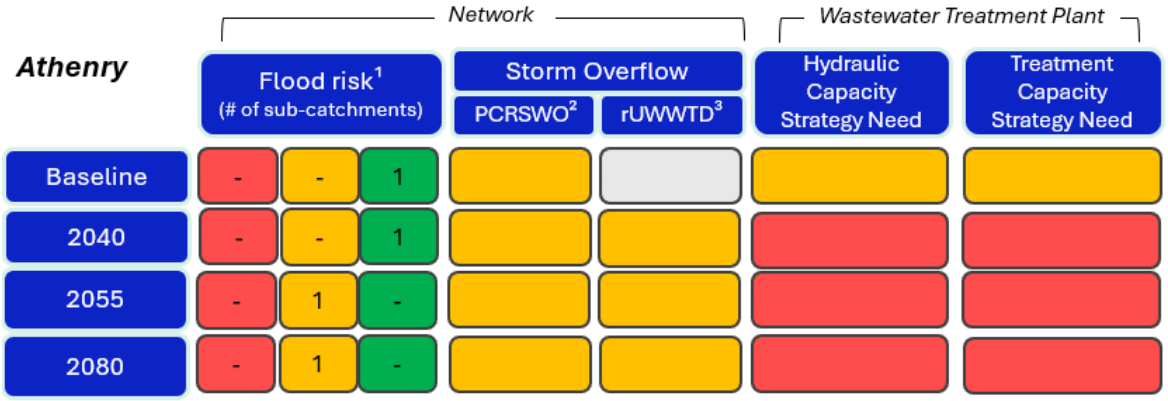
Mutton Island (Galway City) Agglomeration



1. Red, Amber, Green corresponds to High, Medium and Low flood risk respectively. The number in the box denotes the number of subcatchments affected in the model.
2. This is an assessment against current SWO performance criteria (PCRSWOs)
3. This is a future assessment against the indicative non-binding objective within Annex 5 of the rUWWTD (2% Load Lost Objective)

Figure 6-1: Summary of the Key Performance Indicators for Galway City Agglomeration

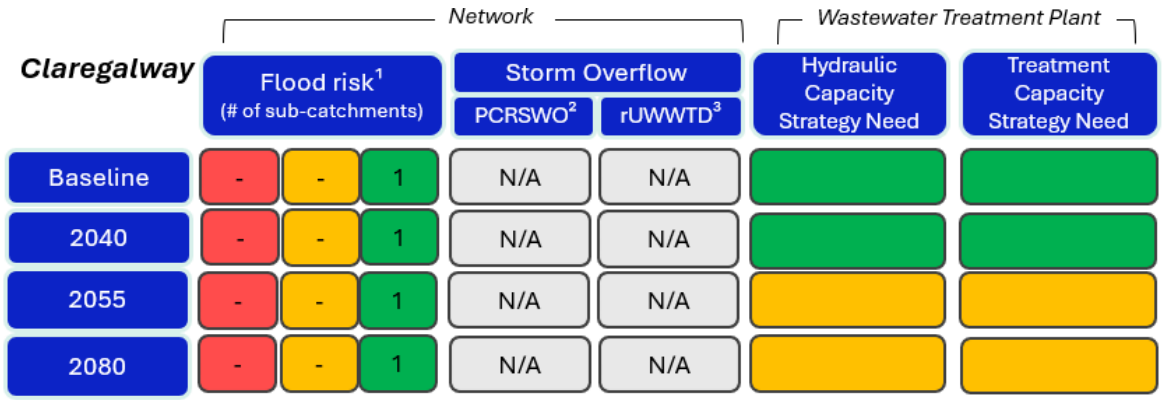
Athenry Agglomeration



1. Red, Amber, Green corresponds to High, Medium and Low flood risk respectively. The number in the box denotes the number of subcatchments affected in the model.
2. This is an assessment against current SWO performance criteria (PCRSWOs)
3. This is a future assessment against the indicative non-binding objective within Annex 5 of the rUWWTD (2% Load Lost Objective)

Figure 6-2: Summary of the Key Performance Indicators for Athenry Agglomeration

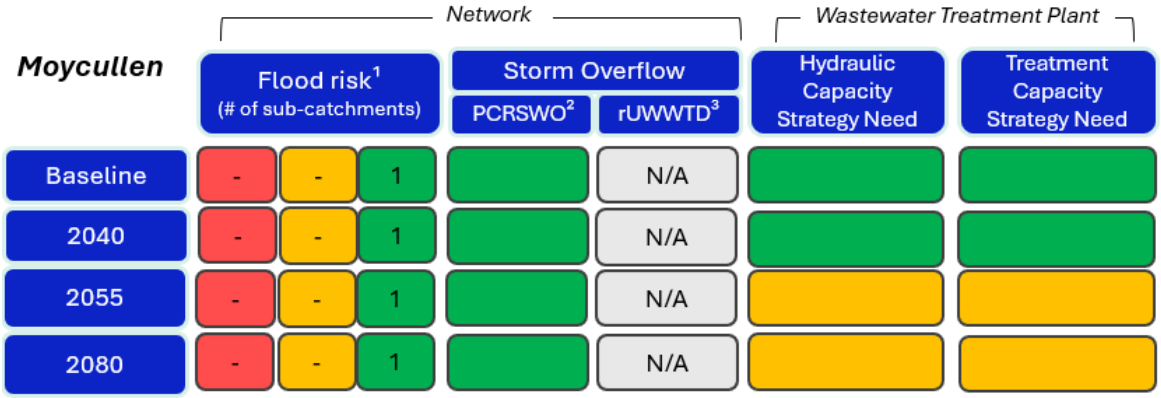
Claregalway Agglomeration



1. Red, Amber, Green corresponds to High, Medium and Low flood risk respectively. The number in the box denotes the number of subcatchments affected in the model.
2. This is an assessment against current SWO performance criteria (PCRSWOs)
3. This is a future assessment against the indicative non-binding objective within Annex 5 of the rUWWTD (2% Load Lost Objective)

Figure 6-3: Summary of the Key Performance Indicators for Claregalway Agglomeration

Moycullen Agglomeration



1. Red, Amber, Green corresponds to High, Medium and Low flood risk respectively. The number in the box denotes the number of subcatchments affected in the model.
2. This is an assessment against current SWO performance criteria (PCRSWOs)
3. This is a future assessment against the indicative non-binding objective within Annex 5 of the rUWWTD (2% Load Lost Objective)

Figure 6-4: Summary of the Key Performance Indicators for Moycullen Agglomeration

Wastewater treatment performance indicators have been discussed within *Appendix 3 - Status and Performance of Wastewater System*. These give an overview of each WWTP, their current and potential ELVs and any associated hydraulic and performance risks. An assessment of future risk and resilience of each WWTP was undertaken in order to make a recommendation on the treatment profile of each WWTP to inform the optioneering process conducted within *Appendix 5 - Our Approach to Optioneering and Feasible Option Development*.

7. Approach to Modelling

The draft GWS study area is served by a network of wastewater assets that collect, transport, and treat wastewater (and stormwater occasionally). The primary components include four major Wastewater Treatment Plants (WWTPs): Mutton Island, Athenry, Moycullen, and Claregalway. These treatment facilities operate at varying capacities and play a crucial role in ensuring compliance with environmental standards. The network also includes over 50 pumping stations, an intricate system of gravity and pumped sewers, and multiple Storm Water Overflows (SWOs).

There are two main aspects of the modelling undertaken in support of the GWS. These are:

1. **Network Modelling** (covering sewer system networks) – to replicate the piped drainage systems collecting flow and load generated within the agglomerations of interest and assess the treated effluent, storm overflow performance as well as sewer flooding.
2. **Water Quality Modelling** (covering waterbody impacts) – to evaluate impacts and benefits of strategic options to both freshwater and coastal waters with the inputs from observed monitoring data and network model outputs.

These are discussed in greater detail in the respective sections below.

7.1 Network modelling

Network models are required for large and complex drainage systems like Galway City. However, in smaller agglomerations like Moycullen and Claregalway, available monitoring information at the WWTP can be sufficient to assess performance. The drainage systems are less extensive in nature and therefore require a more simplified model. Table presents an overview of the modelling approach taken for each agglomeration in the study area with more detail provided in *Appendix 2 - Our Approach To Modelling and Climate Change*.

Table 7-1 Overview of Modelling Approach by Agglomeration in the GWS

Agglomeration	Network Modelling	WWTP Monitoring	Freshwater WQ	Marine Initial Dilution Modelling
Mutton Island (Galway City)	☑	☑	☒	☑
Athenry	☑	☑	☑	☒
Claregalway	☑	☑	☑	☒
Moycullen	☑	☑	☑	☒

The Galway City, Athenry and Moycullen hydraulic models have undergone flow monitoring in the network and verification to observed data in order to represent both dry and wet weather flows.

Dry weather flow provides an estimate of the baseline wastewater flow in a sewer system, excluding storm runoff. It acts as a foundational baseline for capacity planning. The modelled dry weather flow considers the anticipated loadings from population data, and the existing modelled

trade flows for consented trade effluent and commercial discharge. A constant infiltration component has been used (baseflow) and verified based on data collected in 2019.

Wet Weather flows are generated using modelled rainfall runoff. A 10-year time series rainfall series has been used to carry out SWO spill assessments. A series of summer design rainfall events with return periods of 1month (1 hour duration only), 1year, 2y, 5y, 10y, 20y, 30yr and standard durations of 30, 60, 90, 120, 240, 480 minutes were used.

Tidal ingress can occur to sewer networks due to high water levels in surrounding waterbodies and flow paths into the sewer network. The monitoring data showed signs of tidal ingress into the Galway City sewer network. This study has used the representation of a high tide during wet weather events in line with the analysis undertaken during the Galway City DAP. This represents a conservative approach based on the low likelihood of a high tide occurring at the same time as extreme rainfall events.

7.2 Water Quality Modelling

The water quality analysis considers the performance of key wastewater treatment plants and stormwater overflows, and the impacts of these discharges on receiving waters. Water quality modelling was undertaken for both freshwater and coastal environments. Four scenarios were assessed: three representing different growth projections and one accounting for the potential impacts of climate change.

The following sections outline the modelling methods, determinants of interest and standards used to assess the wastewater discharges on the receiving waterbodies.

The **impact of final effluent** from the WWTPs on the receiving water body was assessed with consideration of the WFD classification. Modelling was used to determine whether the discharge met the WFD standards, and if not what potential ELVs would be necessary to achieve them. By estimating the final effluent, and river flows and quality, we were able to assess the impact on receiving watercourses to inform future scenarios for optioneering. Discharges from Athenry, Moycullen and Claregalway agglomerations were assessed.

Modelling of the impact of **intermittent discharges** to freshwater was undertaken for all SWOs which discharged more than 1% of the year. The assessments use simulated SWO spills and final effluent data and models the mixing of this discharge with statistically representative samples of river flow and quality. The resultant mixture is then routed into a simple river model, which simulates the transition of the mixture downstream to determine if rivers and canals can continue to meet WFD standards now and in the future, including under increased growth and climate change conditions.

8. Test Future Needs

8.1 Growth Projections

The GWS aims to ensure that there is adequate wastewater treatment capacity and capability within the study area to meet anticipated growth demand through to the year 2080.To accurately identify future needs we must evaluate future population estimates and incorporate known future commercial demands for each agglomeration within the study area. We have carried out four separate population projections, to estimate the regional loads at WWTP at three key design horizons of 2040, 2055 and 2080. We considered domestic load, commercial load, institutional load and industrial load (more details are set out in *Appendix 1 – Managing Growth*).

At present, Uisce Éireann does not provide wastewater services to several areas on the outskirts of the Study Area, including Furbogh, Clarinbridge, Craughwell and Kilcolgan, where wastewater treatment is predominantly managed through private septic tanks at individual properties. Projected loads for these areas, which are relatively small in scale compared to other parts of the study area, have been included as a contingency allowance in the GWS option development for infrastructure sizing purposes due to the possibility of future connection to the public wastewater collecting and treatment systems at some point in the future.

8.1.1. Annualised Growth Rate Projections

Throughout the report the baseline year for population projections is set at 2022. A detailed assessment was carried out to evaluate the current agglomeration and catchment population, using the latest available 2022 census data[5] from the Central Statistics Office, along with existing industrial and commercial loadings. We also undertook a review of census data from 2002-2022, to understand the population trends which have resulted in current loadings. From 2022 and 2025 we applied regional growth rates to bring projections close to the year of publication of the Strategy.

The National Planning Framework (NPF) and its subset Regional Spatial and Economic Strategy (RSES) offer population projections up to the year 2040 which also cover the initial project design horizon. These projections have been aligned in the short term (up to 2031) with Galway City and Galway County Development Plan targets.

From 2031 to 2040, the NPF and RSES projected growth rate of 0.84% per annum was used. From 2040 to 2055 CSO 2051 projections of 0.73% per annum were used. From 2055 to 2080, the Eurostat 2100 projected growth rate of 0.22% per annum was used. According to EUROPOP2023, and depending on net migration, Ireland may experience continued population growth through the first half of the century, then stabilisation, and potential decline later in the century.

8.1.2. Industrial Development Agency Strategic Sites

Within the draft GWS study area, three strategically significant sites present potential for industrial expansion during the projected strategy timeframe. These locations, all owned by the IDA, are situated in Parkmore (Galway City), Oranmore, and Athenry. The projected impact of anticipated wastewater loading at each site has been estimated with these loadings incorporated into the Mutton Island (Galway City) projections for the purpose of developing strategic options.

For option development, IDA loadings have been considered at the 2040 horizon, which is identified as a key milestone for the effective implementation of strategy recommendations. Full connection of the IDA loadings is expected and projected by 2055. During strategy implementation up to 2040, each industrial discharge application will be assessed against available biological and hydraulic capacity in each agglomeration.

8.1.3. Headroom Capacity

To account for the inherent uncertainties in long-term forecasting, we have included a headroom allowance (safety margin) in our demand forecast for the WWTPs. Future horizon projections include a headroom of 15% for WwTPs outside of the Galway Metropolitan Area and 20% for the WwTP within the Mutton Island (Galway City) agglomeration. Galway City is designated as a large urban settlement, so the higher percentage headroom is justified because of the greater unpredictability of influent generated by a larger number of sources. This approach was adopted due to the extended projection period to ensure adequate resilience in wastewater infrastructure planning for the Strategy.

8.1.4. Growth Estimate Results

In summary, the total PE to be treated is estimated to more than double to around 383,000 by 2080, refer to Table 8-1.

Table 8-1 Summary of PE per agglomeration and Strategy horizon

Agglomeration	2022 Baseline	2040 Horizon	2055 Horizon	2080 Horizon
Mutton Island (Galway City)	143,800	249,400	335,900	350,200
Athenry	6,600	11,900	13,200	13,800
Claregalway	2,700	5,700	6,400	6,700
Moycullen	2,700	3,900	4,400	4,600
Furbogh	1,400	1,900	2,100	2,200
Clarinbridge	1,200	1,900	2,200	2,300
Craughwell	1,500	2,400	2,700	2,800
Kilcolgan	400	600	700	700
Total	**160,300**	**277,700**	**367,600**	**383,300**

The additional loads will mainly be in locations to the east of Galway City (projected as 82%). Refer to Figure 8-1.

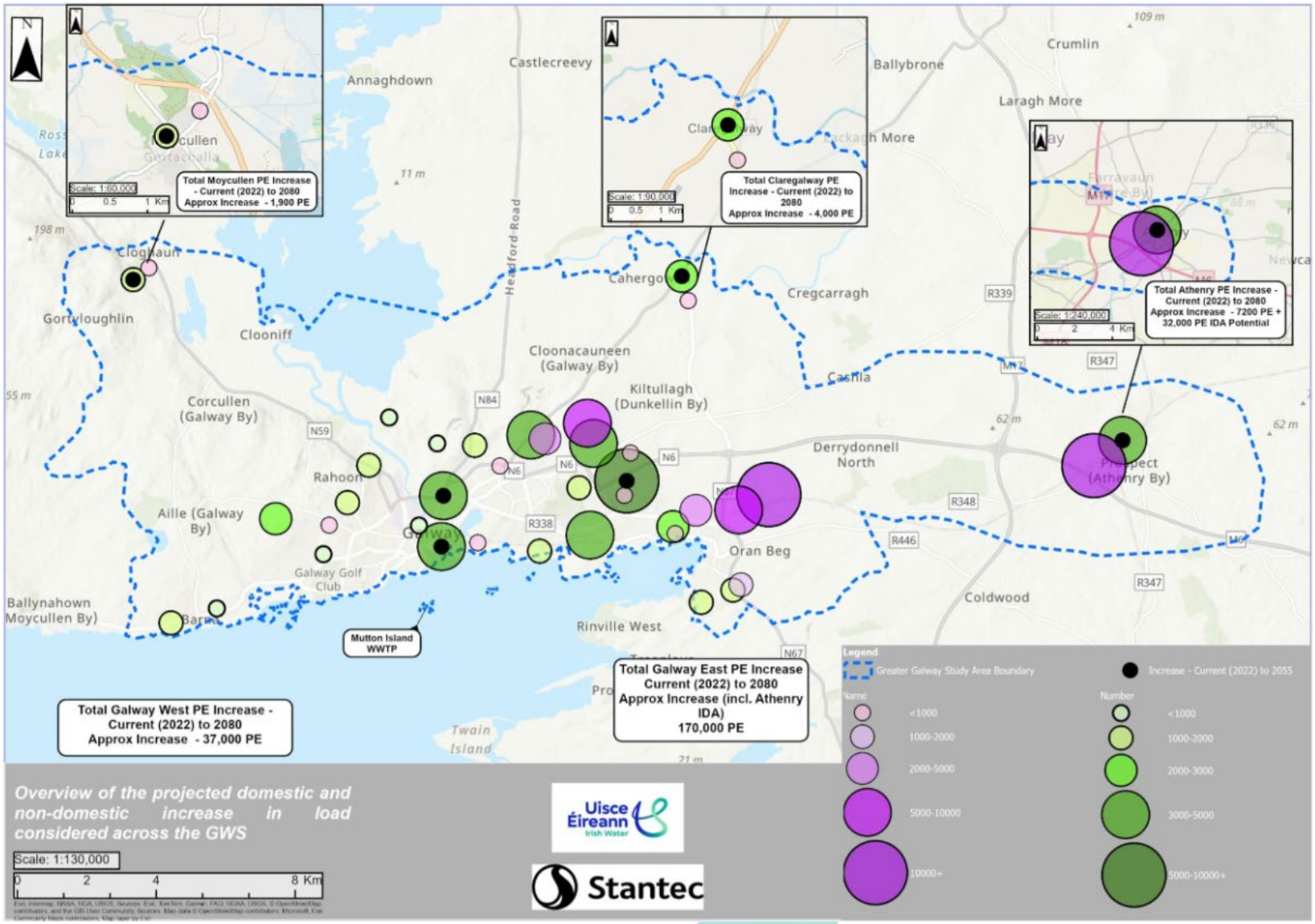


Figure 8-1 Overview of the projected domestic and non-domestic increase in load considered across the GWS

Spatial allocation of projected loadings has been undertaken across the study area for each specified time horizon, in alignment with pertinent development policies, zoning maps, land use strategies, masterplans, and the provisions established within the Galway City and County Council Development Plans. This approach is consistent with the National Planning Framework's objectives for Compact, Smart, and Sustainable Growth, and incorporates perspectives gathered from stakeholder engagement involving the Land Development Agency and local authorities.

According to upper bound estimates, the analysis suggests that, in the absence of upgrades, Mutton Island (serving Galway City, Bearna, and Oranmore) and Athenry are projected to exceed their design capacities by the 2040 design horizon by 46% and 23%, respectively.

Moycullen and Claregalway are anticipated to *marginally* surpass their current design capacities by 8% and 5% by 2055. These latter agglomerations are expected to remain operational through to 2080, contingent upon ongoing monitoring of strategic growth, targeted infrastructure enhancements, and capacity optimisation initiatives to maximise existing assets, pending further detailed modelling and appraisal within the Strategy. It is recommended that more detailed modelling is undertaken at Moycullen to accurately determine any upgrade timeline.

The growth projections show that both Mutton Island (Galway City) and Athenry agglomerations may require significant investment, underscoring the importance of prompt action during the Strategy's option development process.

8.1.5. Uncertainty

It should be noted that population projections are inherently uncertain, and a precautionary and conservative approach to risk has been employed given an extensive design horizon up to 2080. In practice, this means that infrastructure plans are designed to accommodate higher-end population estimates, ensuring resilience against unexpected demographic shifts. Population growth can be influenced by several factors and as a result of this, population projections will be re-evaluated to incorporate new CSO Census data during the five-yearly revisions of the Strategy.

8.2 Climate Change

This section provides a summary of how wastewater infrastructure challenges related to climate change pressures have been assessed as part of the Strategy.

We have used the Environmental Protection Agency's (EPA) National Climate Change Risk Assessment (NCCRA)[2] to identify reliable data sources on projected climate conditions in Ireland. The TRANSLATE project[3] developed by Met Éireann, offers a standardized suite of bias-corrected climate projections and services tailored to Ireland and are accessible through Met Éireann's TRANSLATE portal (TRANSLATE Project). The UK Climate Projections 2018 (UKCP18) are used in assessing coastal flood risks and to inform strategies to address potential impacts on coastal infrastructure and habitats in Ireland.

The NCCRA recommends that climate change risk assessments should consider three time horizons throughout the 21st century (2030, 2050 and 2100) and two scenarios of changing

concentrations of greenhouse gases, known as Representative Concentration Pathways (RCP). RCPs specify a timeline of evolving atmospheric radiative forcing through to the year 2100, and the NCCRA specifies that RCP4.5 and RCP8.5 should be considered, representing a medium level of emissions and a high level of emissions, respectively.

For the GWS, we used the 2100 projections for our 2080 design horizon and the 2050 projections for our 2055 design horizon for both RCP4.5 and RCP8.5 emission levels. The difference between RCP4.5 and RCP8.5 scenarios remains minor through 2030, indicating that the degree of warming from present day to 2030 is relatively small. Climate change projections were not applied to the 2030 design horizon.

The following section identifies how and where the climate change projections were used in the draft GWS Modelling approach.

Climate Change Impact	Application in the model
Air Temperature	We applied the changes in air temperature to the assumed surface water temperature applied in the river models. River water temperature governs ammonia decay rates, proportions of ionised and unionised ammonia factions and dissolved oxygen dynamics and hence changes in river temperature will affect predicted water quality.
Rainfall	Understanding and accurately predicting rainfall patterns is essential for effective infrastructure design and resilience planning. For assessing **environmental performance**, we used the TRANSLATE2RED[9][10] rainfall time series projections for Galway. The TRANSLATE2RED tool's uplifted rainfall time series will be incorporated into both sewer network models and water quality models. This approach simulates the effect of climate-driven changes in pollutant loading on river water quality across seasonal shifts. It enables an assessment of how increased rainfall in wetter winters and reduced rainfall in driver summers might impact pollutant dynamics, affecting water quality and associated risks within freshwater ecosystems. **Flooding performance** presents an additional challenge, because future storm events are expected to become more intense and potentially more frequent. To address this, uplift factors for design storms, as recommended by UÉ's modelling specifications, were applied. These uplift factors help account for increased peak

[9] The TRANSLATE2RED tool was developed by Amphos21 for UÉ

[10] The TRANSLATE2RED is built upon the methodology established by the REDUP tool, which utilizes uplift factors to adjust historical rainfall time series, thereby accommodating for the anticipated impacts of climate change.

	storm intensities and ensure that sewer and drainage systems are resilient to projected flooding risks.
Sea Level Rise	Sea levels are projected to rise significantly in coming decades. The EPA and OPW figures for sea level rise by 2100 are broadly consistent, with figures of 0.63-1.01m[11]. An uplift factor of 1000mm was applied to the tidal level file within the Galway City Sewer Network model because only this network would be affected by changes in mean sea level.

For the GWS, the climate change emission scenarios that were used were RCP4.5 and RCP8.5. Sensitivity analyses focused on variables including rainfall, growth, air temperature, and sea level rise. These factors were assessed for the 2055 and 2080 design horizons to assess the impact that climate change may have on optioneering processes.

[11] Please refer to Appendix 2 - Our Approach To Modelling and Climate Change for further details regarding the data sources considered.

9. Current and Future Performance of the Wastewater System

Analysis of historical WWTP asset data and network model outputs have been used to establish current system performance. We have used the outputs of our models to understand the future performance of the wastewater system. We have run our models with estimated growth projections and climate change impacts to identify where future risks and performance deficits emerge.

Our analysis has focused on identifying where the current system fails to meet regulatory or performance standards, and where there are risks to the system delivering future performance and compliance needs. We have broken down the results below, to provide an assessment of the network in each agglomeration followed by an assessment of the WWTPs. Further detail is provided in *Appendix 3 - Status and Performance of Wastewater System.*

9.1 Network – Storm Water Overflows (SWOs)

Refer to Section 5.3 of this report for the methodology relating to the environmental impact of SWOs. Further details are explained in *Appendix 3 - Status and Performance of Wastewater System.*

For analysis, the agglomerations were sub-divided into 35 hydraulically linked areas. There are 29 SWOs in the GWS study area, 26 are located in Galway City, 2 in Athenry and 1 in Moycullen. As such, our analysis of performance is heavily focused in the Galway City agglomeration.

Overall, Galway City has been classified as an agglomeration requiring priority investigation regarding current network performance. Needs have been identified regarding aesthetic issues and a risk associated with an SWO operating in DWF conditions. However, this SWO requires investigation as to the root cause of this operation as it is based on recent operational data.

Athenry is classified as a medium-risk catchment regarding network performance. Water quality modelling indicates that under UPM High polluting Standards (which aren't legal targets in Ireland) that there may be a potential for ecological impact on the receiving watercourse at high percentile analysis. For this reason, the network is given an amber status.

Moycullen is classified as a low-risk catchment regarding network performance[12].

Claregalway is a fully modern separate sewerage system and therefore does not have any SWOs and any associated risks.

A summary of the baseline performance of these criteria is shown in Table 9-1.

[12] As detailed in Appendix 2, there is low confidence provided for the Moycullen agglomeration as no sewer network monitoring was available to assess the distribution of urban runoff in the sewer network which reduces confidence in model predictions for environmental and flood risks.

Table 9-1 Summary of the Current Environmental Performance Indicators

Agglomeration	PRCSWOs[13]				Overall P&C
	Aesthetic	WQ Impact	National Directives	Operation in DWF	
Galway City (Mutton Island)	🟡	-	🟢	🟠	🟠
Athenry	🟢	🟡	-	🟢	🟡
Moycullen	🟢	🟢	-	🟢	🟢
Claregalway	-	-	-	-	🟢

9.2 Network – Flood Risk

Another fundamental ambition for network performance of the GWS is to reduce flood risk. Flood risk has been assessed using the baseline model and the 2055 and 2080 growth models. The 2055 model uses a rainfall climate change uplift factor of 20%, and the 2080 model results use an uplift factor of 25%. Flood risk has been assessed using the 1 in 20yr return period events. The analysis reports hydraulic flooding predicted in the sewer network models and does not consider other flooding causes, such as equipment failure.

Refer to Section 6.1 and Section 7.1 in this report for an explanation of the methodology used for analysing flood risks. The analysis reports hydraulic flooding predicted in the sewer network models and does not consider other flooding causes, such as equipment failure.

These results show a close correlation between reported flooding from operational (Maximo) data collected in the Galway City DAP and model predicted flood risk which is predominantly in the urban areas of the Galway City agglomeration Table 9-1.

Table 9-1: Sub-Catchments with reported flooding

Sub-Catchment	Reported Flooding Location
3. Murrough	Seagrove. Fuscia WWPS Rising Main Discharge
5. Renmore	Oranmore WWPS Rising Main Discharge
6. Lough Atalia	Lough Atalia WWPS

[13] Procedures and Criteria in relation to Storm Water Overflows (PCRSWO)

Sub-Catchment	Reported Flooding Location
12. Riverside & Tuam Road	Riverside Estate
14. Ballinfoile & Headford Road	Ballinfoile Park
17. City Centre	Quay Street (Basement) Cross Street (Basement) Eglington Street (Basement)
18. Dual Lines	Western Hotel (Basement)
19. Taylors Hill	Taylors Hill
20. Westside	Bothan le Cheile
26. Western Knocknacarra	Bearna Road Gentian Hill WWPS Kingston Road SWO
28. Salthill	Claude's Casino (Basement) Salthill Road Lower (Basement)
31. Bearna	Bearna WWPS

A tidal sensitivity assessment has identified Salthill, Grattan Road, and Oranmore as tide-sensitive areas in the current hydraulic model. Significant efforts to reduce infiltration have occurred since the model's verification, therefore, recent interventions may not be reflected in its latest version, which may reduce the risk within these locations.

Figure 9-2 demonstrates the change in flood risk between baseline, 2055 and 2080 design horizons[14]. There are three areas classified as high in terms of flood risk in the baseline which rises to 12 by 2080. Similarly, there are three areas classified as medium risk in the baseline which rises to five by 2080, and 29 areas deemed to be low risk which reduces to 18 in 2080.

[14] Areas with less than 200m3 of flood volume in the foul / combined sewers have been determined as low risk. Medium risk has been assigned where the total flood volume is over 200m3 and the average flood volume is greater than 25m3. High risk has been classified based on a total flood volume of over 500m3 and an average predicted flood volume over 50m3.

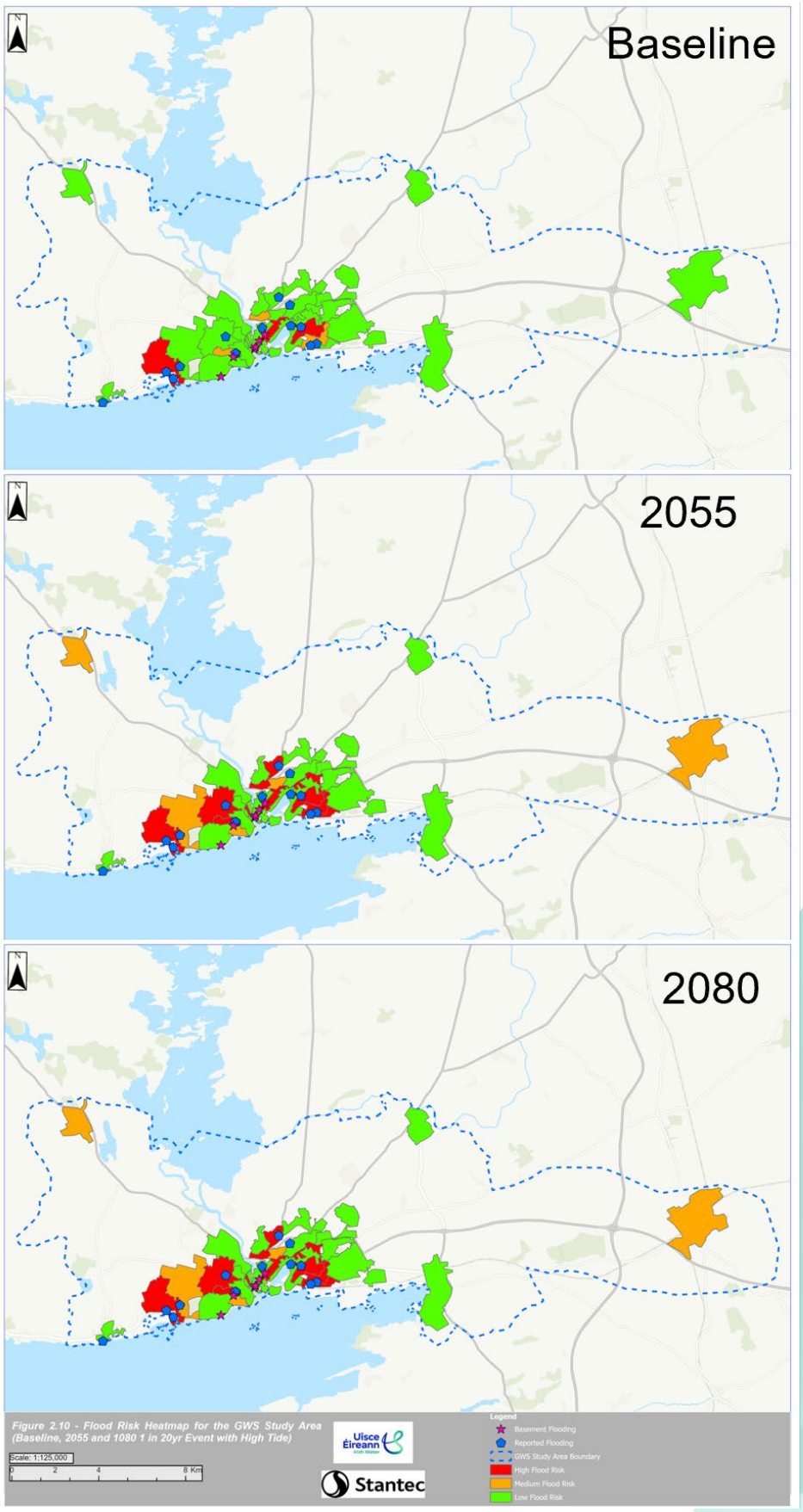


Figure 9-2: Flood Risk Heatmap for the GWS Study Area (Baseline, 2055 and 2080 1 in 20yr Event)

9.3 Wastewater Treatment Plant - Performance

There are four WWTPs in the GWS study area: Mutton Island, Athenry, Moycullen and Claregalway. Table provides a summary of the design organic and hydraulic capacities for the four agglomerations and their potential Emission Limit Values (ELVs). There are no bacterial (faecal coliforms, E.coli or Intestinal Enterococci) ELVs at any of the WWTPs.

Table 9-3 Design organic and hydraulic capacities and potential ELVs

Site/Parameter[15]	Mutton Island WWTP	Athenry WWTP	Claregalway WWTP	Moycullen WWTP
Design PE	170,000	9,500	6,000	4,000
Design FFT (m^3/d)	135,000	6,413	3,600	2,160
Design DWF (m^3/d)	45,000	2,138	1,200	720
BOD Licence (mg/l)	25	6	25	10
COD Licence (mg/l)	125	125	125	125
SS Licence (mg/l)	35	35	35	35
Total Ammonia-N Licence(mg/l)	25	0.4	10	1
TON Licence (mg/l)	20		-	-
Total N Licence (mg/l)	35		-	-
Ortho – P (as P) (mg/l)[16]	-	0.2	9	0.5

Each site has been considered individually and assessed. Our assessment of WWTP performance considers the hydraulic and biological constraints at each site alongside current loadings and headroom allowance. We have looked at the peak collected load, dry weather flow (DWF) and the flow to full treatment (FFT) capacity to identify risks relating to the capacity of the works.

We have used the last 5 years of final effluent data to assess the efficacy of the treatment process and how consistently it achieves compliance with potential ELVs. This will help us identify if any other treatment processes may constrain the ability of the site to achieve the potential ELVs set out in the discharge licence. We must also consider the status of the receiving water and the impact of discharges on WFD classifications.

[15] All values taken from Annual Environmental Reports using WWDL potential ELV Schedule A values for effluent treatment standards.

[16] Ortho-phosphate standards only applied to surface water discharges. There is no Total Phosphorus standard at the Mutton Island WWTP.

A summary of the baseline performance for the four WWTPs is shown in Table 9-4. The WWTPs currently operate below their design capacity. Both capacity and compliance risks (in terms of strategic needs) have been identified at Mutton Island (Galway City) and Athenry.

Table 9-4 Summary of WWTP performance across the planning horizons

WWTP Site	Epoch	Hydraulic Capacity (Strategic Need)	WWDL Compliance [17](Strategic Need)
Mutton Island (Galway City)	Baseline	🟡	🟡
	2040	🟠	🟠
	2055	🟠	🟠
	2080	🟠	🟠
Athenry	Baseline	🟡	🟡
	2040	🟠	🟠
	2055	🟠	🟠
	2080	🟠	🟠
Claregalway	Baseline	🟢	🟢
	2040	🟢	🟢
	2055	🟡	🟡
	2080	🟡	🟡
Moycullen	Baseline	🟢	🟢
	2040	🟢	🟢
	2055	🟡	🟡
	2080	🟡	🟡

For the purpose of this stage of the assessment (i.e. pre-development of strategic options), more than 90% of the growth within the study area is expected to be treated at **Mutton Island** WWTP. Without intervention, projections indicate that the WWTP will exceed its capacity (170,000 PE) before 2040, even under the lowest growth projections.

[17] A red category signifies that immediate investigation and intervention are required due to the identification of a significant strategic need. Amber indicates that a strategic need exists; however, the corresponding intervention involves lower capital requirements. Green denotes that no strategic needs have been identified.

Analysis of the hydraulic capacity at the works has identified that the flow entering the WWTP is hydraulically limited. The analysis shows that the plant may not be always passing forward flow up to design flow to full treatment (FFT) and "peak shaving" may be occurring during higher flows. As further assessment is required, assumptions were made on FFT for purposes of the strategy in order to evaluate the hydraulic performance of the plant. More detailed evaluations should be conducted to for setting of an appropriate FFT figure.

A high-level investigation of the capability of the works to meet the current flow and potential ELV parameters was undertaken. The site is compliant, however the limitation on incoming flow means the facility is not experiencing the full diurnal load range, which continues to present a potential treatment risk if the incoming flow limitation was lifted. Uisce Éireann have commissioned further surveys to assess the treatment capability of the plant as a result of Strategy recommendations.

Coastal flood risk modelling indicates no significant risk to the WWTP site itself, although the causeway may occasionally be overtopped during storms. Further investigation into coastal flood risk is recommended.

In its current configuration, **Athenry** WWTP has a capability up to 9,500PE as specified in the Annual Environmental Report. If housing development accelerates over the next 15 years at the rate specified in the RSES, the facility's capacity may be exceeded by 2030. The scale of growth poses a risk to the plant's ability to meet its discharge licence requirement.

The ammonium and orthophosphate limits at this WWTP are particularly challenging and are representative of the sensitive nature of the receiving waterbody. The downstream reach of the River Clarin from the WWTP has 'Poor' WFD status and the flow in the receiving waterbody can be very low on occasions, which raises concerns about future treatment capacity at the site.

Projected growth in the **Claregalway** area indicates that the WWTP has sufficient capacity to accept and treat the projected additional load up to the planning horizon of 2055. Water quality modelling demonstrates that treatment and discharge to the existing location will remain feasible through 2080 using presently available technologies. Analysis has indicated that the plant would benefit from having more load received at the works, to allow the biological processes to operate more efficiently.

Similarly, the **Moycullen** WWTP is expected to be able to meet growth up to 2055. No flow monitoring is installed at the inlet works to measure total inlet flow, which makes any assessment of flow unreliable. As we monitor growth over the period of the strategy, the WWTP will need to implement a flow measurement system, compliant with industry standard.

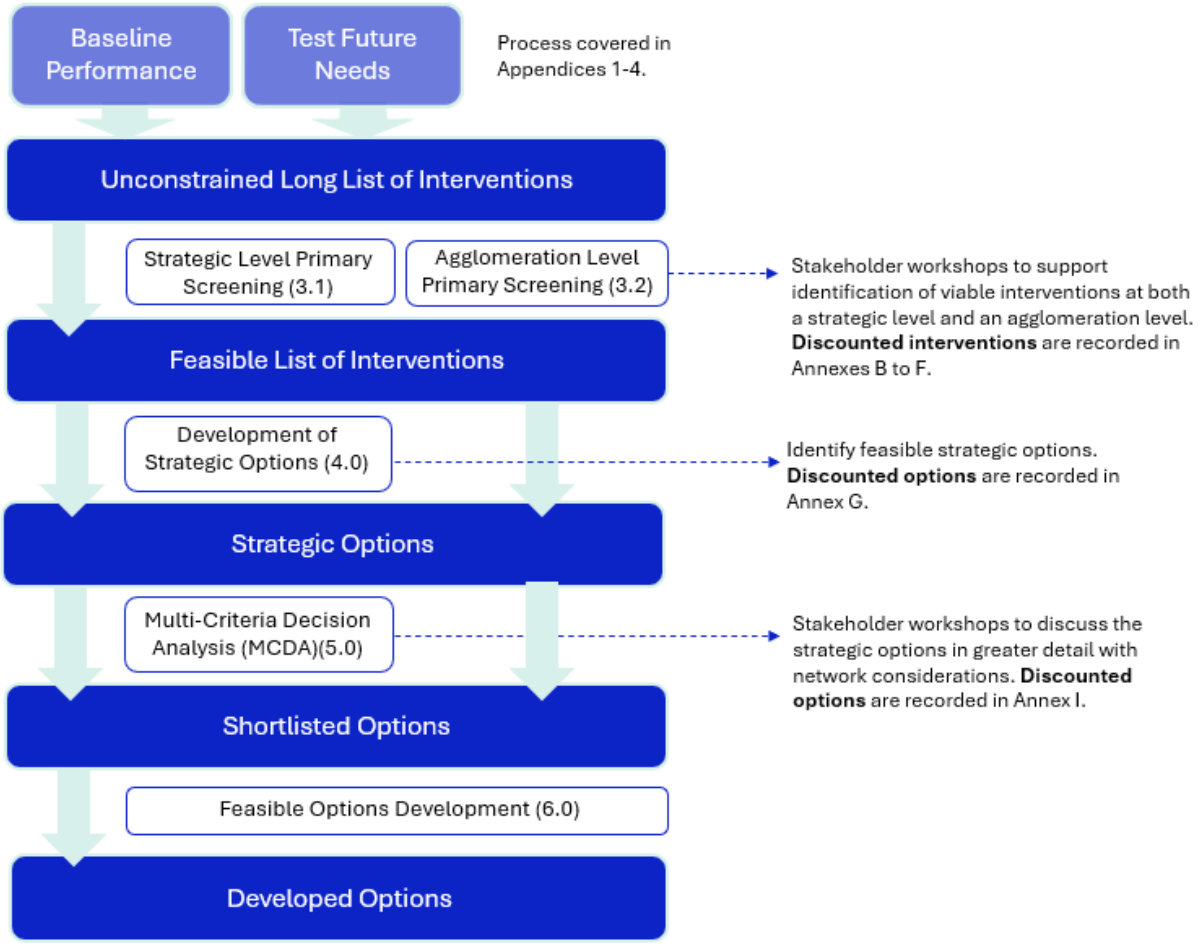
Water quality modelling demonstrates that treatment and discharge to the existing location will remain feasible through 2080 using presently available technologies.

The location is classified as having a low flood risk. Portions of the site are situated within both the 1:100 and 1:1,000-year flood boundaries and mitigation measures should be considered in any future upgrades. Further assessment may be needed to confirm flood risks and identify appropriate action.

10.Interventions and Strategic Options Development

A summary of the draft GWS methodology is provided in Section 5, and this section highlights the key processes undertaken during the optioneering development phase. The optioneering process builds on the analysis and modelling set out in the preceding sections (see Figure 10-1). These steps are described in the following chapter. For a more comprehensive description, please refer to *Appendix 5 – Our Approach to Optioneering and Feasible Option Development*.

Figure 10-1: The optioneering process adopted for Galway Wastewater Strategy



10.1 Terminology Used in this MCDA Process

To help readers understand the progress of interventions through the development of the strategy, we have made a distinction between intervention, option and scenario. We use the following terminology:

- **Interventions** are actions that we could undertake – to intervene - to address the root cause of an issue. Interventions have the potential to provide a performance improvement (e.g. capacity, compliance, resilience, cost efficiency) or mitigate a risk in the system,

- **Options** An option may be a combination of interventions assembled into a plan to solve the particular needs addressed as part of the draft GWS risk assessment. They provide alternative ways of meeting the planning objectives. Options are what you

compare against each other. For example, Option A may have several interventions within it that consider both wastewater treatment and networks performance improvements, and,

- **Scenarios** - a set of external assumptions (such as demographics, climate, regulatory) about the future under which you test your options. These have largely been tested in Appendices 1-4.

This distinction is important because it maintains structured and transparent planning and prevents the conflation of interventions with the way they are grouped as strategic options.

10.2 Unconstrained Long List of Interventions

From the analysis and modelling undertaken and set out in *Appendices 1-4*, we identified a long list of all possible interventions that could partially or wholly address the identified needs. The list was populated through engagement with internal subject matter experts and stakeholders, and examples taken from good practice and comparable strategies.

Each intervention was categorised under the TOTEX hierarchy (see **Error! Reference source not found.**). The Totex hierarchy structures interventions by whole life cost, from lowest cost to greatest. Lower Totex options focus on eliminating the need for investment, before seeking to optimise or adapt existing assets and only 'fabricating' new assets as a last resort. This approach supports and promotes low carbon development and cost-effective options

The TOTEX hierarchy was used to guide the optioneering process in a balanced manner. Options requiring greater levels of collaboration were not excluded early simply because they appeared more challenging to deliver. Recognising that collaborative options can offer significant long-term benefits; these options were given full consideration alongside more conventional interventions.

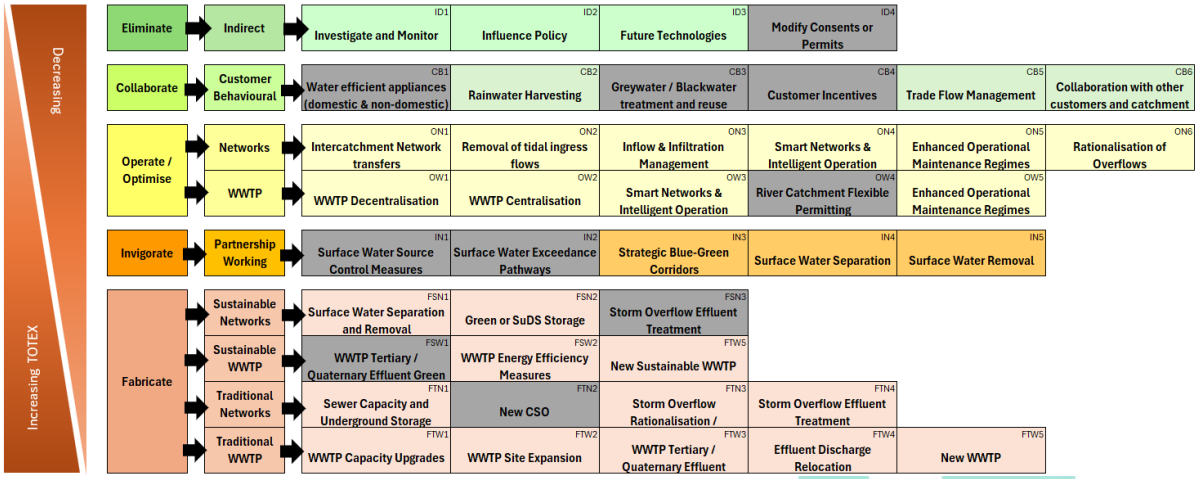


Figure 10-2 TOTEX Intervention Hierarchy with screened out interventions

10.3 Feasible Interventions

The long list of interventions underwent primary screening, to remove those options that were not viable for the Galway region. Primary screening was carried out through several workshops, which focused on both the strategic issues and agglomeration-specific problems. It is important that we

consider all interventions in a consistent way, so that any biases do not influence decisions. To facilitate this, we developed a list of questions to guide workshop discussions and ensure that each intervention was subject to the same level of scrutiny (see Table).

Table 10-1 Key themes used to guide Primary Screening discussions with stakeholders

Theme	Questions Posed
Community Support	Would the intervention have an adverse impact on local communities and what would the public perception be?
Deliverability	What level of confidence is there that the intervention can **safely and feasibly** be constructed within the agglomeration?
Technical feasibility and confidence	How certain are we that the intervention would **deliver the long-term outcome** or at least be a **part of a wider option**?
Resilience	Is the intervention **adaptable** and does it **increase resilience and reduce vulnerability (no regrets)**? For example, a change in circumstances / legislation / or technology within the strategy's horizon? Can it be implemented **at different spatial scales**?
Environmental	Is it envisaged that the intervention would have a **significant environmental impact that cannot be mitigated**?

The Strategic level screening exercise helped us to identify that the key challenge facing the region is responding to growth. The collective treatment capacity of the region is insufficient to accommodate the anticipated population and economic growth to 2080. Additional capacity will need to be created, either via expansion of an existing WWTP or the development of a new one. Assessment of the existing WWTPs for large-scale expansion identified multiple constraints, including environmental vulnerabilities resulting from increased discharges to local water bodies. The outcome of the strategic primary screening exercise was that a new regional WWTP was identified as a need.

Agglomeration level screening was more focused on local issues and constraints. The network and WWTP in each agglomeration have different characteristics and different issues. Primary level screening identified the most effective and targeted interventions appropriate to the location. We also considered the agglomeration level screening with the strategic context, so that we were not 'solving the same problem twice'. As some of the agglomeration level issues may be impacted by our strategic choices, the options that were carried forward were not further developed until the strategic options were agreed.

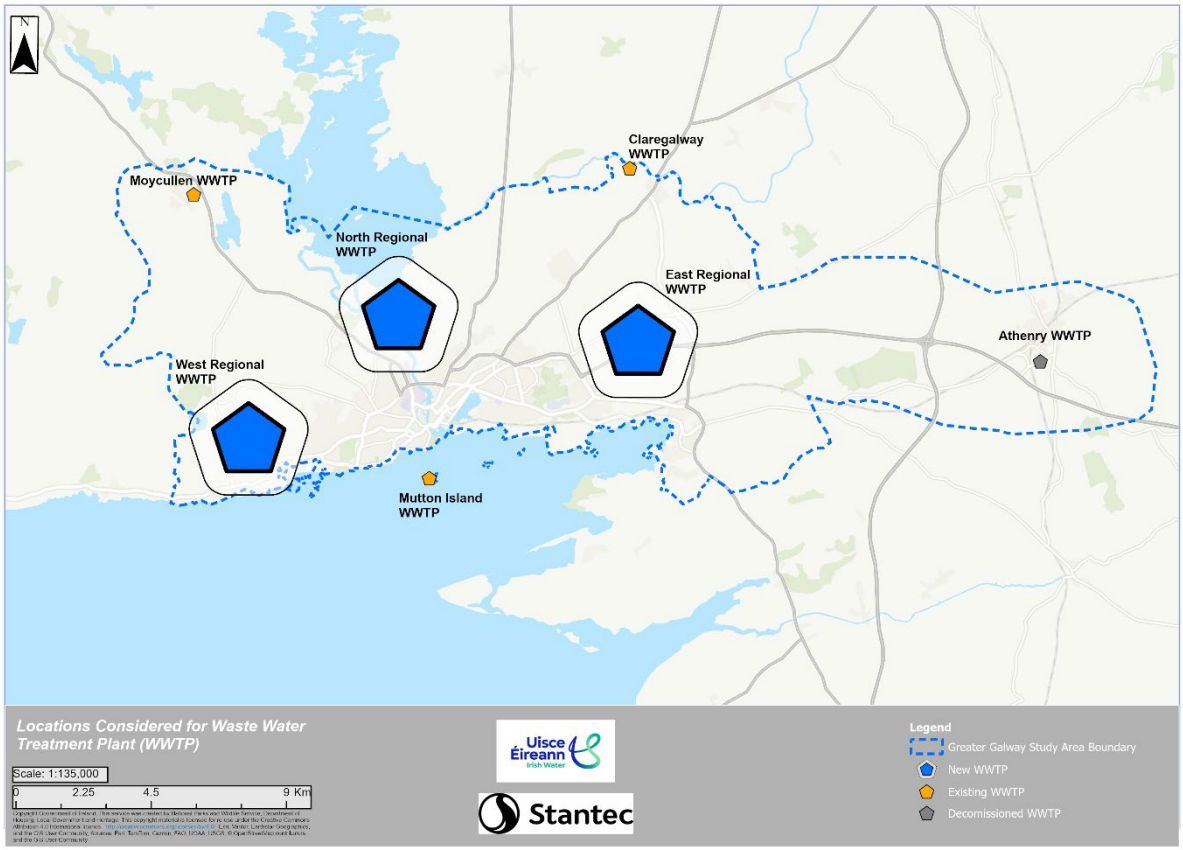
10.4 Strategic Options

Based on the identified need for a new WWTP in the region, three strategic locations were proposed as feasible options (see Figure 10-3). Indicative locations are considered sufficient to support strategic scenario testing. Determining the precise location of a proposed WWTP is not required at this stage and is not within the scope of the Strategy. A detailed site selection process will be undertaken for the proposed WWTP after the final GWS is published.

A key limiting factor in the selection of a WWTP location is the proximity of a suitable discharge point for treated effluent. For the study area, we considered both marine outfalls to the coastal environment and freshwater outfalls (rivers and lakes). Dispersion modelling to assess the suitability of multiple outfall locations and their potential environmental impacts was assessed. This considered how well receiving waters could safely accommodate treated discharges. (Refer to *Appendix* 4 - *Impact on Water Quality*).

The strategic screening of marine outfalls focused on dilution performance, discharge depth, engineering complexity and regulatory and environmental constraints. Two potential outfall locations were taken forward for consideration – one in the east of the bay and one in the west. Of the possible freshwater outfalls considered, each demonstrated limited assimilative capacity to receive effluent from large WWTPs within the study area. The strategic screening of freshwater outfalls focused on the feasibility of maintaining compliance with regulatory standards, environmental risks and long-term resilience. Only the River Corrib was identified as a feasible freshwater outfall.

Figure 10-3 Possible locations for a new regional WWTP



The three feasible regional WWTP locations and three feasible outfall locations create a total possibility of nine strategic options for consideration. The selected location of the new WWTP will have a material impact on the strategy. As such, this is a fundamental decision which will shape the long-term strategy of the region. To ensure robust consideration of the wide-ranging impacts of each option, we carried out multi-criteria decision analysis (MCDA).

In order to provide stakeholders involved in the MCDA with as much information as possible, we identified the key characteristics for each option. These are summarised below – please see *Appendix 5 - Optioneering and Feasible Option Development* for more details. Across each strategic option, agglomeration level screening identified that Moycullen and Claregalway will maintain decentralized treatment, with loads continuing to be processed within their respective existing WWTPs. Growth at these sites can be accommodated until 2055, and neither are in close proximity to the proposed regional sites, which limits the viability of transferring load to the regional site.

10.4.1. Western Regional WWTP

A western regional WWTP centres on the comprehensive redirection of wastewater flows toward the west of Galway City. This strategic shift involves the consolidation of loads from key infrastructure hubs, specifically Athenry, Oranmore, and Galway City East. For a visual representation of these connections and the location of key strategic infrastructure, please refer to Figure 10-4.

To facilitate this, significant pumping infrastructure would be required to manage flows across the region. The existing pumping stations at Oranmore and Galway City West would require capacity upgrades to ensure they can adequately handle the increased incoming loads.

As the eastern region shows the greatest proportion of growth (82%), there is an option to transfer load from Athenry WWTP to the new regional works to centralise treatment. This would require the existing Athenry Wastewater Treatment Plant (WWTP) to be converted into a terminal pumping station to send flows to the west of Galway City.

Under the new configuration, industrial and local flows will be strategically segregated to optimize processing. Galway City West flows will continue to be treated at the Mutton Island WWTP to minimise the construction of new wastewater interception pipelines and pumping stations in the west of the city to redirect flows towards the western regional WWTP, apart from the strategic infrastructure to transfer flows from Athenry, Oranmore, and west of Galway City. Outlying areas such as Bearna could be redirected to the new regional plant.

10.4.2. Northern Regional WWTP

A northern WWTP centres on the consolidation and redirection of wastewater flows to the north of Galway City. The existing wastewater pumping station (WWPS) at Oranmore will be upgraded to act as a primary hub for the eastern corridor. This station will manage loads from Oranmore village and the Oranmore IDA,

These combined loads will then be transferred from the Oranmore WWPS to the new Regional WWTP. To complete this northern diversion, the Parkmore IDA and the Galway City East collection systems will be reconfigured to pump directly to the regional facility, necessitating a capacity upgrade at the Galway City East terminal pumping station.

In contrast, the treatment strategy for the western corridors will continue to utilize the Mutton Island WWTP. Galway City West and Bearna will maintain their current flow paths toward Mutton Island. For a visual representation of these connections and the location of key strategic infrastructure, please refer to Figure 10-5.

10.4.3. Eastern Regional WWTP

An eastern WWTP focuses on the consolidation and redirection of wastewater flows to the east of Galway City. The eastern corridor will need to be reinforced through the upgrade of the existing wastewater pumping station (WWPS) at Oranmore. This station will serve as a primary collection hub for Oranmore village and the Oranmore IDA.

The combined loads will then be transferred from the Oranmore WWPS to the new Regional WWTP. To complete this eastern diversion, both the Parkmore IDA and the Galway City East collection systems will be reconfigured to pump directly to the new regional facility, necessitating a capacity upgrade at the Galway City East terminal pump station to ensure adequate transfer volumes.

In contrast, the treatment strategy for the western catchments remains centred on the Mutton Island WWTP. Galway City West and Bearna will maintain their current flow paths toward Mutton Island. For a visual representation of the location of key strategic infrastructure, please refer to Figure 10-6.

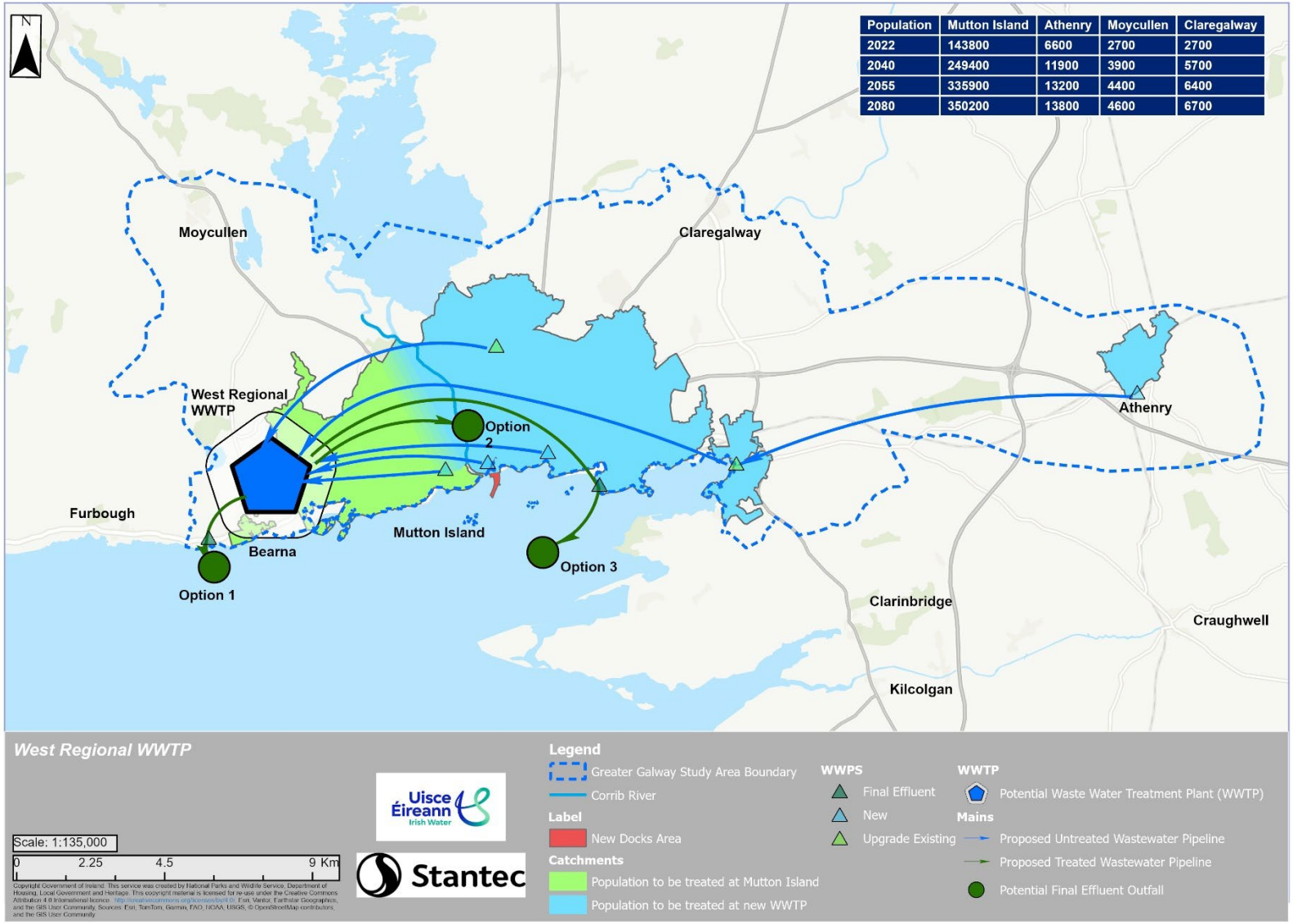


Figure 10-4 Western Regional WWTP

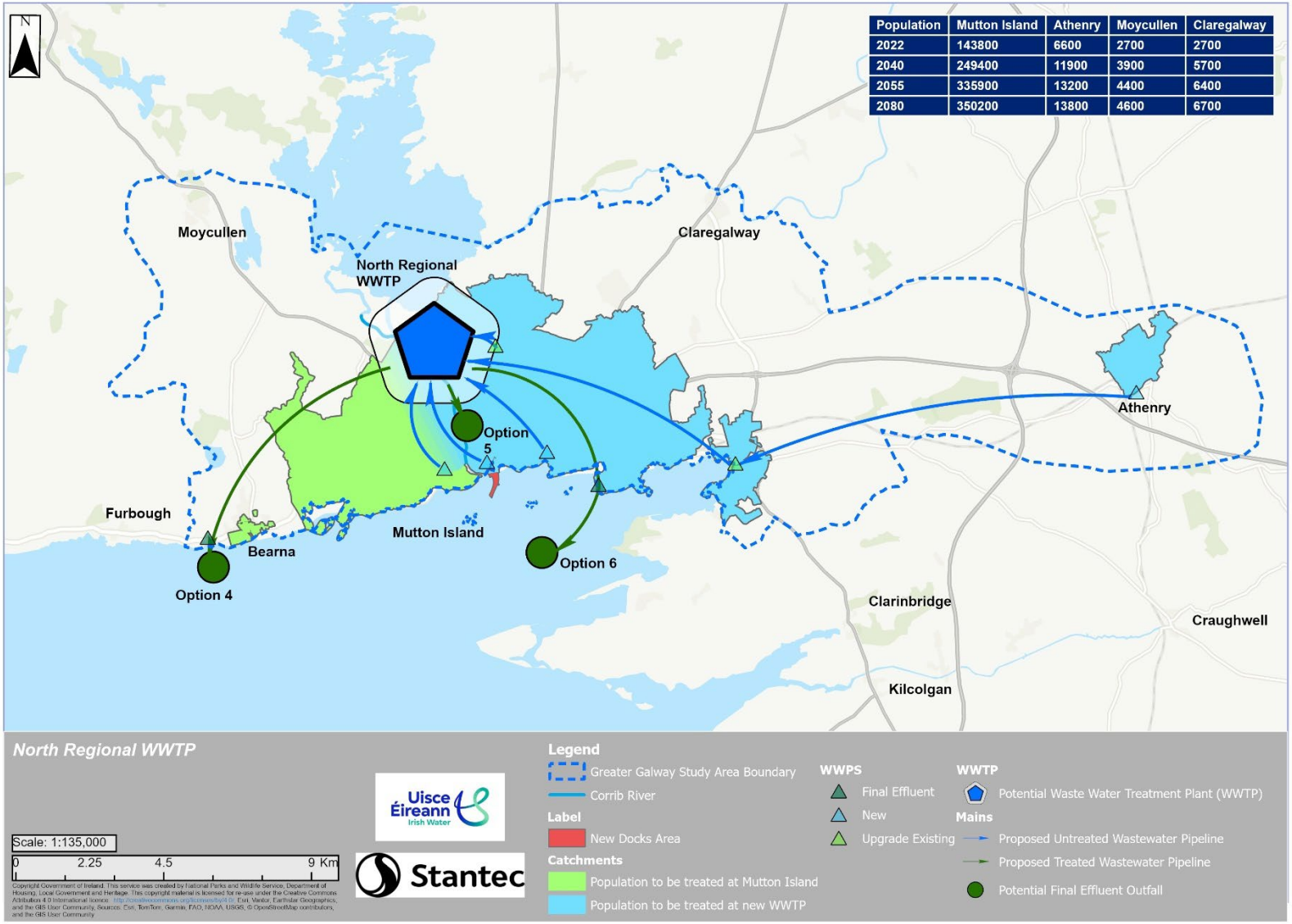


Figure 10-5 Northern Regional WWTP

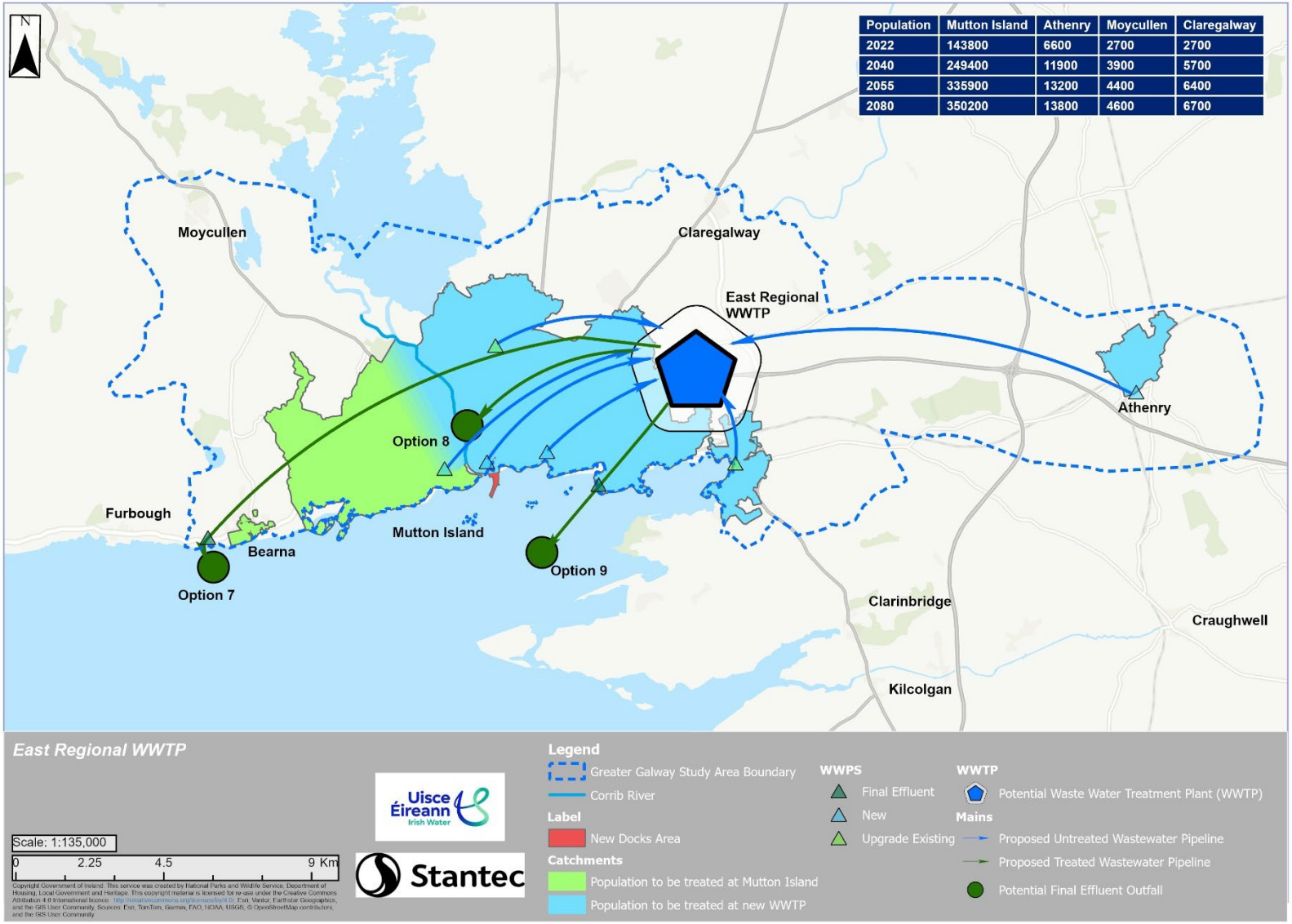


Figure 10-6 East Regional WWTP

10.5 Water Quality Modelling for Optioneering

Water Quality modelling was also used to assess the feasibility of different discharge locations for the development of a new WWTP. Discharges to transitional and coastal waters in Galway Bay and the Corrib Estuary were evaluated. This included modelling initial dilution and feasible effluent quality requirements and outfall configurations likely to meet WFD objectives.

10.6 Multi-Criteria Decision Analysis (MCDA)

Each scenario underwent a comparative assessment using MCDA to determine which offer the greatest benefits across a set of pre-defined criteria. Multi-Criteria Decision Analysis (MCDA) is a robust methodology used to identify preferences where the perspectives of multiple stakeholders need to be considered.

Decision matrices were employed during the shortlisting process at workshops to calculate the overall value of each option, enabling the summation and ranking of optimal options. Participants scored each option against the specific criterion in a stepwise fashion. This approach supported the development of a shared understanding and helped facilitate consensus among stakeholders and technical experts. The MCDA process is summarised in Figure **10-7**10-7.

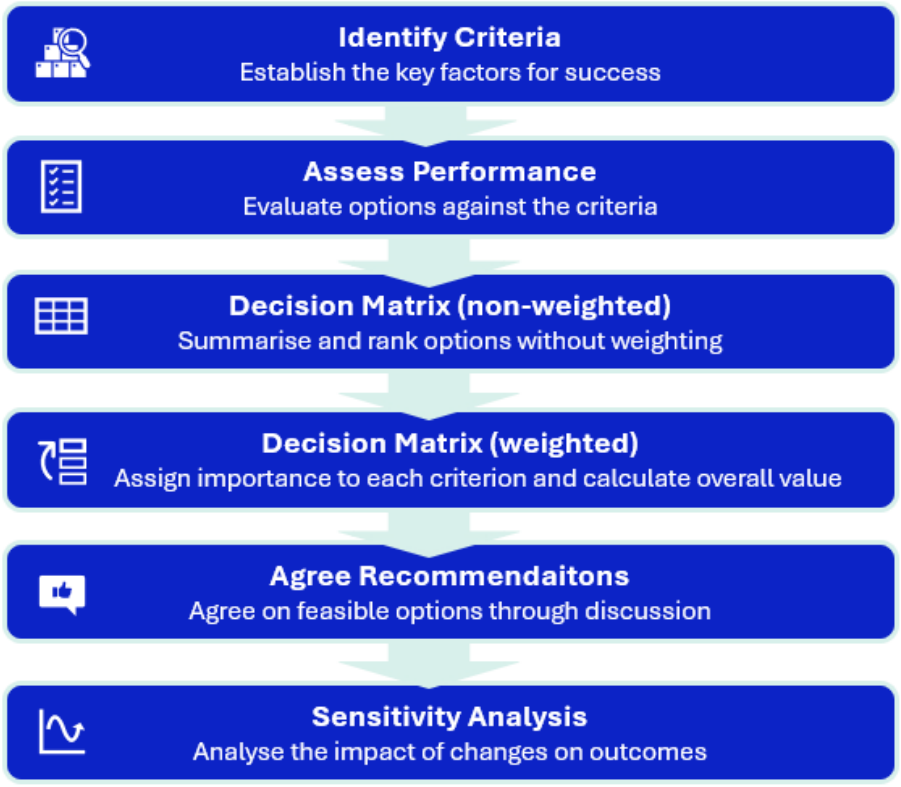


Figure 10-7: Summary of the MCDA process

10.6.1. MCDA Results

The eastern regional WWTP was seen as a more favourable location due to its proximity to the areas identified for both commercial and domestic growth (82% of growth to the east of the study

area). The western and northern sites would require substantial conveyancing across the urban centre from the areas of growth to the treatment centre. The conveyancing needs would be more costly to build but would also have higher operating costs due to pumping requirements.

The northern location was less favourable due to the need for it to be constructed within a highly constrained urban site. The greater density of existing infrastructure, logistics and site access will have a greater impact on local connectivity and accessibility of surrounding areas with broader socio-economic impacts. The northern site is the most convenient location for the River Corrib discharge location, however this was the least favourable discharge location. There was a greater environmental risk identified here due to the proximity of a drinking water source, and concerns regarding public opinion due to it being a high-amenity area and recreational zone.

The scenarios with long sea outfalls were identified as more beneficial than the River Corrib discharge locations due to the greater dilution capacity of the bay. The western outfall was identified as the preferable option due to the shorter length required. The eastern outfall would need to be considerably longer than the western option, and there is a greater environmental risk due to its proximity to Special Areas of Conservation (SAC) and Special Protection Area (SPA).

The results of the MCDA are shown in the non-weighted decision matrix in Table 10-2Table 10. We tested the sensitivity of the results using 'swing weighting'. The results demonstrated that the final ranking is not sensitive to different criteria weightings, with the same two options emerging as the most preferable options.

Table 10-2 MCDA Non- Weighted Decision Matrix

Strategic Option Reference	WWTP Location	Outfall Location	Provide Resilience & Reduce Risk	Enhance Local Communities & Support	Deliverability & Flexibility			Environmental & Sustainability					MCDA Total Score
			Deliver Outcomes & Provide Long Term Resilience	Minimise impact and increase support, health and wellbeing	Planning & Regulatory	Growth & Population Receptors	Ease of Implementation and	Ecology & Biodiversity	Impact on Water Environment	Archaeology, Cultural & Architectural	Energy Efficiency	Net Zero	
1	West	West	5	3	4	3	3	3	5	4	4	5	39
2	West	Corrib River	2	2	2	3	3	2	4	2	3	3	26
3	West	East	6	2	2	3	2	2	5	2	2	2	28
4	North	West	6	3	3	4	3	3	5	3	3	3	36
5	North	Corrib River	2	2	2	4	3	2	4	2	5	5	31
6	North	East	5	2	2	4	3	2	5	3	3	3	32
7	East	West	6	3	3	7	3	3	5	2	5	5	42
8	East	Corrib River	2	2	2	7	3	2	4	2	5	5	34
9	East	East	7	5	4	7	4	2	5	4	6	6	50

10.7 Optimised Options

The feasible options were considered for each agglomeration to ensure a final integrated strategy that delivers the region's needs in the short-, medium- and long-term. The following section outlines those features which are common across both options, before examining both scenarios in more detail.

10.7.1. Wastewater Treatment Works Feasible Options

Table 10-3 Common WWTP features for feasible options

Wastewater Treatment Plant	Feasible Option
New Regional WWTP	Under both options, the proposed new regional wastewater treatment plant is situated in the eastern part of the study area. **By 2040** ✓ Site selection and WWTP design completed to meet projected load requirements through 2080, which will be up to 400,000 PE. ✓ The design will utilize a modular framework to allow for adaptable expansion amid population uncertainty. ✓ Initial construction completed so that load can start to be transferred. ✓ Implement energy efficiency measures in the design to achieve energy neutrality targets as required under the rUWWTD. **By 2055** ✓ The site treats the majority of the load from the region. Transfers from Mutton Island (Galway City) and Athenry have been completed, enabling economies of scale to be accessed. ✓ The size of the site will require quaternary treatment to be in accordance with the future requirements of the UWWTD.
Mutton Island WWTP	**By 2040** ✓ Resilience upgrade to Mutton Island WWTP to ensure growth up to 2040 can be accommodated at the site. ✓ Strategic phasing plan implemented to gradually transfer load from Mutton Island WWTP to the new WWTP, including all of Galway City East, and part of the wastewater network in Galway City West (west of the River Corrib). **By 2055** ✓ As per engineering evaluations, a reduced load at Mutton Island WWTP would reduce future regulatory risks at the site and reduce the vulnerability of the existing asset.
Athenry WWTP	**By 2040** ✓ An upgrade at Athenry WWTP to ensure sufficient treatment capacity and capability is in place to service growth in the short to medium term.

	By 2055 ✓ **Decentralisation** of the WWTP will require the transfer of load from the Athenry site to the new regional facility to take advantage of economies of scale and ensure capacity for growth and compliance with water quality objectives. ✓ Transfer will enable decommissioning of the current Athenry facility, pending further detailed appraisal, and the Athenry WWTP could be reconfigured as a Terminal Pumping Station, to support the transfer of flows to a new regional WWTP.
Moycullen and Claregalway	**By 2040** ✓ The current WWTPs in Moycullen and Claregalway will continue to serve their local populations. ✓ Ongoing monitoring of water quality and possible upgrades to meet water quality objectives. ✓ Ongoing monitoring of growth against forecasts will inform the timing of relevant upgrades. **By 2055** ✓ Implement capital upgrades as required to enhance capacity. ✓ The existing treatment technologies will remain in use at both sites unless advancements emerge during the Strategy's timeline that offer a more sustainable option than the present systems.

10.7.2. Option variables – Marine Outfalls

The key difference between the two shortlisted options is the location of the marine outfall. Wastewater at the WWTP would be treated to a standard that ensures minimal impacts on water quality. The size of the site (>150,000 PE) will require quaternary treatment by 2045 under the rUWWTD, and as such the effluent will be highly treated to stringent regulatory standards. Given the discharge location and effluent quality, direct impacts on public health at designated recreational or bathing waters within the area, as well as marine habitats, are considered unlikely. However, in the absence of a dispersion model at the time of strategy formulation, this assessment should be substantiated through comprehensive, detailed modelling studies.

The eastern outfall requires the construction of a new pumping station and marine outfall extending considerable distance into the Corrib Estuary. The water column here is relatively shallow, which means that to meet initial dilution requirements would require an outfall length of about 3,500m from Roscam Point. The location of the diffuser heads is within the Inner Galway Bay SPA and Complex SAC. As such, detailed environmental assessments, construction techniques and route optimisation strategies will be needed to avoid and mitigate any disturbance and/or temporary or permanent loss of habitats as part of our mitigation strategy.

The western outfall is located within the Outer Galway Bay coastal water body, along the land-to-coast boundary between Bearna and Furbogh. This placement is considered optimal, as it

facilitates greater dilution by accessing deeper waters approximately 600 metres from the shoreline.

Compared to the eastern outfall, this location offers distinct advantages regarding overall life-cycle costs and carbon footprint. Construction of a pumping station and pipeline is also likely to be simpler, but this requires confirmation through further surveys and appraisal. Additionally, the diffuser heads are situated outside the Galway Bay Complex SAC, further enhancing its suitability by avoiding construction within designated habitats. Nonetheless, given the lack of a dispersion model during the development of the strategy, thorough and detailed modelling studies are necessary to confirm that no adverse impacts extend into protected areas.

This option involves the construction of a final effluent pipeline that spans the entire breadth of the city from the WWTP in the east to the proposed western discharge point. This would be subject to further appraisal and thorough site and route selection processes and will require optimisation to ensure that no protected habitats are disturbed within the Lough Corrib SAC and require consideration as part of our mitigation strategy.

Table 10-5 Comparison of key considerations for each marine outfall

Criteria	Eastern Outfall	Western Outfall
Environmental	This option has the potential for impacts on Annex I habitats, as outlined below, that will have to be considered for avoidance and mitigation during the implementation phase of the Strategy: • **Reefs** • **Mudflats and Sandflats** • **Shallow Inlets and Bays**: • **Perennial Vegetation and Stony Banks** The outfall route should be optimised to avoid disturbance of habitats and mitigate for temporary and/or permanent loss of any designated habitats. Appropriate construction techniques and route selection should be explored as part of mitigation strategy.	This option is expected to have the shortest outfall length and would avoid Galway Bay Complex SAC, reducing potential for impact on Annex I habitats. Nonetheless, given the lack of a dispersion model during the strategy's development, thorough and detailed modelling studies are necessary to confirm that no adverse impacts extend into protected areas.

Public Perception and Visual Impacts	Although the discharge location would be within a SPA/SAC, it would only be visible to the public during construction and maintenance activities. During operation it would not be visible to the public and due to the high effluent quality is unlikely to impact on any bathing or recreational waters. The latter would also require substantiation through detailed modelling studies.	While the route for the treated effluent outfall may be situated in a relatively scenic area west of Galway City, it does not intersect any protected European sites, which presents a notable advantage compared to the eastern outfall. Furthermore, it would only be visible to the public during construction and maintenance activities. During operation it would not be visible to the public and due to the high effluent quality is unlikely to impact on any bathing or recreational waters. The latter would also require substantiation through detailed modelling studies.
Treated Effluent Pumping and Design Complexity	Selection of an appropriate location for the WWTP must strike a balance between the requirements for pumping both untreated sewage to the WWTP and discharge of treated effluent to the marine outfall. Extensive conveyancing infrastructure will be needed throughout the study area. Consideration will be required to optimise the pump routes, complexity, OPEX and whole life carbon.	The treated effluent pipeline is much shorter than the eastern option, however this advantage is offset by the extensive terrestrial pump route from the Eastern WWTP to this location. Additionally, the natural gradient of the seabed slopes downward at quite a steep gradient that would need consideration at future appraisal.
Construction, Buildability and Engineering Requirements	This outfall option would likely require specialised, complex construction methods to navigate Annex I habitats within the Inner Galway Bay SPA and Complex SAC. While technically feasible, this option is considered more challenging than the western outfall option from an engineering perspective.	Since the outfall is located outside the Galway Bay SAC, it is unlikely that specialised or complex construction methods will be needed to navigate Annex I habitats. Instead, simpler techniques, such as straightforward float-and-sink or lay barge methods, are expected to be suitable. The overland terrestrial transfer main from the Eastern WWTP to the marine outfall is a complex engineering challenge. Thorough route and site selection needs to consider the elevation of the terrain, environmental constraints, whole life energy and carbon to optimise this route and reduce the need for interstage pumping and any emergency overflow arrangements that may be required.

10.7.3. Network Feasible Options

Table 10-4 Common Agglomeration features for feasible options

Agglomeration	Feasible Option
Galway City	**By 2040** ✓ Removal of tidal ingress in low-lying areas of the Galway City network, ✓ Implement inflow and infiltration management to prevent groundwater eroding network capacity. ✓ Surface water separation and removal will be explored alongside combined sewer separation to manage hydraulic load from impermeable areas. ✓ Collaborate with local authorities to implement SuDS and remediate stormwater misconnections. ✓ Explore partnership-based interventions, including strategic blue-green corridors and Green or SuDS storage to reduce the volume of rainwater entering the network. **By 2055** ✓ Upgrade of WWPS at Oranmore and reconfiguration of the network so Parkmore IDA and Galway City East collection system pump directly to the regional facility. ✓ Phased transfer of load from Mutton Island WWTP to the new regional facility via new and upgraded WWPS's and associated pipelines.
Athenry	**By 2040** ✓ Removal of storm water misconnections ✓ Identify opportunities to implement nature-based solutions to manage surface water. **By 2055** ✓ Gradual transfer of loads to the new facility. ✓ Convert Athenry site into a terminal pumping station with rising main to the new facility
Moycullen and Claregalway	**By 2055** ✓ Monitor flood risk to identify if interventions are necessary to manage surface water.

11.Result of Optioneering

The outcome of our optioneering process is the identification of two feasible strategic options for the development of a new regional WWTP. The new capacity created by the WWTP will accommodate the anticipated growth in the region and facilitate a centralised approach to wastewater management.

The gradual transfer of loads from the Mutton Island (Galway City) agglomeration and Athenry to the new site will remove pressures at both WWTPs. Gradually reducing the load at Mutton Island WWTP from the design capacity of 170,000 PE to approximately 100,000 PE will provide additional resilience to the site, in relation to maintaining compliance with regulatory standards over the long-term. Similarly, at Athenry, the transfer of load away from the site will help protect the River Clarin and the karst environment.

The recommended feasible options for WWTPs can be summarised as follows:

- **Upgrading Existing WWTPs**
    - Enhancements to treatment capacity and process efficiency at Mutton Island (Galway City) and Athenry by 2040 to accommodate short-term growth.
    - Enhancements to Claregalway and Moycullen, beyond 2055 to manage long-term growth.
- **New Regional WWTP Infrastructure**
    - Two options were identified for the development of a regional WWTP to accommodate future growth and redistribute loading from existing constrained sites. The plan will feature a long-sea outfall to maximise dilution and minimise ecological impact.
    - Partial or full decommissioning of Athenry WWTP, and conversion into terminal pumping station to transfer flows to the new WWTP.
    - Transfer of load from Mutton Island WWTP to new WWTP.
- **Energy Efficiency Measures**
    - Identify opportunities to integrate energy efficiency within WWTP upgrades and development. Widespread integration of sustainability actions (see sustainability considerations)

We have identified the most effective network interventions to address local issues in each agglomeration. The following list covers all the feasible options, as each site will require more detailed analysis to ensure that the identified option will resolve the underlying issue.

- **Intercatchment Network Transfers, Removal of Tidal Ingress Flows, Smart Networks and Intelligent Operation, Enhanced Operational Maintenance Regimes and Rationalisation of Overflows**: Each of these interventions plays a critical role in addressing the distinct challenges within the study area. A balanced strategy that integrates traditional (grey) infrastructure upgrades, green solutions, and emerging

technologies will be essential to optimising wastewater management, enhancing climate resilience, and supporting long-term sustainable development across the region.

- **Strategic Blue-Green Corridors, Surface Water Separation and Surface Water Removal**: These options offer wider benefits to the environment, reduce carbon and offer long-term sustainability. We will carry out a spatial assessment to identify priority areas for Sustainable Drainage Systems (SuDS) and Nature-based Solutions (NbS). Collaboration with local authorities will support the evaluation of potential interventions, particularly within urban redevelopment projects. These will also be addressed in the IUWWMP required by the rUWWTD.
- **Sewer Capacity and Underground Storage, Storm Overflow Rationalisation, Storm Overflow Effluent Treatment**: These options are at the bottom of the Totex hierarchy, with higher costs associated with them, and as such we will seek to implement these when other options have been identified as non-viable.

11.1 Sustainability Considerations

One of the objectives of the draft GWS is to develop a sustainable strategy that enhances our environment. In response to national and EU climate and sustainability objectives we have considered a range of sustainability areas of focus that are consistent with the broader objectives of our sustainability framework. These measures seek to optimize the environmental performance and energy self-sufficiency of wastewater infrastructure within the region.

The sustainability initiatives outlined below are recommended for further detailed investigation and validation through follow-up studies, pilot projects and integration into wider strategies (for example, Bioresources Strategy). Such in-depth appraisal will be integrated into future asset-specific evaluations to refine implementation pathways, estimate costs and benefits, and ensure alignment with the strategy's long-term environmental and operational targets.

Table 11-1 Summary table of sustainability options to be further explored

Method	Opportunity
Solar Energy	• Install solar PV panels on suitable WWTPs and pumping stations • Consider off-site solar farms to overcome space constraints and support energy neutrality.
Wind Energy	• Use micro or small-scale wind turbines to supplement power, especially when solar is less effective.
Anaerobic Digestion & CHP	• Expand use of anaerobic digestion and Combined Heat & Power (CHP) to convert biogas into electricity and heat, supporting circular economy goals. Further expansion should be explored in line with the objectives of the recast UWWTD and UÉ'S Bioresources Strategy.
Wastewater Heat Recovery	• Capture thermal energy from wastewater (10–15°C) via heat exchangers/pumps for heating or electricity generation.

Efficient Energy Use	• Apply carbon hierarchy to decision-making: **Use less → Use efficiently → Use at low cost → Use renewables**.
	• Consider:
	  ○ High-efficiency equipment (e.g., VSD pumps)
	  ○ Real-time monitoring and automation
	  ○ Gravity-fed systems
	  ○ Passive building designs
	  ○ Network optimisation and demand management

Climate Adaptation	• Conduct site-specific flood risk assessments using climate models. • Implement flood-resilient design (e.g., elevated process tanks, SuDS, bunds). • Promote surface water separation and nature-based solutions.
Circular Economy & Waste Minimisation	• Improve sludge treatment (e.g., drying, dewatering) to reduce disposal costs/emissions. • Reuse biosolids and recover phosphorus for fertiliser. • Encourage treated effluent reuse on-site and for potential re-use in industrial cooling. • Apply sustainable construction practices (e.g., trenchless technologies).

Biodiversity & Nature-Based Solutions	• Promote Biodiversity Net Gain through:
	  ○ Constructed wetlands and green infrastructure
	  ○ Impact minimisation, habitat restoration, and (if needed) offsetting
	  ○ Support for wildlife through native planting and corridor creation
	  ○ Aligning with UÉ's Biodiversity Action Plan

Carbon Neutral Design & Construction	• Use low-carbon and locally sourced materials. • Integrate renewable energy during both construction and operation. • Apply whole-life carbon assessments and digital design tools (e.g., BIM).
Social Responsibility	• Control odour and noise emissions to maintain community trust. • Engage the public through education and outreach. • Incorporate recreational/green spaces to enhance local amenity. • Prioritise occupational health and safety through training, monitoring, and strong safety protocols.

11.2 Strategic Environmental Assessment

11.2.1. Integration of SEA and AA into the Draft GWS

Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) requirements have been fully integrated into the development of the draft GWS and have directly informed the options assessment methodology. At this strategic stage, the SEA is appropriately high-level and desk-based, reflecting the nature of the draft GWS, its objectives, and the strategic types of options and methodologies proposed. Environmental impacts and cost considerations will be subject to further, more detailed assessment as options identified in the draft GWS are progressed to project-level design and implementation.

11.2.2. Role of SEA in Option Selection

The SEA played a central role in informing the selection of preferred options within the GWS. All nine strategic options were assessed against the SEA Topics and corresponding Strategic Environmental Objectives (SEOs), with particular emphasis on environmental protection, human health, and long-term sustainability.

11.2.3. Relationship between SEA and MCDA

In parallel with the SEA, all nine options were evaluated using a Multi-Criteria Decision Analysis (MCDA) as part of the optioneering process. While the SEA and MCDA addressed some overlapping themes, they applied different assessment perspectives:

- SEA focused on environmental receptors, sustainability, and compliance with SEOs.
- MCDA placed greater emphasis on engineering feasibility, deliverability, resilience, flexibility, and planning and regulatory risk.

These differing emphases explain variations between the outcomes of the SEA fine screening and the MCDA assessments. The outcome of the SEA fine screening is provided in Table 11-1.

Table 11-1: SEA Fine Screening Outcomes

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
Water Environment (W1)	6	4	5	6	4	5	6	4	5
Population, Economy, Tourism and Recreation, and Human Health (P1)	5	4	3	5	4	4	4	4	4
Climate Change (C1)	4	2	2	4	3	4	4	3	5

Biodiversity (B1)	6	4	4	6	4	4	6	4	4
Material Assets (M1)	5	5	5	5	5	5	5	5	5
Landscape, Townscape and Seascape (L1)	4	4	3	4	4	4	4	4	4
Cultural Heritage – Archaeological and Architectural (H1)	3	3	1	3	3	2	3	3	2
Geology and Soils (G1)	3	3	2	3	3	3	3	3	3
Air Quality (A1)	4	4	4	4	4	4	4	4	4
Total Score	**40**	**33**	**29**	**40**	**34**	**35**	**39**	**34**	**36**

For the strategic determination of wastewater treatment plants (WWTP) and outfall locations, the MCDA also incorporated SEA-related objectives, including environmental protection, carbon reduction, and sustainability criteria. Risks to habitats and European designated sites were highlighted to inform stakeholder engagement, with SEA and AA applied to all feasible options to further support decision-making.

11.2.4. Preferred Options and SEA Findings

The MCDA identified Option 9 (eastern WWTP with eastern outfall) and Option 7 (eastern WWTP with western outfall) as the preferred options. Subsequent SEA assessment confirmed that both options perform satisfactorily across all SEA Topics and are consistent with the SEOs. Both options include advanced wastewater treatment processes, which will be required by 2045, and provide robust options for the safe discharge of treated effluent.

11.2.5. Mitigation, Monitoring, and Regulatory Oversight

In line with SEA requirements, the selection of Options 7 and 9 is accompanied by commitments to mitigation measures, monitoring, and phased implementation. Regulatory oversight by the Commission for Regulation of Utilities (CRU) and the Environmental Protection Agency (EPA) will ensure that environmental protections identified through the SEA are embedded throughout the delivery and operation of the GWS.

11.2.6. Screening and Environmental Constraints

Primary screening criteria incorporated objectives addressing SEA considerations. In particular, the impact of operational activities on the water environment was explicitly assessed for each wastewater treatment plant, taking account of increased loadings arising from future growth. This approach facilitated early identification of regulatory and environmental constraints.

12.Implementation of the Strategy

12.1 Recommended Approach

Our approach to the development of the draft GWS was to assess strategic options, which have a regional impact, and to assess options for each agglomeration. We have taken steps to integrate these, so that there is a holistic strategy that delivers both sets of needs. An important aspect of this integration is the different timelines over which different options will be implemented.

It is recommended that the draft GWS is implemented in a phased manner, aligned with our capital investment planning framework and regulatory oversight from the Commission for Regulation of Utilities (CRU) and the Environmental Protection Agency (EPA).

Due to the scale and complexity of the proposed interventions, delivery will span several investment cycles. The GWS anticipates a phased delivery aligned with the next three regulatory control periods (RC4 to RC6) and will ensure alignment with the plans being developed under the Galway City Drainage Area Plan (DAP) project.

12.2 Adaptive Planning

Given the dynamic and evolving nature of climate change, environmental legislation, and technological innovation, it is important that the draft GWS can remain adaptable to changes. Adaptive pathways have been identified as part of the Strategy's framework and align with objectives of the Water Services Strategic Plan.

As adaptive pathways approach provides flexibility and will help us to manage uncertainty over long-term planning horizons. The adaptive pathway will identify decision points and sequence interventions to accommodate changes in knowledge, regulation, or societal needs, while maintaining strategic coherence.

The Strategy outlines phased actions through to 2080, integrating short-, medium-, and long-term projects. Early implementation phases will involve critical appraisals, particularly around the future role of the Mutton Island Wastewater Treatment Plant (WWTP) and site selection for the new WWTP. The site selection process must determine the most suitable and sustainable locations for the new WWTP. This will involve technical, environmental, and economic appraisals.

As we start to plan the implementation of medium to long-term options, we will need to link our monitoring of key performance indicators to the relevant decision points in our adaptive plan. The ongoing monitoring of performance and growth will enable us to verify that the options identified remain viable, or that we may need to reevaluate proposed options.

The draft GWS will remain a living document—capable of evolving in step with changing conditions and continuing to deliver long-term environmental, social, and economic benefits. This will help to create flexible and robust, strategies over time, avoiding premature decisions or maladaptation. This and future iterations of this document should be considered in the continual evolution of the Strategy.

There will be economic and strategic checkpoints during the regular review periods for the GWS (i.e. every 5 years), to reassess the cost-effectiveness and relevance of the selected options. These

allow for flexibility if external conditions change. Construction of WWTP assets will follow a modular, scalable model aligned with demand, environmental needs, and funding. In addition, the six-yearly reviews will be aligned with River Basin Management Plans and the UWWTD cycles to coordinate regular updates, ensuring the Strategy remains aligned with evolving policy, environmental targets, and investment priorities.

Implementation through a progressive and integrative approach, ensuring that individual projects contribute to a coherent long-term vision without requiring costly rework between investment phases, is recommended. This method prioritises cost efficiency, minimises disruption, and ensures alignment with long-term service, environmental, and regulatory objectives.

A key milestone in the process will be the publication of this Draft Strategy, Strategic Environmental Assessment (SEA), Appropriate Assessment (AA), and a public consultation period between May and July 2026, followed by the formal adoption of the Strategy, scheduled for Autumn 2026.

13.Monitoring and Evaluation

13.1 How will the Strategy be Monitored?

The draft GWS will be monitored through a robust framework of Key Performance Indicators (KPIs), data collection, and reporting mechanisms to ensure the effectiveness of wastewater management. The KPIs will focus on:

- **Regulatory Compliance**: Measuring adherence to Urban Wastewater Treatment Directive (UWWTD) and Water Framework Directive (WFD) standards.
- **Ambient Water Quality Monitoring:** Ensuring that no deterioration of water quality occurs as part of the River Basin Management Plan monitoring.
- **Network Performance:** Monitoring stormwater overflow (SWO) performance and sewer network capacity to prevent flooding risks.
- **Treatment Efficiency**: Evaluating WWTP removal efficiency in line with UWWTD requirements and licencing provisions.
- **Annual Environmental Reports**: Monitor WWTP performance annually against environmental licence conditions to track any deterioration in performance.

The monitoring plan is a requirement under the SEA regulations to provide a basis of identifying significant environmental effects during the implementation of the plan. This is required to review the predicted impacts of the draft GWS, and the adequacy of the mitigation measures recommended so that additional mitigation can be applied if required. Performance against the monitoring plan targets will also inform the next iterations of the GWS and the SEA process.

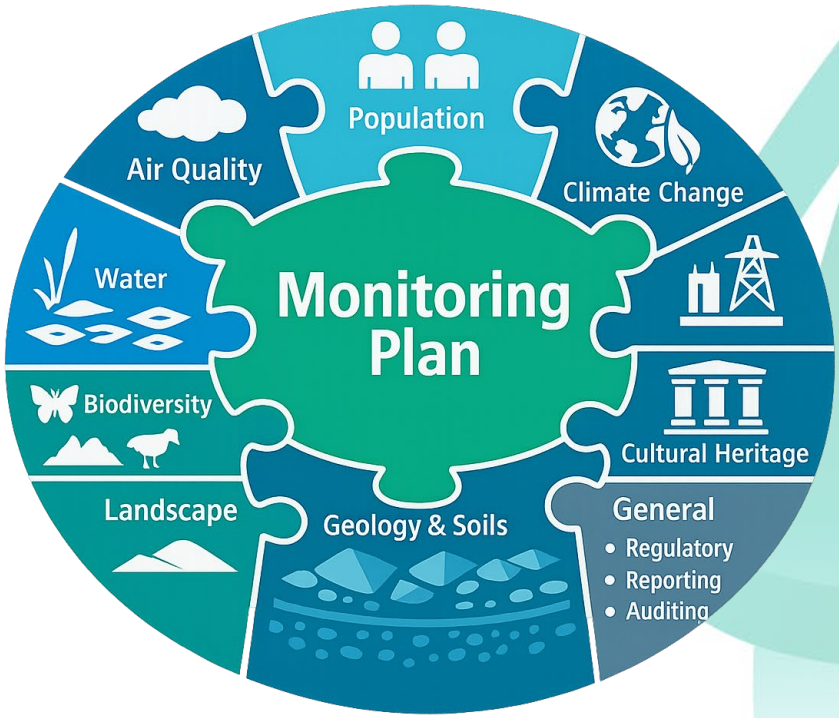


Figure 13-1: SEA Objectives Requiring General Mitigation Measures

As the draft GWS does not involve the recommendation of specific investment options, the monitoring plan is intended to track the progress of implementing the SEA recommendations during the local strategy implementation.

The monitoring plan covers the integration of environmental and sustainability considerations throughout implementation of the draft GWS and the options development methodology. It also provides a framework for future long-term monitoring. In most cases, more detailed baseline collection and project studies will be required to confirm the significance of environmental effects and ensure appropriate mitigation is included as part of the scheme designs.

In certain circumstances, monitoring and feedback will identify the need for a variation to be made to the strategy. Where a variation is required, UÉ will screen the change against SEA and AA requirements in accordance with its legal obligations. As part of the screening, UÉ will consult with the EPA and relevant Government Departments as required by Article 9(5) of the EC (Assessment of Certain Plans and Programmes) Regulations 2004 (SI 435/2004).

If, following screening, UÉ determines that the change is likely to have significant effects on the environment, it will carry out an SEA before adopting the change. UÉ will also carry out an AA if it determines, following screening, that the change is not directly connected with or necessary to the management of any European site and UÉ cannot, on the basis of objective scientific information, exclude that the change, individually or in combination with other plans and projects, will have a significant effect on European sites, as required by Article 42(6) of the EC (Birds and Natural Habitats Regulations) 2011 (SI 477/2011).

A draft Monitoring Plan is provided in the *SEA Environmental Report* and will be updated following consultation. It will form part of the SEA statement to be published with the Final Strategy.

13.2 Tracking Progress

To ensure the long-term effectiveness of the strategy, progress will be reviewed on a six-year cycle, in alignment with the Water Framework Directive's River Basin Management Planning cycle and the proposed review timelines under the recast Urban Wastewater Treatment Directive

It is recommended that population projections be regularly reviewed and updated alongside Strategy revisions, ensuring alignment with emerging data and enabling the timely incorporation of adaptive pathways as necessary

13.3 Key Risks and Mitigation Strategies

The delivery of the draft GWS is subject to a range of technical, financial, environmental, and regulatory risks. As the Strategy progresses from planning through detailed design, procurement, and construction, a robust and adaptive risk management approach will be essential.

This approach will rely on integrated mitigation strategies, early stakeholder engagement, and contingency planning. The following outlines a representative sample of key risks associated with a project of the GWS's scale and complexity, along with proposed mitigation measures.

Table 13-2 Identified Technical Risks and Mitigations

Description	Mitigation
Uncertainty in Demand Forecasts	
Population and economic growth projections underpin infrastructure sizing and investment decisions. Variability in growth patterns - particularly between urban and peri-urban areas or in trade effluent contributions - may lead to over- or under-design of assets.	Adopt flexible, modular infrastructure designs that can be scaled over time. Demand forecasts should be reviewed and updated at each Business Case stage, with scenario planning and sensitivity testing embedded into decision-making. The GWS will be reviewed at regular key intervals to monitor this risk.
Model Reliability and Data Gaps	
Hydraulic and water quality models are critical tools for informing intervention design. Gaps in input data or reliance on outdated assumptions may compromise model outputs and the robustness of decisions based on them. For example, large quantities of saline ingress in networks can be rehabilitated and affect the scale of infrastructure proposed.	Expand and maintain SMART monitoring networks to improve data granularity and accuracy. Implement regular model updates and validation using real-time system performance data. Assess model sensitivity to changes in key uncertainties against strategy outcomes.
Site and Routing Constraints	
Physical, topographical, and utility-related challenges may limit the feasibility or increase the complexity of construction at proposed sites or along network routes.	Conduct early-stage route and site selection exercises using constraint mapping, geotechnical surveys, and multi-criteria evaluation frameworks to optimise locations based on constructability, cost, environmental performance and public acceptability.

Table 13-3 Identified Financial Risks and Mitigations

Description	Mitigation
Escalation of Capital and Operational Costs	
Inflation in construction, energy, and material costs - along with supply chain volatility - can significantly affect programme affordability and delivery timelines.	Employ whole-life cost (WLC) appraisals and incorporate risk-adjusted cost estimates during the Preliminary Business Case (PBC) stage. Maintain cost benchmarking and value engineering processes throughout the project lifecycle.
Funding Limitations Across Investment Cycles	

National and internal budgetary constraints may impact the availability and timing of funding for capital projects, potentially delaying or deferring delivery of priority infrastructure.	Prioritise interventions based on criticality, environmental compliance drivers, and regulatory commitments. Explore opportunities for co-funding (e.g., through EU or climate adaptation funding) and consider phased or modular delivery options aligned with available budgets.

Table 13-4 Environmental and Regulatory Risks

Description	Mitigation
Changing Discharge and Treatment Standards	
Updates to the Urban Wastewater Treatment Directive (UWWTD), Water Framework Directive (WFD), or local catchment targets will require stricter discharge limits, rendering previously viable options non-compliant. Imminent updates, where visible, have been considered but it is reasonably shrewd to assume further updates across the 54-year strategy horizon.	Incorporate conservative design assumptions and select outfall locations that offer long-term compliance flexibility. Monitor regulatory developments closely and maintain ongoing engagement with the EPA and other competent authorities. Ensure that Strategy is updated in line with River Basin Management planning cycles.
Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA)	
The implementation of large-scale wastewater infrastructure and potential impacts have been assessed at a strategic level within the SEA and AA documents contained within the Strategy. As detailed design progresses, these risks, such as those related to the marine outfalls for example, must be prioritised to assess whether methods still remain robust and in line with objectives of these documents and the strategy.	Engage early with key environmental stakeholders and integrate the mitigation hierarchy into strategic planning, option development, and design. Undertake high-quality ecological assessments and incorporate adaptive design features to mitigate environmental impact.

Managing these risks effectively will require a proactive, systems-based approach that allows for ongoing review, adaptation, and collaboration across regulatory, financial, and community stakeholders. Embedding resilience into the Strategy from the outset - guided by frameworks such as the 4 R's (Robustness, Redundancy, Resourcefulness, Rapidity) - will ensure that GWS investments are future-proofed, sustainable, and responsive to evolving challenges.

14. Conclusion

14.1 Recommendations

Based on the assessment undertaken as part of the draft GWS, it is recommended that

- **a new Regional Galway East Wastewater Treatment Plant (WWTP**) is progressed to meet the long-term wastewater treatment needs of the study area and to provide sufficient capacity, resilience and environmental protection up to 2080.
- **Enhancements to treatment capacity at Mutton Island (Galway City) and Athenry** Wastewater Treatment Plants in the short term to meet population demands. Works on these plants is planned within the 2040 investment cycle.
- Once the new Regional Galway East plant is commissioned, there will be a gradual **transfer of loads from Mutton Island (Galway City) and Athenry** to reduce loading pressures on the existing plants, protect the environment, and manage long term regulatory risk. Mutton Island plant will continue to operate at a reduced capacity and Athenry plant will become a pumping station to transfer load to the new Regional Galway East plant.
- **Treatment at Moycullen and Claregalway Wastewater Treatment Plants** will be maintained with future upgrades informed by population and economic growth projections.

The new Regional Galway East WWTP will need to be initiated in the short-term to address emerging capacity and compliance pressures and this will include a full site selection and environmental assessment process. The facility will be designed on a modular basis, enabling phased expansion to accommodate future growth, with an ultimate treatment capacity of up to 400,000 population equivalent (PE), by 2080. Over this period, the PE in the study area is projected to increase from 160,300 to 383,300. The proposed infrastructure would provide wastewater treatment capacity equivalent to that required for approximately 82,500 new houses.

The development of the Regional Galway East WWTP will:

- Enable the diversion of wastewater load from the eastern part of Galway City away from the existing Mutton Island WWTP, thereby relieving pressure on existing infrastructure, improving system resilience, and supporting future growth in a sustainable manner.
- Facilitate the decommissioning of the existing Athenry Wastewater Treatment Plant, with wastewater flows from Athenry to be pumped to the new Regional Galway East WWTP, providing a more sustainable, efficient and resilient regional wastewater solution.

To support delivery of the recommended Regional Galway East WWTP, two discharge outfall options are identified for further assessment and consideration.

- **Option 1:** A discharge outfall located in the eastern part of Galway Bay, approximately 3.5 kilometres from the shore.
- **Option 2:** A discharge outfall located in the western part of Galway Bay, approximately 1 kilometre from shore.

Progression of these options to the next stage will enable more detailed assessment, including environmental, technical and deliverability considerations, to inform the identification of a preferred solution.

These options represent the **most viable and robust strategic solutions** identified through the Strategy's optioneering and assessment process. Both options can meet the Strategy's objectives, achieving long-term regulatory compliance, protecting the receiving environment, and providing a resilient wastewater service to 2080.

Figure 14-1 Galway Wastewater Strategy Infographic

14.2 Next Steps

Post-Consultation (PC2) Stakeholder Responses and Integration

The consultation phase (PC2) will gather formal feedback from a broad range of stakeholders. This phase plays a critical role in ensuring the final Strategy is inclusive, transparent, and responsive to local needs. The feedback will be reviewed and used to inform the final GWS.

Finalisation of the Strategy Document

Following consultation and refinement, the final GWS will be published. This will provide a clear and actionable roadmap for implementation and ensure continued alignment with regulatory and environmental policy frameworks. Ensure that Key Performance Indicators (KPIs) are appropriate to support transparent monitoring and evaluation of the Strategy as we move forward. The Strategy's final publication will also be accompanied by the Strategic Environmental Assessment (SEA) Determination and the Natura Impact Statement (NIS), completing the required environmental assessments.